The Long-Run Labor Market Effects of the Canada-U.S. Free Trade Agreement*

Allison Devlin† Brian K. Kovak‡ Peter M. Morrow§

December 2020

Abstract

This paper uses matched longitudinal administrative data for Canadian workers during 1984-2004 to assess the long-run effects of the 1988 Canada-U.S. Free Trade Agreement (CUSFTA) on the Canadian labor market. Due to its bilateral nature, we are able to examine simultaneously the effects of increased export expansion and import competition. For workers initially in manufacturing industries that experienced Canadian concessions, we find a heightened probability of work-shortage based separations at large firms but little impact on long-run cumuilative earnings. Lower cumulative earnings at the initial employer are offset by gains outside manufacturing. For Canadian workers in industries that obtained U.S. concessions, we find a lower probability of separation and higher cumulative earnings. These effects are concentrated among workers initially employed in larger firms, and there are important differences between low and high attachment workers.

*We thank Nate Baum-Snow, Winnie Chan, Gordon Hanson, Keith Head, Ig Horstmann, Kory Kroft, Thomas Lemieux, Kevin Lim, René Morissette, David Price, John Ries, Lowell Taylor, Daniel Trefler, Eric Verhoogen, and seminar participants at the 2020 Atlanta Fed International Economics Workshop, Chinese University of Hong Kong, FGV São Paulo, Georgetown, and the 2020 Nordic International Trade Conference for helpful comments and suggestions. We especially thank Danny Leung and Beryl Li at Statistics Canada and Shenjie Chen and Emily Yu at Global Affairs Canada for all their help, without which this project would never have gotten off the ground. All remaining mistakes are those of the authors alone. We thank Global Affairs Canada for generous funding. Results in this paper have been screened by Statistics Canada to ensure that no confidential results have been released.

†Department of Economics, University of Toronto, (allie.devlin@mail.utoronto.ca).

‡Heinz College, Carnegie Mellon University, NBER, IZA (bkovak@cmu.edu).

§Department of Economics, University of Toronto, (peter.morrow@utoronto.ca).

1 Introduction

We know very little about what happens to workers when industrialized countries deliberately agree to freer trade with one another. The many recent high profile trade negotiations between high-income countries underscore the importance of this issue.[1] This project attempts to fill this gap by examining the long-run effects of the 1988 Canada-U.S. Free Trade Agreement (CUSFTA) on Canadian workers. While classic factor abundance-based models suggest that similar pre-integration wage levels in Canada and the U.S. imply modest effects of free trade on the two countries' labor markets, a large body of work documents tremendous patterns of plant exit and employment churning in response to this change in trade policy (Head and Ries, 1999; Trefler, 2004).

Our focus on long-run effects is important in light of recent work documenting the long-lived labor market effects of economic downturns and trade shocks. In the labor literature, Oreopoulos et al. (2012) document long-run negative effects of graduating college during a recession in Canada. In trade, Dix-Carneiro and Kovak (2017) show that relative labor market conditions in Brazilian regions adversely affected by tariff concessions *grew worse over time*, with no recovery twenty years after a unilateral trade liberalization. Using U.S. data for 1992-2007, Autor et al. (2014) show that the cumulative effects of Chinese import competition do not level off even 16 years after the beginning of the China Shock and 6 years after China's WTO accession.[2] In this paper, we combine aspects of this prior work by focusing on the long-run effects of an explicit change in trade policy in high-income countries.

Specifically, we examine the long-term effect of CUSFTA on labor market outcomes in Canada using high-quality, longitudinal, matched worker-firm administrative data for the years 1984-2004 obtained from Statistics Canada. We examine the career trajectories of workers who were initially employed in industries in 1988 that were subsequently subject to both Canadian and United States tariff concessions legislated by CUSFTA, which began on January 1, 1989. Our data allow us to examine a large number of individual-level labor market outcomes including cumulative earnings in the 16 years following CUSFTA and whether or not workers in affected industries were more likely to leave their initial firm or industry of employment, leave manufacturing, or enter spells of unemployment.

We apply a research design similar to that of Autor et al. (2014) to the context of bilateral changes in trade policy. We examine otherwise similar workers initially employed on the eve of CUSFTA implementation in industries that subsequently saw different bilateral tariff cuts by Canada and the U.S. Because our sample starts in 1984, we can control for a variety of initial conditions and pre-trends including worker, firm, and industry wage trajectories, firm and industry employment trajectories, and capital intensity. To reinforce the causal interpretation of these results, we show that tariff changes were

[1] Examples include the Canada-European Union (EU) Comprehensive Economic and Trade Agreement (CETA) , the Canada-United States-Mexico Agreement (CUSMA), and potential agreements that Britain signs post-Brexit.

[2] In ongoing work, Autor, Dorn, and Hanson extend this result forward nine years to 2016. See "On the Persistence of the China Shock," presented at the fall 2020 NBER International Trade and Investment Program Meeting.

unrelated to prior industry performance and find no effects on separations unrelated to work shortages.

We find that workers initially employed in manufacturing industries that subsequently lost tariff protection in Canada experienced an *increased* probability of a job separation, while those facing U.S. tariff concessions had *lower* probabilities of separation. For low labor force attachment workers employed at large firms, the average Canadian concession caused the probability of a permanent work-shortage separation to *increase* by 3.1 percentage points (22 percent), while the average U.S. concession caused the probability of a work-shortage related separation to *decrease* by 2.8 percentage points (20 percent). Thus, for low attachment workers, the negative effects of increased import competition in Canada and the favorable effects of increased access to the U.S. export market roughly offset each other on average.

In spite of these substantial effects on a worker's probability of separating from their initial job, we find little effect on cumulative earnings over the 16 years following the FTA's implementation. Consistent with the separation results, Canadian tariff cuts did indeed reduce a worker's earnings from their initial employer, while U.S. tariff cuts increased them. But these losses and gains at the initial employer were offset by earnings from other sources outside manufacturing. In addition, permanent separations driven by Canadian tariff concessions did not lead to long spells of unemployment on average. These findings contrast with the much larger and longer lasting effects of the China Shock in Autor et al. (2014) or of Brazilian trade liberalization in Dix-Carneiro and Kovak (2017) and imply that Canadian workers were able to quickly reallocate to other sectors of the labor market in response to the FTA tariff cuts without long unemployment spells or persistent earnings losses.

We also find important heterogeneity in these effects. While workers with low labor force attachment experienced roughly offsetting effects of Canadian and U.S. tariff cuts on average, those with high initial labor force attachment had smaller negative effects of Canadian concessions and larger favorable effects of U.S. cuts. For high attachment workers employed at large firms, the average Canadian concession caused the probability of a permanent work-shortage separation to *increase* by 1.1 percentage points (12 percent) without changing cumulative earnings, while the average U.S. concession *decreased* the probability of a work-shortage related separation by 2.6 percentage points (32 percent) and *increased* cumulative earnings by 1.6 percent. In comparison to low attachment workers, high attachment workers thus reaped larger benefits of U.S. market access with smaller losses from increased import competition.

As in the prior empirical work on the CUSFTA, firm size plays an important role (see literature review below). Canonical models of heterogeneous firms and trade, such as Melitz (2003), predict that larger Canadian firms should benefit most from increased access to the U.S. export market because those more productive firms can bear the fixed cost of exporting. Our results are consistent with this prediction, finding that workers initially employed at larger firms experience larger reductions in separations when facing larger U.S. tariff reductions. However, in contrast to the canonical models, we observe larger increases in separations for workers initially employed at larger firms when facing larger Canadian tariff reductions. As discussed below, this surprising result is consistent with the empirical

findings of Head and Ries (1999) and can be rationalized by the niche-market mechanism formalized by Holmes and Stevens (2014).

Relative to the existing literature, this study possesses three virtues. First, it examines the effects of a well-defined policy change. In this sense, it is most closely linked to studies analyzing the effect of the NAFTA on various aspects of the American, Canadian, and Mexican economies (see literature review below), the effect of trade liberalization in developing countries (e.g. McCaig (2011) and McCaig and Pavcnik (2018) for Vietnam, Topalova (2007) and Topalova (2010) for India, and Kovak (2013) and Dix-Carneiro and Kovak (2017) for Brazil), and the end of the Multi Fibre Arrangement (e.g. Harrigan and Barrows (2009) and Utar (2014, 2018)). In addition, CUSFTA was not part of a larger package of market reforms, unlike many other episodes, which allows us to more cleanly assess its impacts (Trefler, 2004).

Second, because of the bilateral nature of CUSFTA, we are able to simultaneously examine the effects of increased export access to U.S. markets and also the effects of increased import competition in Canada. Prior studies that examine the joint effects of imports and exports generally study the effects of changes in trade flows rather than examining explicit trade policy changes.[3] Studies examining unilateral trade liberalizations are restricted to studying the effects of imports. We contribute an analysis of explicit trade policy changes substantially and simultaneously affecting both import competition and access to an important export market.[4]

Third, by relying on longitudinal matched employee-firm data, we are able to examine not just whether workers were displaced by import competition (for example) but also where they went and whether these displacements affected their cumulative earnings. In this sense our work is distinct from all the papers we are aware of examining the effects of the CUSFTA on the Canadian economy, which focus on outcomes at the plant or industry level (e.g. Gaston and Trefler (1997), Head and Ries (1999), Beaulieu (2003), Trefler (2004), and Lileeva (2008)), and the vast majority of papers studying other trade liberalization episodes, although Utar (2014), Utar (2018), and Dix-Carneiro and Kovak (2017) are notable exceptions.

Literature Review

A large body of work documents that CUSFTA had measurable effects on Canadian plant performance and churning. Using industry-level data on the number of manufacturing establishments, total output, and output per establishment, Head and Ries (1999) find evidence of establishment destruction and increases in output per establishment. Trefler (2004) uses plant-level data from the Canadian Annual

[3]See, for example, Biscourp and Kramarz (2007), Dauth et al. (2014), Dauth et al. (2021), Hummels et al. (2012) and Costa et al. (2016). In addition, Feenstra et al. (2019) study the effect of increased exports to China from the U.S.

[4]In this regard, our analysis is most closely related to a robustness test in McCaig and Pavcnik (2018) that considers the effects of tariff changes in the U.S. and Vietnam as part of the U.S.-Vietnam Bilateral Trade Agreement. However, in contrast, they use repeated cross-sections for four years (2001-2004).

Survey of Manufactures for the years 1980-1996 to show that firms adversely affected by Canadian tariff concessions suffered employment losses, and that there was, on average, no effect of U.S. concessions on Canadian plant-level employment. However, this null result for U.S. concessions is a combination of a positive effect for Canadian exporting firms and a negative effect for non-exporting firms. While Trefler finds that Canadian industries that lost protection subsequently had relatively *higher* average earnings, this result conditions on workers remaining employed and does not take into account workers whose income disappeared due to being laid off.[5] Beaulieu (2003) finds that job losses were concentrated among lower-paid production workers rather than higher-paid managers. In contrast to this study, neither Beaulieu (2003) nor Trefler (2004) observe whether these contractions in industry-level employment were accompanied by reallocations to other sectors, whether these reflect transitions into temporary and/or permanent unemployment, or examine the effect on cumulative long-run incomes of workers.[6]

The existing literature also motivates our exploration of how CUSFTA affected firms of different sizes. Canonical models of firm heterogeneity such as Melitz (2003) and Melitz and Ottaviano (2008) predict that Canadian concessions will lead to larger degrees of exit and job displacement among *smaller* firms. However, both our results and those of the prior literature on CUSFTA find that Canadian concessions led to larger degrees of exit and job displacement at *larger* firms [e.g. Head and Ries (1999) and Lileeva (2008)]. Baldwin and Gu (2004) and Lileeva (2008) argue that this surprising finding reflects contraction at multi-plant firms and increased specialization at the firm level. It is also consistent with models described in Head and Ries (1999) and Holmes and Stevens (2014) in which smaller firms are more nimble in responding to import competition, and can reconfigure more effectively towards niche markets, leading them to experience less employment displacement in response to increased import competition. The effects of U.S. tariff cuts on Canadian firms are more consistent with canonical heterogeneous-firm trade models. Lileeva (2008) finds that exporters experienced employment growth, whereas non-exporting firms actually contracted due to within-industry reallocation of workers. Although data constraints force us to use firm size as a proxy for exporting behavior, our empirical results confirm this finding, which is consistent with the mechanisms in Melitz (2003) and Melitz and Ottaviano (2008), as well as the theory and empirics of Verhoogen (2008) who finds that large Mexican firms were most able to take advantage of the 1994 Peso devaluation.[7]

There is also a large set of papers that examine the impact of NAFTA on Mexican and U.S. workers but which do not follow-long term outcomes. Chiquiar (2008) finds that regions in Mexico more exposed

[5]See Trefler (2004), section IX for more details. Autor et al. (2013a) demonstrate that increased transitions into unemployment are extremely important for understanding the effect of Chinese import competition on U.S. labor markets.

[6]Trefler (2004) only makes use of plans that were in existence in 1980, 1986, 1988, and 1996 and is unable to make corrections for entry and exit due to data limitations. Trefler (2004) also notes that many of these panel-based studies (including Gaston and Trefler (1997)) fail to correct for auto-correlation in standard errors. Lileeva (2008) explicitly accounts for entry and exit. Hsieh et al. (2016) offer a structural assessment of variety creation/destruction due to the agreement.

[7]Like Trefler (2004), Lileeva (2008) uses the Canadian Annual Survey of Manufactures.

to NAFTA exhibited an increase in wage levels, but a decrease in inequality, relative to other regions of the country. Hanson (2003) engages in a more general discussion of the effect of NAFTA on Mexico's wage structure and finds that wage gains were largest in regions most exposed to globalization. Hakobyan and McLaren (2016) use a local labor markets analysis for the United States but only focus on industries' vulnerability to Mexican imports and localities' dependence on these industries. They find evidence of lower wage growth for blue-collar workers in the most affected industries and localities.[8]

By explicitly examining the importance of sectors outside of manufacturing, our paper is also linked to recent work assessing the importance of the service sector in adjustment to import competition. Fort et al. (2018) and Bloom et al. (2019) each emphasize the importance of services in how the United States responded to the China Shock documented in Autor et al. (2013a).[9]

This document is organized as follows. Section 2 discusses the Agreement in more detail. Section 3 describes our data. Section 4 discusses our empirical approach. Section 5 presents results. Section 6 presents additional results, and Section 7 offers concluding comments.

2 The Canada-U.S. Free Trade Agreement

The Canada-US Free Trade Agreement was signed on January 2, 1988 by Canadian Prime Minister Brian Mulroney and U.S. President Ronald Reagan, culminating more than 100 years of proposals and negotiations seeking free trade between the two neighbors.[10] The Agreement went into effect on January 1, 1989, eliminating tariffs for nearly all non-agricultural goods traded between Canada and the U.S. In addition to tariff cuts, the agreement liberalized foreign investment in Canada, required nondiscrimination in new regulations applying to the service sector and to foreign investment, and created an appeals mechanism to ensure appropriate application of treaty commitments, along with a variety of other minor provisions (Copeland, 1989).

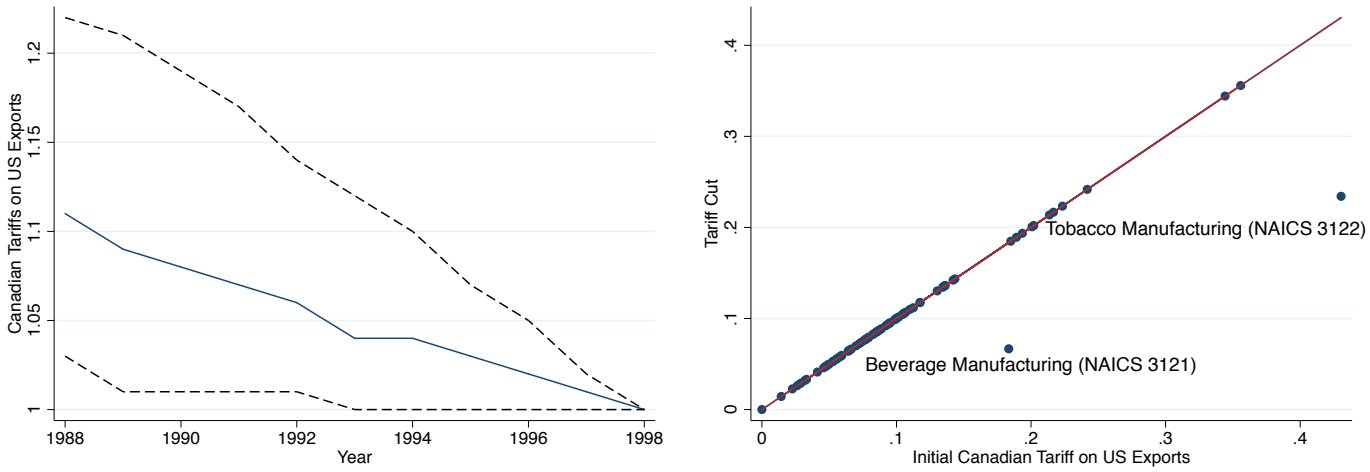
The tariff cuts were phased in from 1989 to 1998. The vast majority of goods experienced linear tariff reductions during this 10-year period, with the remainder phased in linearly over a 5-year period or implemented immediately in January 1989 (Head and Ries, 1999). Figure 1 presents the evolution

[8]Unfortunately, such a local labor markets approach is infeasible in Canada because, unlike the United States, Canada's population is concentrated in a few large cities, and these cities are largely close to the U.S. border [see Albouy et al. (2017)].

[9]More generally, Harrison (2017) argues that understanding the role played by service sectors in globalization is extremely important for understanding how trade affects labor markets.

[10]Under the Elgin-Marcy Treaty of 1854, the two countries engaged in duty-free trade in a variety of primary products from 1854 to 1866, with failed attempts at subsequent agreements in the 1870s, 1910s, and 1940s (Morici, 1990). Canadian passage of the FTA was far from certain. The Canadian Senate rejected the bill after it passed the House of Commons, something that had not happened in the preceding 40 years (Forsey, 2020). The FTA dominated the ensuing November 1988 election, in which the Conservatives won enough seats for a majority (although they lost the popular vote), which led the Senate to pass the FTA (Lileeva and Trefler, 2010; Sears, 2012). Because of this uncertainty and prior failures at passing free trade agreement, we do not expect to observe anticipatory effects.

Figure 1: Canadian CUSFTA Tariff Cuts



Notes: The figure on the left plots the unweighted average NAICS tariff plus one in Canada against U.S. exports from 1988 through 1998. Values of 1 represent no tariff. The dotted lines represent 5^{th} and 95^{th} percentiles. The figure on the right plots the initial 1988 tariff on the horizontal axis and the cut from 1988 to 1998 on the vertical axis. Each dot is an industry and the line is a 45 degree line. Values of zero on the horizontal axis represent no tariff.

of Canadian tariffs on U.S. manufacturing exports between 1988 and 1998. The left panel plots the (unweighted) average of one plus the tariff rate across manufacturing industries, along with (in dashed lines) the 5th and 95th percentiles. Average tariffs declined from approximately 10% in 1988 to close to zero in 1998. In 1988, protection varied greatly, with industries in the 95th percentile receiving levels of protection of more than 20%, while the least protected industries observed rates of less than 5%. CUSFTA saw both the variance and levels of tariffs fall dramatically, with almost all tariffs going to zero. The right panel shows this more clearly, plotting the 1988 tariff rate on the horizontal axis and the tariff cut from 1988 to 1998 on the vertical axis. Each point represents an industry, and the 45-degree line is shown for reference. Nearly all points lie on the diagonal, confirming that very few industries maintained tariff protection. The exceptions are notable: beverage manufacturing and tobacco, both of which the Canadian provinces tax heavily to finance public goods provision. Figure A1 in the Appendix graphs the corresponding U.S. tariff cuts. There is more variation in U.S. tariff cuts unrelated to the initial level and more variation in 1998. This reflects the use of import duties paid divided by customs value rather than statutory tariffs for U.S. cuts. However, both the variance and level of protection fall dramatically.[11]

Because of the linear phase-in of the tariff cuts, there is minimal variation in the timing of cuts.

[11]We have collected U.S. statutory rates and results using them will be forthcoming in our next disclosure through Statistics Canada.

We therefore use cross-industry variation in tariff cuts between 1988 and 1998 to examine the effects of CUSFTA on the Canadian labor market. In order to interpret our results as the causal effect of the tariff changes, it must be the case that the i) observed tariff cuts were unrelated to counterfactual industry performance and ii) the tariff cuts were uncorrelated with other aspects of CUSFTA that might have affected industry outcomes. We address the former requirement in section 5.2, showing that the tariff cuts were unrelated to pre-FTA industry performance. On the latter point, CUSFTA is nearly ideal relative to other large liberalization episodes (Trefler, 2004). While most large-scale trade liberalizations, particularly those in lower-income countries, involved significant reductions in non-tariff barriers and other reforms, the non-tariff provisions of CUSFTA primarily focused on limiting new non-tariff barriers and prohibiting new discriminatory regulations (Copeland, 1989).

3 Data

Our research design compares labor market outcomes for Canadian workers whose initial industries faced different tariff cuts in Canada or the U.S. as a result of the FTA. We observe individual workers' labor market outcomes over time using Statistics Canada's matched T2-LEAP-LWF data set covering 1984-2004. The heart of this database is the Longitudinal Worker File (LWF), which assembles individual tax records providing demographic information and longitudinal employment and earnings information.[12] The LWF represents a 10 percent random sample of Canadian workers appearing in the underlying tax records during 1984-2004, and we observe complete labor market histories for the workers in our sample.[13] As discussed below, we restrict attention to workers initially employed in manufacturing, but we are able to follow them even if they move into other sectors, including agriculture, mining, and services.

The LWF contains yearly data on each worker's employer(s), wage income, basic demographic information, province of employment, and industry affiliation at the 4-digit NAICS level. There are 328 of these industries, of which 85 are within manufacturing. The LWF also includes a unique field based on Records of Employment (ROE) that employers must submit whenever a worker experiences an interruption in earnings.[14] The ROE classifies each separation as either temporary (returned to the firm in the year of separation or the following year) or permanent (otherwise) and provides a reason for the separation, including firing, returning to school, ending seasonal work, quit, or work shortage (equivalent to layoff). This information allows us to focus our main analysis on permanent layoffs.

[12] All references to "income" refer to wage income reported on tax form T4.

[13] The 10% random sample is taken over unique Social Insurance Numbers for workers appearing in the data at any point. If a worker's SIN number is in the 10% sample, they are included in all years in which they received T4 income.

[14] The Canadian Employment Insurance Act requires every employer to issue an ROE when an employee working in insurable employment has an interruption in earnings. The ROE information is used to determine eligibility for Employment Insurance (EI) benefits, the benefit rate, and the claim duration, and the ROE must be issued even if the employee does not intend to file a claim. Morissette et al. (2013) describe ROEs in detail.

Statistics Canada merges the longitudinal worker-level information in the LWF with firm-level data for their employers. T2 Corporate Income Tax Returns report interest, sales, gross profits, equity, assets, etc. for all incorporated firms in Canada and the Longitudinal Employment Analysis Program (LEAP) database reports firms' total employment over time. Unlike Trefler (2004) who uses the Canadian Annual Survey of Manufactures, we possess data on firms (tax entities) rather than plants. Consequently, changes in continuing firm employment can be due to either plant entry and exit or changes in employment within continuing plants.

While the LWF data are very rich, particularly in their ability to track workers across employment status and different jobs over time, they have a few important limitations. We cannot observe non-labor income except Employment Insurance payments and have no information on occupation or education. To account for heterogeneity in worker skill in our empirical analysis, we will normalize workers' earnings by their pre-FTA earnings and will control for the share of workers in the industry earning less than the national median income. We also have relatively coarse geographic information at the province level, precluding us from implementing local labor markets analyses by commuting zone.

We calculate tariff changes in each worker's initial industry using data from multiple sources. Legislated Canadian tariffs from 1988 through 1998 come from Global Affairs Canada, including both tariffs facing U.S. exports to Canada and Most Favored Nation (MFN) tariffs facing other exporters.[15] U.S. Tariffs are derived from Feenstra (1997).[16] In both cases, the data are provided at the 8-digit Harmonized System (HS) level, which we aggregate up to 4-digit NAICS industries using concordances from Pierce and Schott (2012) and the U.S. Census Bureau.[17]

4 Empirical Approach

Our empirical analysis compares labor market outcomes of otherwise similar Canadian workers who were initially employed in industries facing different levels of import competition from the U.S. due to Canadian tariff cuts or differential increases in access to U.S. markets due to U.S. tariff cuts. As discussed in Section 2, we measure the effects of the CUSFTA using the change in log one plus the tariff rate from 1988 to 1998: $\Delta_{88-98} \ln(1 + \tau_j^c)$, where $c \in \{\text{CAN}, \text{US}\}$ is the country imposing the tariff in industry j.

We relate these tariff changes to labor market outcome Y_{ifjk} for worker i initially employed in firm

[15] We are extremely grateful to Emily Yu at Global Affairs Canada for providing us with data that describes the phase-in schedule for Canadian CUSFTA tariff cuts between 1988-1998.

[16] As a proxy for U.S. MFN tariffs, we divide total duties paid by total customs imports from Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, and the United Kingdom.

[17] When calculating average tariffs at the 4-digit NAICS level, we weight 8-digit HS codes by 1988 imports to the relevant country. See the Data Appendix for details.

f in manufacturing industry j using the following specification.

$$Y_{ifjk} = \beta_0 - \beta_1 \Delta_k \ln(1 + \tau_j^{\text{CAN}}) - \beta_2 \Delta_k \ln(1 + \tau_j^{\text{US}}) + \mathbf{X}_i' \beta_3 + \mathbf{X}_f' \beta_4 + \mathbf{X}_j' \beta_5 + \epsilon_{ifjk}. \quad (1)$$

The subscript k represents one of two time windows over which we calculate the worker's post-FTA outcomes, often either 1989-1998 or 1989-2004. The first time span covers the phase-in of tariff cuts and the second extends to the final year of the sample. Since all tariffs fell as a result of the FTA, we multiply the tariff changes by -1. A positive estimate of β_1 therefore implies that workers' whose initial industry faced larger Canadian tariff cuts experienced more positive values of outcome Y. The vectors $\mathbf{X}_i'$, $\mathbf{X}_f'$, and $\mathbf{X}_j'$ are worker, initial firm, and initial industry level controls, described below. ϵ_{ifjk} is an error term, clustered by the worker's initial four-digit NAICS industry.[18]

Tariff cuts are assigned to workers based on their *initial* industry of employment, so even if a worker switches industries after 1988, the same initial-industry tariff cuts remain associated with that worker, as in Autor et al. (2014) and Utar (2018). To assign an initial firm and industry, we define the worker's base year as the last year in 1986-1988 in which the worker had strictly positive earnings. We then define the initial industry as the industry of employment in that base year. The initial firm and initial province are defined analogously.

Our sample consists of workers initially employed in manufacturing who were born between 1940 and 1967, ensuring they were of working age (22-64) during 1989-2004. We require that workers had positive earnings in at least one year during 1986-1988 to assign an initial firm and industry of employment. In order to present results by province while satisfying disclosure requirements, we drop workers initially employed in the Canadian territories. Following Autor et al. (2014), we examine both high and low labor force attachment workers. High attachment workers are defined as those who earned at least the equivalent of 1,600 annual hours of work at the nominal provincial minimum wage in *every* year between 1985 and 1988 (inclusive). Low attachment workers are the remainder of workers meeting other sample requirements. Section 5 discusses the characteristics of these workers in more depth, and the Data Appendix describes the sample and variable construction in detail.

We include extensive controls in equation (1) to ensure that we are comparing outcomes for otherwise similar workers facing different tariff cuts. $\mathbf{X}_i'$ is a vector of worker level controls including the worker's gender, birth year dummies, average log earnings during 1986-1988, earnings growth from 1986 to 1988, and indicators for labor market experience, tenure in the worker's initial firm, and the initial province of employment. A worker is defined as having "low" labor market experience if they had positive earnings in two or fewer years in the period 1984-1988, "medium" if they had positive earnings in three

[18] Although it is unclear a priori at what level to cluster standard errors, common practice clusters at the level of the treatment, in our case 4-digit NAICS. However, if tariffs were established at a higher level of aggregation, this may understate our standard errors. To assess this possibility, we regressed our 4-digit NAICS tariff cuts on a set of 3-digit NAICS fixed effects. Since we could not reject the null that all of these fixed effects were jointly zero (N=85,F=1.42,p=0.14), the tariffs do not appear to have been set at a higher level, supporting 4-digit clustering.

or four years, and "high" if they had positive earnings in all years in the period 1984-1988. Tenure is distinct from experience in that it refers to the worker's tenure in a given firm whereas the labor market experience measures employment regardless of employer. A worker is defined as "low" tenure if they have fewer than two years of experience at their initial firm, "medium" if they have two or three years, and "high" if they have four or more years as of their base year.

Initial-firm controls, $\mathbf{X}'_f$, include indicators for firm size. Following Autor et al. (2014), "small" firms are defined as those with 99 or fewer workers, "medium" sized firms have 100 to 999 workers (inclusive), and "large" firms are those with 1000 or more workers. We also include log average earnings per worker in 1988 and average growth in firm-level earnings between 1986 and 1988.

Initial-industry controls, $\mathbf{X}'_j$, include the log share of workers earning less than the aggregate median income in 1988, log average earnings per worker in 1988, the log industry capital-labor ratio in 1988, the change in the log share of aggregate employment accounted for by the industry between 1984 and 1988, and the change in log of mean earnings between 1986 and 1988. While our data cannot directly distinguish between skilled and unskilled workers, we use the share of workers below the median wage as a proxy for the industry's unskilled labor intensity. The change in the industry's share of aggregate employment captures whether certain industries were already shedding employment for reasons unrelated to CUSFTA. We also control for a measure of industry responsiveness to the business cycle to avoid confounding from the early-1990s Canadian recession.[19] We control for the change in log one plus the MFN tariff facing non-FTA countries to account for substitution between potential trading partners, and an indicator for industries subject to the 1965 Canada-U.S. Auto-Pact, which allowed duty-free trade in many automotive goods.[20] Finally, we include 2-digit NAICS fixed effects, so we compare outcomes for workers initially in different 4-digit industries within the same 2-digit industry.

The outcomes in our empirical analysis examine workers' employment and earnings. We first examine an indicator for whether a worker experienced a permanent work-shortage related separation from their initial employer during the relevant time period. This dependent variable allows us to measure how Canadian and U.S. tariff cuts in the worker's initial industry affected their probability of a layoff by their initial firm.

We also examine workers' labor market transitions by observing their employment status in the year following a permanent separation. For the purposes of this transition analysis, and because our earnings information is reported at the yearly level, we define a worker as being unemployed if their yearly

[19] One of the major objects of interest in Gaston and Trefler (1997), Beaulieu (2003), and Trefler (2004) was to estimate the independent effects of CUSFTA on Canadian employment relative to recession. Using the NBER manufacturing database for 1958-1989, we regress log industry employment on log GDP and a linear time trend, and use the coefficient on GDP our measure of cyclicality. Ex-ante, it is not obvious that more sensitive industries would have worse employment outcomes, as our study also covers the late 1990s expansion.

[20] This indicator takes a value of one for NAICS industries 3361,3362, and 3363. The Auto Pact was incorporated into CUSFTA, but we must control for it because although there was a legislated CUSFTA tariff cut, the initial tariff was waived if easily reached domestic content requirements were satisfied.

earnings fall below the equivalent of 1600 hours worked at the relevant provincial minimum wage.[21] For employed workers, we then observe whether they are working for a different firm in the same industry, a different industry within manufacturing, or in a different sector in the year following separation. Because the indicators for each of these post-separation conditions sum to the overall separation indicator, we perform an additive decomposition revealing how workers transitioned following a permanent separation.

In addition to employment status, we also study the FTA's effects on workers' cumulative earnings, $\tilde{E}_{ifjk}$, where

$$\tilde{E}_{ifjk} \equiv \frac{\left[\sum_{t=1989}^{2004} \sum_{j'} \sum_{f'} E_{if'j't}\right]}{\overline{E}_{i,88-86}}. \tag{2}$$

The numerator is worker i's cumulative earnings from 1989 to 2004 from employment in any firm f' and in any industry i', including those other than the worker's initial firm and industry.[22] To account for unobserved worker heterogeneity, we normalize these cumulative earnings by the worker's pre-FTA yearly earnings, $\overline{E}_{i,88-86}$, calculated as average yearly earnings in 1986-1988 (averaging over years with strictly positive earnings). Given this normalization, $\tilde{E}_{ifjk} = 20$ means that the worker earned 20 times their pre-FTA average yearly earnings during the 16 years spanning 1989-2004. Because the numerator of (2) decomposes additively into earnings from different firms, industries, and sectors, we additionally investigate how the sources of workers' earnings adjusted in response to the FTA tariff changes.

Finally, we examine heterogeneity in the effects of the FTA along a few dimensions. For all of our main analyses, we separately analyze the effects on workers with high vs. low initial labor force attachment (defined above). We also consider heterogeneous effects by the size of the worker's initial employer by interacting the tariff cut variables with indicators for small (1-99 employees), medium (100-999), and large ($\geq$ 1000) initial firms. This analysis is motivated by the findings of Head and Ries (1999), Lileeva (2008), and Autor et al. (2013b) who find heterogenous effects by firm size.

5 Results

We present four sets of results in this section. First, to provide context, Section 5.1 examines the observables of workers initially employed at large firms, and then of workers defined as high attachment. Second, Section 5.2 examines the structure of tariff cuts in Canada and largely rules out the possibility that these cuts were related to observable characteristics or pre-existing trends. Third, Section 5.3 examines whether workers who were initially employed in industries that subsequently experienced Canadian and American concessions were more or less likely to experience a separation from their

[21] Note the distinction between this unemployment measure and those in surveys such as the U.S. Current Population Survey and the Canadian labor Force Survey, which ask about employment and job search activity within a specified reference period.

[22] Because many workers earn labor income from multiple employers in a given year, we follow Autor et al. (2014) and define the worker's primary employer as the one from whom a worker earns the most income in a given year.

initial employer. Fourth, Section 5.4 studies the effects of tariff concessions on cumulative long-run earnings, including total cumulative earnings and a decomposition of earnings from different types of employment. Section 5.5 examines whether these results depend on the size of the firm at which the worker was initially employed. Finally, section 5.6 examines where permanently separated workers went, including jobs at other firms in the same manufacturing industry, firms in other manufacturing industries, firms outside of manufacturing, or into spells of unemployment.

5.1 Characteristics of Workers at Large Firms and High Attachment Workers

We start by examining the characteristics of workers initially employed at large firms. Column (1) of Appendix Table A1 regresses an indicator for having a large initial employer ($\geq$ 1000 employees) on the control variables discussed in the previous section; however, we drop the firm size dummies as they are collinear with the variable of interest. At the worker-level we find that women and more highly paid workers are more likely to be employed at large firms. Importantly, we find no evidence that workers with rising or falling wages are systematically more or less likely to be employed at large firms. In terms of firm characteristics, higher paying firms are more likely to be large, as are more capital intensive firms. Again, we find no evidence of differential firm-level pre-trends in average wages. Turning to industry characteristics, industries with lower initial levels of protection, auto-pact sectors, and industries with more workers above the median wage are more likely to have large firms. Again, we find no evidence of pre-trends: industries that were expanding or contracting or that had differential pre-tends in average wages do not appear to have a larger share of employment at large firms.

Who are high attachment workers? Overall, the majority of our sample is high attachment: our sample contains 73,238 high attachment workers and 23,482 low attachment workers. To examine correlates of high attachment status, column (2) of Table A1 takes as its dependent variable an indicator for workers with high labor force attachment in 1988. On the right hand side, we use the same correlates as in column (1) but reintroduce the firm size dummies and omit the tenure dummies, which are very highly correlated with the high attachment indicator. Despite the fact that women are unconditionally less likely to be high attachment, they are conditionally more likely. In addition, workers with higher average wages are more likely to be high attachment. Appendix Figure A2 plots the birth-year effects, showing a roughly constant probability of being high attachment for those born in 1940-1960 and a steep drop-off, as the younger 1961-1967 cohorts are increasingly less likely to be high attachment workers.[23] In terms of firm-level correlates, workers at large firms are *less* likely to be high attachment, and firms with stronger pre-FTA wage growth are *less* likely to employ high attachment workers, although the magnitude of this effect is quite small. Turning to industry characteristics, industries with a larger share

[23]The oldest cohort, born in 1940, is the omitted category.

of workers below the median wage and higher average wages are less likely to employ high attachment workers. Lastly, declining industries (in both average wages and share of the labor force) are less likely to employ high attachment workers, although again the magnitudes are very small.

5.2 Endogeneity of Trade Policy

Although the Agreement's passage was uncertain, there may remain concerns that tariff changes were correlated with confounding factors. Since nearly all tariffs fell to zero (Figure 1), the main concern is regarding whether initial tariff levels were correlated with counterfactual industry performance. In order to assess the importance of these concerns, in Table 1 we examine the correlates of the initial level of protection. Specifically, at the four-digit NAICS level, we estimate the following equation:

$$\ln\left(1+\tau_{j,1988}^{\text{CAN}}\right) = \beta_0 + \mathbf{X}_j'\beta + \epsilon_j \tag{3}$$

where $\mathbf{X}_j$ is a vector of industry level controls listed above. As shown in Table 1, the U.S. level of protection is by far the strongest determinant of the Canadian level of protection; other factors are far less important.[24] Of particular importance is the lack of relationship with changes in the industry's share of employment from 1984 to 1988 and the growth in the industry's average wage from 1986 to 1988. While these findings do not guarantee the exogeneity of CUSFTA trade policy changes to labor market outcomes, they do reinforce a causal interpretation by ruling out the presence of substantial pre-trends in industry employment or wages that might have confounded the analysis.

5.3 Separations

We now estimate a linear probability model using equation (1) and setting $Y_{ifjk} = 1$ if worker i was initially employed at firm f in industry j, and had a permanent work-shortage related separation from *that employer* f between 1989 and 1998 (inclusive), and zero otherwise.[25] We do this separately for low attachment and high attachment workers, with results in Table 2. Note that p-values rather than standard errors appear in parentheses.

Column (1) of Table 2 estimates equation (1) assuming that the effect of tariff cuts is homogenous across initial firm sizes. Although the signs are as expected, with larger Canadian tariff cuts increasing the probability of separation and U.S. tariff cuts decreasing it, the effects are small and statistically indistinguishable from zero. Melitz (2003) and Melitz and Ottaviano (2008) suggest that

[24] Although the initial Canadian and U.S. tariff levels are closely related, there are far from perfectly collinear, making it possible for us to separately identify their effects. The R^2 from a bivariate regression of initial Canadian tariffs on initial U.S. tariffs is 0.259.

[25] We do not consider permanent separations from a firm that was not their initial employer. For example, if they quit their initial employer and then had a permanent separation from a second employer, this is not recorded. We do not consider temporary separations as suggested by Statistics Canada. We thank René Morissette for this guidance.

Table 1: Endogeneity of Trade Policy

	(1)	(2)
$\ln(1+\tau^{US}_{j,1988})$	0.941***	
	(0.001)	
auto pact$_j$	0.015	-0.003
	(0.358)	(0.835)
cyclicality$_j$	-0.004	0.003
	(0.418)	(0.536)
share below median$_j$	0.038	0.029
	(0.330)	(0.482)
$\ln(\overline{w}_j)$	0.052	0.006
	(0.364)	(0.918)
$\ln(K_{j,1988}/L_{j,1988})$	0.001	0.002
	(0.913)	(0.749)
$\ln\left(\frac{emp_{j,1988}}{\sum_j emp_{j,1988}}\right) - \ln\left(\frac{emp_{j,1984}}{\sum_j emp_{j,1984}}\right)$	0.071	0.031
	(0.149)	(0.536)
$\Delta_{88-86}\ln(\overline{w}_j)$	-0.042	-0.052
	(0.640)	(0.612)
Observations	85	85
R-squared	0.300	0.199

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Both columns estimate versions of equation (3). All variables are as described in the text. Estimation is OLS.

smaller and (potentially) less productive firms may exit and shed employment more so than larger firms, and Verhoogen (2008) suggests that only large firms will be able to take advantage of increased export opportunities. For this reason, column (2) interacts the tariff changes with firm size indicators.

Column (2) finds job displacement effects of Canadian concessions at the largest firms. While this is counter to recent economic theory, it is fully consistent with a well-developed literature on industry dynamics in response to CUSFTA.[26] Head and Ries (1999) find that the effect of Canadian tariff concessions on establishment scale is larger for large firms than for small firms (as measured by employment). In addition, Head and Ries also find that Canadian tariff reductions appear to induce exit in the large size category as well. To rationalize their findings they sketch a model later formalized in Holmes and Stevens (2014) arguing that smaller firms can avoid import competition if they specialize in niche markets. Relatedly, Lileeva (2008) finds that Canadian concessions tend to decrease the number of plants at multi-plant firms, especially when these plants produce goods outside the core competency of the firm.[27]

Larger U.S. tariff concessions decrease low-attachment workers' probability of separation only in

[26] Autor et al. (2013b) find a similar pattern in the context of increased Chinese import competition in the U.S.

[27] This literature is also developed in Baldwin and Gu (2004) who document the closure of plants belonging to multi-plant firms and increased rationalization of output within manufacturing plants. Baldwin et al. (2001) document a substantial increase in the degree of specialization of multi-plant firms across four-digit (SIC) manufacturing industries after the signing of the CUSFTA. See Lileeva (2008), especially pg. 378-379, for a deeper discussion.

Table 2: Probability of Separation from Initial Firm

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.079		0.095	
	(0.289)		(0.286)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		-0.199		-0.089
		(0.136)		(0.357)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		0.091		0.183
		(0.338)		(0.107)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		0.354**		0.133
		(0.021)		(0.394)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.271		-0.703***	
	(0.366)		(0.005)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		0.671**		0.142
		(0.037)		(0.668)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-0.377		-0.706***
		(0.231)		(0.008)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		-1.270***		-1.193***
		(0.002)		(0.001)
Observations	23,482	23,482	73,238	73,238
R-Squared	0.060	0.062	0.032	0.033

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

large initial firms, suggesting that larger Canadian firms are more able to take advantage of increased access to U.S. markets, while small Canadian firms shed employment if they are in industries that benefit from U.S. concessions. This is consistent with Trefler (2004) and Lileeva (2008) who find that the effect of U.S. tariff concessions is positive for Canadian exporters but negative for Canadian non-exporters.[28] Columns (3) and (4) perform the same exercise for high attachment workers. While high attachment workers benefit from U.S. concessions in a similar manner as do low attachment workers, they do not seem to experience heightened probabilities of separation if they are initially employed in industries that lost Canadian protection.

We now assess magnitudes. The average cut in Canadian tariffs for our sample was roughly 8.8 percentage points, while the average U.S. concession was approximately 2.2 percentage points. Using the estimates in column (2), low attachment workers at large firms in an industry that experienced an average Canadian tariff cut had a probability of separation that was 3.1 percentage points higher than in an industry with no concession. Given the mean separation probability of 14 percent, this is a 22 percent increase. The effect of an average U.S. concession was to decrease the probability of

[28]See Trefler (2004) pg. 858. The Canadian *Annual Survey of Manufactures* contains plant-level export data while the matched T2-LEAP-LWF data set used here does not.

separation by 2.8 percentage points (a 20 percent increase). Consequently, the net effect of the bilateral agreement was roughly zero for a hypothetical worker at a large firm whose industry of employment saw both average Canadian and U.S. concessions. For high attachment workers, the effect of Canadian concessions was small and imprecisely estimated – approximately 1.1 percentage points relative to a mean separation probability of 9 percent – but the stabilizing effect of U.S. concessions was comparable to those for low attachment workers: approximately 2.6 percentage points. In short, the average effect of CUSFTA for low attachment workers was a wash, while the net effect was increased stability for high attachment workers. This increased stability is non-trivial given that this was also a period of substantial job displacement during the major North American recession of the early 1990s.

To ensure that our results capture actual changes in work-shortage related separations, and not some other spurious phenomenon, Appendix Table A2 replicates Table 2, except that the dependent variable is an indicator for permanent separations that are *not* due to work-shortages (e.g. they include quits and firings). We obtain much smaller point estimates for nearly all coefficients of interest. The one exception is that low attachment workers at large firms in industries with larger Canadian concessions are *less* likely to have a separation. One possibility for this is that these workers have diminished outside options in their industry so are less likely to quit.[29]

5.4 Cumulative Earnings

We now examine the effects of the bilateral CUSFTA tariff cuts on cumulative earnings of Canadian workers between 1989 and 2004. We follow Autor et al. (2014) and use cumulative earnings between 1989 and 2004 relative to average yearly earnings in 1986-1988, as defined in equation (2). We analyze earnings for low and high attachment workers separately. For the former group, the mean normalized cumulative earnings is 33.01, meaning that low attachment workers' total earnings during 1989-2004 was 33 times their initial yearly earnings. For high attachment workers, the mean is lower: 19.43. This reflects the fact that low attachment workers tended to be younger in 1988 and also reflects a declining gender wage gap for women (Baker and Drolet, 2010). Column (1) of Tables 3 and 4 present results from estimating equation (1) on cumulative normalized earnings for low attachment and high attachment workers, respectively.

Table 3 finds minimal effects of Canadian and U.S. concessions on the cumulative earnings of low attachment workers. A worker in a Canadian industry facing the average Canadian and U.S. tariff cuts saw earnings that were 0.6% lower due to Canadian concessions, and 1.4% higher due to U.S. concessions.[30] However, we cannot reject the nulls that either of these effects is zero. The remaining columns decompose cumulative normalized earnings into different sources, revealing the much larger offsetting effects that generate the overall null result. The change to earnings from the initial firm of employment

[29] See Chan et al. (2013) argue for the prevalence of quits in non work-shortage separations.

[30] $\frac{-2.589 \cdot 0.0868}{33.01} = -0.0068$ for Canadian concessions and $\frac{21.2 \cdot 0.0222}{33.01} = 0.0143$ for U.S. concessions

Table 3: Cumulative Normalized Earnings for Low Attachment Workers

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN})$	-2.589	-9.33***	-1.505	-0.104	2.97	-0.827*	5.603***	0.604**
	(0.49)	(0.008)	(0.312)	(0.973)	(0.533)	(0.097)	(0.001)	(0.039)
$\Delta_k \ln(1+\tau_j^{U.S.})$	21.2	48.03***	-3.53	0.111	-25.95	3.042	-0.684	0.192
	(0.275)	(0.003)	(0.661)	(0.992)	(0.326)	(0.296)	(0.885)	(0.536)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.180	0.041	0.014	0.049	0.144	0.016	0.038	0.005

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings: $\tilde{E}_{ifj}$. Column (2) examines cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for low attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

is negative for Canadian concessions and positive for U.S. concessions, with both effects precisely estimated. These significant earnings changes at the initial firm are consistent with the nontrivial effects on the probability of separating from the initial firm in Table 2. The negative effect of Canadian concessions on initial firm income is offset by higher earnings in construction and mining (labeled "Other" in Table 3), and a large but imprecisely estimated effect for income in the service sector. The positive effect of U.S. concessions on initial firm income is largely offset by lower service sector earnings.

Table 4 presents similar results for high attachment workers. We cannot reject the null that Canadian concessions have no effect on cumulative income (column 1) nor any effect on same firm income (column 2), and both point estimates are small. However cumulative earnings for workers in industries receiving U.S. concessions were higher. The average fall in U.S. concessions increased high attachment cumulative earnings by 1.6%, with higher earnings at the same firm (column 2) being mildly offset by lower earnings from other sources (columns 3-8).[31]

In sum, we find roughly offsetting forces of Canadian and U.S. concessions on total cumulative earnings of low attachment workers, and positive average effects on the income of high attachment workers. Although low attachment workers had reduced income at their initial firm of employment in response to Canadian concessions, this was roughly offset by higher levels of income in other sectors. In contrast, high attachment workers benefitted from U.S. concessions largely due to increased income at the affected initial employer. In short, the Canadian labor market seems to have been able to adjust quite well to lower levels of domestic protection and to have benefitted from greater access to U.S.

[31] Average cumulative earnings for high attachment workers were 19.43 times initial earnings. $\frac{13.92 \cdot 0.0222}{19.43} = 0.0159$.

Table 4: Cumulative Normalized Earnings for High Attachment Workers

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN})$	0.403	-2.088	-1.486	3.034	-0.381	-0.391*	1.669**	0.044**
	(0.826)	(0.457)	(0.29)	(0.225)	(0.780)	(0.099)	(0.028)	(0.021)
$\Delta_k \ln(1+\tau_j^{U.S.})$	13.92**	35.42***	-6.995	-7.799	-4.088	-0.305	-2.409	0.0976
	(0.025)	(0.003)	(0.36)	(0.348)	(0.46)	(0.752)	(0.323)	(0.104)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.128	0.068	0.028	0.051	0.080	0.012	0.034	0.003

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings: $\tilde{E}_{ifj}$. Column (2) examines cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1).All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

markets.

5.5 Cumulative Normalized Earnings by Firm Size

Table 2 suggested that the labor market effects of CUSFTA varied dramatically across the sizes of initial employers. Table 5 presents results analogous to Table 3 but allowing the effect of Canadian/U.S. concessions to vary by firm size bin. Table 6 does the same for high attachment workers. Table 5 shows that workers employed at all sized firms saw lower earnings at their initial employer in response to Canadian concessions, although this is not always precisely estimated. Workers at small and large firms were able to make up for lost income: for workers at small firms, these gains came in construction and mining, while for workers at large firms, losses were more than made up for in the service sector. Workers initially at medium sized firms, on the other hand, saw lower earnings at their initial employer that were (on net) exacerbated elsewhere. Turning to the effect of U.S. concessions, we cannot reject the null of no effect overall for all types of workers: higher earnings at the initial firm of employment were offset by lower earnings elsewhere.[32] Reassuringly, the effect on initial earnings is largest for large firms who were more likely to be able to overcome potential fixed costs of exporting.

Table 6 presents results for high attachment workers. Again, we find an asymmetry with low attachment workers. Neither total cumulative earnings nor earnings at the initial firm of employment appear to have been affected by Canadian concessions: while the point estimates are negative for each bin, we

[32]Although there were income gains for those initially employed at medium sized firms at the 11% level of certainty.

Table 5: Cumulative Normalized Earnings by Firm Size for Low Attachment Workers

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	-1.668	-6.797	-1.395	-1.038	1.905	-1.093	5.777***	0.972**
	(0.818)	(0.276)	(0.501)	(0.803)	(0.771)	(0.151)	(0.008)	(0.019)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	-12.95***	-10.33***	-1.869	-3.278	-2.802	-0.109	5.128**	0.3***
	(0.005)	(0.006)	(0.273)	(0.529)	(0.646)	(0.773)	(0.0129)	(0.004)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	18.53	-10.35	-2.236	6.067	23.08*	-0.913	3.125	-0.247**
	(0.155)	(0.397)	(0.504)	(0.297)	(0.064)	(0.298)	(0.444)	(0.042)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	11.11	40.69*	5.212	-11.05	-29.15	0.871	4.803	-0.263
	(0.665)	(0.058)	(0.578)	(0.367)	(0.305)	(0.712)	(0.481)	(0.649)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	35.98	37.47**	-0.808	-3.263	-3.045	-0.321	5.734	0.212
	(0.106)	(0.032)	(0.934)	(0.786)	(0.894)	(0.883)	(0.403)	(0.631)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	7.438	59.44**	-17.93**	22.82	-53.41*	8.879**	-12.78	0.414
	(0.814)	(0.033)	(0.019)	(0.142)	(0.086)	(0.04)	(0.153)	(0.257)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.18	0.042	0.015	0.049	0.145	0.017	0.039	0.005

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings: $\tilde{E}_{ifj}$. Column (2) presents results for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for low attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

cannot reject that all six coefficients for Canadian concessions are zero in columns (1) and (2) . Turning to the effect of U.S. concessions, we find precisely estimated effects of U.S. concessions on cumulative income of those initially employed at medium sized firms (column 1) and higher income at the initial firm of employment for each firm-size bin.

Summarizing, we find similar results here as we did for separations and average income: low attachment workers seem to have experienced both the pain of lower incomes from import competition – especially at their initial firm of employment – and the gain of higher income from U.S. concessions – again, especially at their initial firm of employment. However, high attachment workers experienced far less of the pain and far more of the gain from these bilateral concessions: income losses due to Canadian concessions were small and indistinguishable from zero for the most part, but the gains from U.S. concessions were positive and more precisely estimated.

Table 6: Cumulative Normalized Earnings by Firm Size for High Attachment Workers

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	3.293	2.421	0.463	1.471	-2.602	-0.441	1.958**	0.024
	(0.268)	(0.475)	(0.84)	(0.602)	(0.131)	(0.237)	(0.036)	(0.62)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	-2.824	-3.181	-2.305	1.933	-0.616	-0.373**	1.646***	0.073***
	(0.273)	(0.482)	(0.134)	(0.489)	(0.836)	(0.054)	(0.008)	(0.003)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	-1.123	-5.951	-3.779	6.571	0.926	-0.411	1.435	0.086*
	(0.77)	(0.456)	(0.131)	(0.163)	(0.71)	(0.143)	(0.441)	(0.069)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	7.404	25.89*	0.105	-11.96	-5.768	-0.835	-0.228	0.195
	(0.431)	(0.094)	(0.99)	(0.254)	(0.329)	(0.268)	(0.943)	(0.141)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	22.77***	35.6**	6.529	-14	-5.3	-0.451	0.341	0.047
	(0.007)	(0.018)	(0.355)	(0.126)	(0.515)	(0.520)	(0.894)	(0.548)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	9.918	41.58**	-21.32**	0.937	-5.465	0.067	-5.97**	0.092
	(0.269)	(0.018)	(0.017)	(0.934)	(0.379)	(0.963)	(0.04)	(0.182)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.128	0.068	0.032	0.052	0.080	0.012	0.034	0.003

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings: $E_{ifj,1989-2004}$. Column (2) presents results for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

5.6 Transitions

We now examine where displaced workers went after they experienced a permanent separation from their initial employer. Did they experience spells of unemployment or were they able to quickly find reemployment elsewhere? Table 7 performs this exercise for low attachment workers, and Table 8 for high attachment workers.

Column (1) of Table 7 replicates column (1) of Table 2: Canadian concessions increased the average probability of separations, and U.S. concessions lowered the average probability, but both effects are imprecisely estimated. Columns (2)-(8) decompose this probability of a separation based on the worker's status the following year into seven mutually exclusive and exhaustive groups: the worker remained in the same four digit industry (column 2), moved to another manufacturing industry (column 3), moved into services (column 4), moved into agriculture (column 5), moved into construction and mining (column 6), moved into a (possibly different) industry with a missing NAICS code (column 7), or experienced a

Table 7: Transitions for Low Attachment Workers

	(1) Total	(2) Same Ind.	(3) Manuf.	(4) Serv.	(5) Agriculture	(6) Other	(7) Unknown	(8) Unemployment
$\Delta_k \ln(1+\tau_j^{CAN})$	0.079	0.039**	0.035***	0.008	-0.009*	0.036**	-0.001	-0.028
	(0.289)	(0.019)	(0.01)	(0.667)	(0.087)	(0.045)	(0.160)	(0.619)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.271	-0.042	-0.005	-0.073	0.021	-0.018	0.004	-0.157
	(0.366)	(0.387)	(0.924)	(0.306)	(0.340)	(0.772)	(0.34)	(0.54)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.060	0.008	0.006	0.006	0.005	0.012	0.003	0.072

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for the probability of a permanent work-shortage related separation. Column (2) presents results for the probability of such a separation where the worker is employed in the same industry in the following year. Column (3) presents results for the probability of such a separation where the worker is employed in a different manufacturing industry in the following year. Column (4) presents results for the probability of such a separation where the worker is employed in Services in the following year. Column (5) presents results for the probability of such a separation where the worker is employed in Agriculture in the following year. Column (6) presents results for the probability of such a separation where the worker is employed in Construction and in the following year. Column (7) presents results for the probability of such a separation where the worker is employed at a firm with a missing NAICS code in the following year. Column (8) presents results for the probability of such a separation where the worker is un/under-employed in the following year. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for low attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

spell of unemployment (column 8).[33]

As in Table 2, Table 7 shows that low attachment workers do not see higher rates of permanent work-shortage-related separations in response to Canadian tariff concessions, nor do they see lower rates of separation in response to U.S. tariff concessions. However, for certain types of transitions we see higher probabilities. There is an elevated probability of permanent separations that lead to re-employment in other manufacturing industries as well as construction and mining. There is also a heightened probability of a transition to another firm in the same industry, which is surprising given that all firms in a given industry are subject to the same levels of protection. Appendix Table A3 disaggregates these results by firm-size bins analogous to column (2) of Table 2 and documents clear heterogeneity. Of the overall increase in the probability of a permanent separation from a large employer, approximately 1/3 of it is due to transitions into unemployment (imprecisely estimated), approximately 40 percent is due reallocations into other manufacturing industries and services, and approximately 15 percent is due to transitions into construction and mining.

While there is no effect of U.S. concessions on average (Table 7), Table A3 documents substantial heterogeneity with respect to firm size. Consistent with Trefler (2004) and Lileeva (2008), industry reallocations à la Melitz (2003) show up as a reduced probability of a separation at large firms, accompanied by a higher probability of separation at small firms (column 1). More frequent separations at small firms are partially accounted for by transitions to other firms in the same industry (column 2) and

[33]Destinations are based on primary employers. We define unemployment to include years in which T4 earnings were below the equivalent of 1600 hours worked at the relevant provincial minimum wage.

Table 8: Transitions for High Attachment Workers

	(1) Total	(2) Same Ind.	(3) Manuf.	(4) Serv.	(5) Agriculture	(6) Other	(7) Unknown	(8) Unemployment
$\Delta_k \ln(1+\tau_j^{CAN})$	0.095	0.011	0.032*	0.005	-0.007	0.053***	0.002	0.000
	(0.286)	(0.511)	(0.063)	(0.76)	(0.208)	(0.004)	(0.321)	(0.999)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.703***	-0.14**	-0.112	-0.163***	0.011	-0.017	0.001	-0.283**
	(0.005)	(0.021)	(0.243)	(0.001)	(0.610)	(0.643)	(0.679)	(0.034)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.032	0.014	0.005	0.004	0.004	0.008	0.001	0.025

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for the probability of a permanent work-shortage related separation. Column (2) presents results for the probability of such a separation where the worker is employed in the same industry in the following year. Column (3) presents results for the probability of such a separation where the worker is employed in a different manufacturing industry in the following year. Column (4) presents results for the probability of such a separation where the worker is employed in Service the following year. Column (5) presents results for the probability of such a separation where the worker is employed in Agriculture in the following year. Column (6) presents results for the probability of such a separation where the worker is employed in Construction and Mining in the following year. Column (7) presents results for the probability of such a separation where the worker is employed at a firm with a missing NAICS code in the following year. Column (8) presents results for the probability of such a separation where the worker is un/under-employed in the following year. The coefficients in columns (2)-(8) sum to the coefficients in column (1).All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

more by an increased probability of unemployment (column 8). The reduced probability of a separation for those employed at a large firm is accounted for by lower probabilities of transition to another firm in the same industry, into services, and unemployment.

Table 8 and Appendix Table A4 present analogous results for high attachment workers. For these types of workers, we find a small and precisely estimated zero effect of Canadian concessions on the probability of a separation (column 1). On the other hand, we continue to find a stabilizing force of U.S. concessions as indicated by a lower probability of a separation. In addition, a large portion of this is driven by a lower probability of a separation that led to unemployment in the following year (column 8).

5.7 Summary

We emphasize three sets of results from the preceding analysis. First, CUSFTA was a double-edged sword in Canada. While industries that saw Canadian concessions had higher probabilities of separations for some types of workers, industries that saw U.S. concessions had lower probabilities of separation. This increased stability is especially relevant given the major recession that occurred in Canada and the rest of North America in the early 1990s. Second, separations did not lead to lower cumulative earnings. Lower earnings at the initial industry of employment were mostly offset by higher earnings in other sectors, including services and construction and mining. Third, there seem to have been distributional effects in which both high and low attachment workers saw increased stability and higher earnings from

U.S. concessions, but only low attachment workers saw lower income from Canadian concessions at their initial firm of employment.

6 Additional Results

We now present additional results that help us explain the main results above. First, we examine whether the results vary depending on the capital-intensity of the initial employer. We do this to assess whether workers at firms that might have stronger increasing returns to scale are driving the results that we see above or whether size-related issues potentially such as the elimination of plants for multi-plant firms are more important, as suggested by Head and Ries (1999) and Lileeva (2008). Second, we examine the cumulative earnings results during a shorter time span (1989-1993), when displaced workers might not yet have had time to reallocate. Third, we present our separations results by province.

6.1 Capital Intensity

To assess the importance of initial-firm capital intensity, we additionally control for the initial employer's capital labor ratio in 1988, along with its interactions with all tariff cuts (Canadian and U.S. bilateral tariffs and MFN tariffs). We do this to assess whether our size measures are picking up the effects of capital-intensity related increasing returns to scale. For industries where production is at a constant average cost, the advantage of a large market might not aid U.S. firms and displace Canadian firms; however, for those with substantial increasing returns to scale, the home market effect might play a role and cause more displacement at Canadian firms (e.g. Krugman (1980) and Costinot et al. (2019)). The conclusions discussed here have been disclosed, but the full table of results has not. The results described above continue to hold, and the heterogeneous effects for larger firms do not appear to be driven by their capital intensity.

6.2 Shorter Time Horizons

Tables 9 and 10 replicate Tables 3 and 4 except that cumulative earnings are calculated through 1993 rather than 2004. All right hand side variables are unchanged. We continue to use tariff cuts from 1988 to 1998 rather than relying on partial cuts through 1993 whose timing might be endogenous to counterfactual industry performance.[34] Table 9 shows that low attachment workers receive lower earnings at their initial firm of employment if that firm is more affected by Canadian concessions, and higher earnings if the firm benefits from U.S. concessions. Although lower levels of income at the

[34]This can be thought of as the reduced form of an IV regression where the endogenous variable is the 1988-1993 tariff cut and the instrument is the overall tariff cut. We pursue this strategy because the large number of interaction terms leads to there being many endogenous variables and many instruments in an IV setting.

Table 9: Cumulative Normalized Earnings for Low Attachment Workers (1989-1993)

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN})$	-1.887**	-3.926***	-0.222	0.206	1.508**	-0.236**	0.781***	0.001
	(0.036)	(0.000)	(0.416)	(0.678)	(0.027)	(0.031)	(0.001)	(0.969)
$\Delta_k \ln(1+\tau_j^{U.S.})$	6.063	8.428**	0.958	-0.666	-3.428	0.785	-0.083	0.069
	(0.219)	(0.032)	(0.488)	(0.689)	(0.414)	(0.252)	(0.937)	(0.598)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.129	0.054	0.011	0.040	0.113	0.015	0.027	0.007

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings through 1993. Column (2) presents results for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1).All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

initial firm in response to Canadian concessions are partially offset by higher earnings in services as well as construction and mining (labeled "Other"), the net effect at this shorter time horizon is precisely estimated to be negative. The overall effect of U.S. concessions continues to be indistinguishable from zero although the point estimate is positive, and the own firm effect is positive and different from zero.

Table 10 presents results for high attachment workers. For the effect of Canadian concessions, the results are generally similar: there is little effect. For the effect of U.S. concessions, the overall effect is not significantly different from zero, unlike the longer-term effects when they were precisely estimated to be positive.

This leads to the conclusion that job displacement effects occurred relatively quickly while expansion from access to U.S. markets took longer. This may be because it took longer for Canadian firms to establish export capacity after the CUSFTA or because there are complementarities with the nominal exchange rate, which only started to depreciate against the U.S. Dollar in in the early- to mid-1990s.

6.3 Separation Results By Province

Finally Appendix Tables A7-A12 replicate Table 2 province by province, except for cases where provincial populations require pooling across provinces to satisfy Statistics Canada disclosure requirements.[35] Job displacement effects for those in Canadian concession industries are strongest in British Columbia

[35]This requires pooling the four Atlantic provinces (Nova Scotia, Prince Edward Island, New Brunswick, and Newfoundland and Labrador) into one group as well as Manitoba and Saskatchewan into a second group.

Table 10: Cumulative Normalized Earnings for High Attachment Workers (1989-1993)

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN})$	0.463	-0.167	-0.226	0.274	0.296*	-0.079*	0.358***	0.006
	(0.254)	(0.725)	(0.334)	(0.495)	(0.091)	(0.058)	(0.01)	(0.587)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.295	4.581**	-1.749	-1.050	-1.482*	0.118	-0.720	0.008
	(0.855)	(0.045)	(0.121)	(0.508)	(0.06)	(0.494)	(0.115)	(0.813)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.078	0.078	0.015	0.038	0.058	0.007	0.024	0.005

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings through 1993. Column (2) estimates equation (1) for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

and Quebéc. Interestingly, there is no measurable effect for workers in Ontario. This may be due to Ontario's reliance on the auto industry, which saw little change in its level of protection due to the pre-existing Auto Pact between Canada and the United States. The job stabilization effects for those employed in industries positively affected by U.S. concessions is present across most provinces but is often imprecisely estimated and not significantly different from zero.

7 Conclusion

The literature provides little evidence of what happens to workers when two high-income countries purposefully reduce bilateral trade barriers with one another. While a large literature has documented substantial reallocation of demand across Canadian firms in response to CUSFTA [e.g. Head and Ries (1999), Trefler (2004), Lileeva (2008)], we had little understanding of what happened to the workers who were shed by contracting firms or whether expanding firms passed along any of their increased sales to individual workers in the form of increased earnings or more stable employment.

This paper fills that gap by using high quality longitudinal matched employer-employee data from Canada for the years 1984-2004. It follows the employment trajectories of workers who were initially employed in 1988 in industries that saw either Canadian or U.S. tariff concessions as legislated in CUSFTA.

Canadian tariff concessions led to an increased probability of separation from a worker's initial employer and lower income from that firm, and that this effect was concentrated among workers employed

at large firms. However, Canadian workers seem to have been able to reallocate themselves to other sectors relatively easily, as higher wages in services and construction and mining roughly offset these lower initial-firm incomes so that the long term effect was roughly zero. U.S. tariff concessions led to lower rates of work-shortage based separations in the face of a major recession, this effect was also concentrated among those initially working at large firms. While we find little to no effect of these U.S. concessions on the cumulative earnings of low attachment workers, we do find a strong and positive effect for high attachment workers.

The distributional effects of CUSFTA are also apparent in our findings. Low attachment workers saw higher rates of separation and lower initial-firm income in industries that saw Canadian concessions, and lower rates of separation and higher initial-firm income in industries that saw U.S. concessions. However, the negative effects were attenuated for high attachment workers who primarily experienced the positive effects of lower separation rates and higher income from U.S. concessions.

The results here are far more favorable than those in the recent literature on unilateral trade liberalizations and the China Shock, both of which find large and long lasting differences in outcomes for workers facing larger vs. smaller changes in tariffs. The results here suggest that it is possible for a small open economy to reallocate its labor across firms and sectors without major losses. The task now is to determine what aspects of the Canadian economy allowed this to be so and whether these features are at all generalizable.

References

Albouy, David, Chandler Lutz, and Casey Warman, "Local Labor Markets in Canada and the United States," Working Paper, University of Illinois at Urbana-Champaign June 2017.

Autor, David H., David Dorn, and Gordon H. Hanson, "The China Syndrome: Local Labor Market Effects of Import Competition in the United States," *American Economic Review*, October 2013, *103* (6), 2121–2168.

_ , _ , _ , and Jae Song, "Trade Adjustment: Worker-Level Evidence," *NBER Working Paper*, 2013, (19226).

_ , _ , _ , and _ , "Trade Adjustment: Worker-Level Evidence," *The Quarterly Journal of Economics*, 2014, *129* (4), 1799–1860.

Baker, Michael and Marie Drolet, "A new view of the male/female pay gap," *Canadian Public Policy*, 2010, *36* (4), 429–464.

Baldwin, John R and Wulong Gu, "Trade liberalization: Export-market participation, productivity growth, and innovation," *Oxford Review of Economic Policy*, 2004, *20* (3), 372–392.

_ , Desmond Beckstead, and Richard E Caves, "Changes in the diversification of Canadian manufacturing firms (1973-1997): a move to specialization," *Statistics Canada, Analytical Studies-Micro-Economic Analysis Div. Series 11F0019MIE*, 2001, (179).

Beaulieu, Eugene, "The Canada-U.S. Free Trade Agreement and labour market adjustment in Canada," *Canadian Journal of Economics/Revue canadienne economique*, 2003, *33* (2), 540–563.

Biscourp, Pierre and Francis Kramarz, "Employment, skill structure and international trade: Firm-level evidence for France," *Journal of International Economics*, 2007, *72* (1), 22–51.

Bloom, Nicholas, Kyle Handley, André Kurmann, and Philip Luck, "The impact of chinese trade on us employment: The good, the bad, and the apocryphal," in "American economic association annual meetings," Vol. 2019 2019.

Chan, Winnie, Rene Morissette, and Hanqing Qiu, "Longitudinal Worker File (LWF): User Guide and Data Dictionary (2013 Data Vintage)," Working Paper, Social Analysis and Modelling Division, Statistics Canada 2013.

Chiquiar, Daniel, "Globalization, regional wage differentials and the Stolper-Samuelson Theorem: Evidence from Mexico," *Journal of International Economics*, January 2008, *74* (1), 70–93.

Copeland, Brian R, "Of Mice and Elephants: the Canada-US Free Trade Agreement," *Contemporary Economic Policy*, 1989, *7* (3), 42–60.

Costa, Francisco, Jason Garred, and Joao Paulo Pessoa, "Winners and losers from a commodities-for-manufactures trade boom," *Journal of International Economics*, 2016, *102*, 50–69.

Costinot, Arnaud, Dave Donaldson, Margaret Kyle, and Heidi Williams, "The more we die, the more we sell? a simple test of the home-market effect," *The quarterly journal of economics*, 2019, *134* (2), 843–894.

Dauth, Wolfgang, Sebastian Findeisen, and Jens Suedekum, "The rise of the East and the Far East: German labor markets and trade integration," *Journal of the European Economic Association*, 2014, *12* (6), 1643–1675.

_ , _ , and _ , "Adjusting to Globalization in Germany," *Journal of Labor Economics*, 2021, *1* (39), 263–302.

Dix-Carneiro, Rafael and Brian K. Kovak, "Trade Liberalization and Regional Dynamics," *American Economic Review*, October 2017, *107* (10), 2908–46.

Feenstra, Robert C, "U.S. Exports by TSUSA, HS, SITC, 1972-2001," Working Paper 5590, National Bureau of Economic Research March 1997.

_ , Hong Ma, and Yuan Xu, "US exports and employment," *Journal of International Economics*, 2019, *120*, 46–58.

Forsey, Eugene A., *How Canadians Govern Themselves*, 10th edition ed., Library of Parliament, 2020.

Fort, Teresa C, Justin R Pierce, and Peter K Schott, "New perspectives on the decline of us manufacturing employment," *Journal of Economic Perspectives*, 2018, *32* (2), 47–72.

Gaston, Noel and Daniel Trefler, "The Labour Market Consequences of the Canada-U.S. Free Trade Agreement," *The Canadian Journal of Economics / Revue canadienne d'Economique*, 1997, *30* (1), 18–41.

Hakobyan, Shushanik and John McLaren, "Looking for Local Labor Market Effects of NAFTA," *The Review of Economics and Statistics*, October 2016, *98* (4), 728–741.

Hanson, Gordon H., "What Has Happened to Wages in Mexico since NAFTA?," NBER Working Papers 9563, National Bureau of Economic Research, Inc March 2003.

Harrigan, James and Geoffrey Barrows, "Testing the theory of trade policy: Evidence from the Abrupt End of the Multifiber Arrangement," *The Review of Economics and Statistics*, 2009, *91* (2), 282–294.

Harrison, Ann E., "The Changing Landscape of International Trade: Protectionism, Bashing China and the American Worker," in Federal Reserve Bank of Kansas City, ed., *Fostering a Dynamic Global Economy: Jackson Hole Economic Policy Symposium*, 2017, pp. 137–152.

Head, Keith and John Ries, "Rationalization effects of tariff reductions," *Journal of International Economics*, April 1999, *47* (2), 295–320.

Holmes, Thomas J and John J Stevens, "An alternative theory of the plant size distribution, with geography and intra-and international trade," *Journal of Political Economy*, 2014, *122* (2), 369–421.

Hsieh, Chang-Tai, Nicholas Li, Ralph Ossa, and Mu-Jeung Yang, "Gains from Trade with Flexible Extensive Margin Adjustment," NBER Working Papers 22069, National Bureau of Economic Research, Inc March 2016.

Hummels, David, Jakob R Munch, Lars Skipper, and Chong Xiang, "Offshoring, transition, and training: Evidence from Danish matched worker-firm data," *American Economic Review*, 2012, *102* (3), 424–28.

Kovak, Brian K, "Regional effects of trade reform: What is the correct measure of liberalization?," *American Economic Review*, 2013, *103* (5), 1960–76.

Krugman, Paul, "Scale economies, product differentiation, and the pattern of trade," *The American Economic Review*, 1980, *70* (5), 950–959.

Lileeva, Alla, "Trade liberalization and productivity dynamics: evidence from Canada," *Canadian Journal of Economics/Revue canadienne d'économique*, 2008, *41* (2), 360–390.

_ **and Daniel Trefler**, *The Quarterly Journal of Economics*, 2010, *125* (3), 1051–1099.

McCaig, Brian, "Exporting out of poverty: Provincial poverty in Vietnam and US market access," *Journal of International Economics*, 2011, *85* (1), 102–113.

_ **and Nina Pavcnik**, "Export markets and labor allocation in a low-income country," *American Economic Review*, 2018, *108* (7), 1899–1941.

Melitz, Marc J., "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, November 2003, *71* (6), 1695–1725.

_ **and Gianmarco I. P. Ottaviano**, "Market Size, Trade, and Productivity," *Review of Economic Studies*, 2008, *75* (1), 295–316.

Morici, Peter, "The Environment for Free Trade," in Peter Morici, ed., *Making Free Trade Work: The Canada-U.S. Agreement*, New York: Council on Foreign Relations, 1990, chapter 1, pp. 1–26.

Morissette, Rene, Hanqing Qiu, and Ping Ching Winnie Chan, "The risk and cost of job loss in Canada, 1978-2008," *Canadian Journal of Economics/Revue canadienne d'economique*, 2013, *46* (4), 1480–1509.

Oreopoulos, Philip, Till von Wachter, and Andrew Heisz, "The Short- and Long-Term Career Effects of Graduating in a Recession," *American Economic Journal: Applied Economics*, January 2012, *4* (1), 1–29.

Pierce, Justin R. and Peter K. Schott, "Concording U.S. Harmonized System Codes over Time," *Journal of Official Statistics*, 2012, *28* (1), 53–68.

Sears, Robin, "The great free-trade election of 1988," *Globe and Mail*, October 1 2012.

Topalova, Petia, "Trade liberalization, poverty and inequality: Evidence from Indian districts," in "Globalization and poverty," University of Chicago Press, 2007, pp. 291–336.

_ , "Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India," *American Economic Journal: Applied Economics*, 2010, *2* (4), 1–41.

Trefler, Daniel, "The Long and Short of the Canada-U. S. Free Trade Agreement," *American Economic Review*, September 2004, *94* (4).

Utar, Hale, "When the floodgates open:" Northern" firms' response to removal of trade quotas on Chinese goods," *American Economic Journal: Applied Economics*, 2014, *6* (4), 226–50.

_ , "Workers beneath the Floodgates: Low-Wage Import Competition and Workers' Adjustment," *Review of Economics and Statistics*, 2018, *100* (4), 631–647.

Verhoogen, Eric A, "Trade, quality upgrading, and wage inequality in the Mexican manufacturing sector," *The Quarterly Journal of Economics*, 2008, *123* (2), 489–530.

Appendix

A Tariff Data

Our measures of Canadian protection come from the statutory phase-in from the published *Canada-U.S. Free Trade Agreement*. This was generously provided by Emily Yu at Global Affairs Canada. Raw data are provided at the HS 8-digit level. When a given 8-digit code is only comprised of specific tariffs, we calculate an ad valorem tariff as duties paid divided by customs import value. In this respect, if a given HS 8-digit code only consists to ad-valorem tariffs, our measure is what was written into the agreement and, if a code has only specific tariffs, then it is a function of observed trade. For some 8-digit codes, there are two different specific tariffs. This corresponds to different specific tariffs at the 10-digit level. To convert these two the 8-digit level, we simply take the mean. For other 8-digit codes, there are compound tariffs with both ad-valorem and specific tariffs. If there was both an ad valorem tariff and a specific tariff separately, the specific tariff was used because it was converted using the customs duty and would therefore already include the ad valorem value. If that specific tariff value was below the given ad valorem tariff, then the higher ad valorem tariff value was used instead. If there was a specific tariff with an ad valorem lower limit, the max of those two was used. If there was a specific tariff with an ad valorem upper limit, the min of those two was used. If there was an ad valorem tariff with a specific upper limit, the min of those two was used. Once these HS 8-digit ad-valorem tariffs are calculated, we take simple averages within HS 6-digit codes obtain a panel of HS six-digit/year tariffs.

We use concordances from the World Bank WITS database to convert HS 6-digit codes for 1988, 1996, and 2002 to 2007 HS codes. We then take weighted averages of 2007 HS codes within a given 2007 NAICS four-digit code where weights correspond to 1988 import values *from the world*. Canadian MFN tariffs rates from 1989 onward were provided by Global Affairs Canada at the HS 8-digit level along with an HS concordance to convert all HS codes from their given year to HS88/92. The HS 8-digit codes were then aggregated by simple averages to the HS 6-digit level. These 6-digit HS codes were converted to 4-digit 2007 NAICS codes and aggregated by taking a simple mean.

For U.S. tariffs, at the time of this draft, we did not possess similar legislated tariff levels so we rely on observed tariff revenue. For 1988, we rely on TS USA imports available.[36] At the seven-digit TS level, we isolate total duties paid and total customs imports from Canada and (separately) from Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, and the United Kingdom, divided by total customs value of imports from those same countries. We refer to the latter countries as MFN countries. We then use a crosswalk from the same resource to merge these into the 10-digit HS level. We then sum duties paid and customs value to the 10-digit HS level for Canada and for the MFN countries. We take the 1988 U.S. tariff on Canadian exports at the 10-digit HS level to then be equal to total duties paid divided by customs value. The 1988 U.S. MFN tariff is equal to total duties paid on these MFN countries divided by the customs value of imports from these MFN countries. These are then aggregated to the NAICS level using a crosswalk constructed from the 1989 U.S. import data from the same source where weights correspond to total import value at the HS level within NAICS codes. We have recently acquired legislated statutory tariffs and these will be used in a disclosure in early 2021 in place of these tariffs.

For the years 1989-1998, we calculate the 10-digit HS tariff at the HS-country-year level for Austria, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain,

[36] From *https://cid.econ.ucdavis.edu/usixd/wp5515d.html*

Sweden, and the United Kingdom. We then take the Canadian tariff to be the weighted average of these tariffs for Canada where weights correspond to time-invariant 1989 aggregate import values. For the MFN countries, we take the weighted average over the remaining countries with similar weights. Time varying NAICS codes are transformed into 2007 NAICS codes using crosswalks from WITS.

B Administrative Data Construction

B.1 Sample Selection

We start with the raw data set *LWF_T2LEAP_w_uiearn.dta*. We then keep workers born between 1940 and 1967 (inclusive) so that they were between 22 and 64 in all years from 1989 to 2004. We consider these to be "prime age workers." When workers have multiple years of birth listed, we take the earliest year. We also drop workers who have an unknown province of residence in *any* year.

We also drop workers who worked for the first time after 1988 (exclusive). As we discuss below, these workers cannot be assigned to the "low attachment" or "high attachment" groups because we cannot see their 1984-1988 work histories. Using the Statistics Canada variable *earnflag*, we attribute all of a worker's earnings in a given year to their highest paying job for the years 1984-1988. We drop all workers who do no have any earnings in *any* year prior to 1989. Following Autor et al. (2014), we also drop workers who did not work in any of the years 1986-1988.[37] However, for the years 1989-2004, earnings are attributed to the industry or sector in which they were earned, not just to the primary job's sector. For example, if a worker separated from their initial manufacturing job in 1995, and then took a primary construction job and a side job in services, they would have earnings showing in both construction and services the in the table of their cumulative earnings (e.g. Table 3).

For a large number of "initial" outcomes (e.g. initial industry, initial firm, etc.), we require a base year. For workers with positive earnings in 1988, we set their base year to 1988. This causes all high attachment workers to have 1988 as their base year. If the worker did not have positive earnings in 1988 but did have positive earnings in 1987, we set their base year to 1987. If they did not have positive earnings in 1988 nor 1987, we set their base year to 1986. All workers have positive earnings in at least one of these years. We then define the initial industry as the industry of primary employment in the base year. The initial firm and initial province are defined analogously. The initial wage is defined as total T4 earnings in the base year.

B.2 Worker Variables

We define a minimum wage cutoff as total income a worker would have earned at a prevailing province-year nominal minium wage if they worked 1600 hours a year, as in Autor et al. (2014).[38] We define a "high attachment" worker as one who earned more than this cutoff for *each* of the years 1985-1988.

We now have a potentially unbalanced panel with each worker having no more than one observation per year. We define the *initial industry* of employment as the industry of the highest paying job for a given worker in 1988. If there is not record for 1988, we use 1987. If there are no records for 1988 and 1987, we use 1986. The *initial firm* and *initial wage* are defined analogously.

[37] See footnote 27 in Autor et al. (2014).

[38] These were retrieved from *http://srv116.services.gc.ca/dimt-wid/sm-mw/rpt2.aspx?GoCTemplateCulture=en-CA*.

Annual income is defined as total T4 earnings in a given year. Average worker earnings from 1986 to 1988 are the simple average of annual T4 total earnings during this period. We define cumulative earnings as total worker T4 income after and including 1989. Cumulative unemployment insurance earnings are defined analogously. We define a *top earner* as the 99th percentile of cumulative earnings for each final year of employment (e.g. the 99th percentile of cumulative earnings for workers who stopped working in 1989, 1990, 1991, and so on). We drop workers whose final year cumulative earnings are greater than the 99th percentile of all workers who have the same final year of work.

Cumulative earnings are total worker earnings from 1989 to a later year (inclusive). *Normalized cumulative earnings* are *Cumulative earnings* in the final year of employment divided by the *Average worker income* for 1986-1988 only taking positive values into account. *Firm tenure at the initial firm* is constructed as follows: create a dummy variable that takes a value of one for every year prior to the base year. If the sum of these dummy variables equals 0 or 1, they are defined as "low tenure", if the sum is strictly greater than one and strictly less than four, they are defined as "medium tenure", if the sum is weakly greater than four, they are defined as "high tenure."

To create firm size bins, we start by taking the firm size (*nalus*) of the base firm. These are full time equivalent workers calculated by Statistics Canada as total payroll divided by average wages taking worker characteristics into account. Because we are using *nalus* from the LEAP portion of the data set, this counts *all* workers at the firm and not just those in the sample. If this average is strictly less than 100, then the firm is assigned to the "small" bin, if the average is strictly greater than 99 and strictly less than 1000, then the firm is assigned to the "medium" bin, and if the average is strictly greater than 999, then the firm is assigned to the "large" bin.

Experience captures the number of years the worker was employed from 1984 to 1988 (inclusive). The experience dummy takes a value of 1 if the worker worked strictly less than three years, a value of 2 if they worked between 2 and 5 years, a value of 3 if they worked strictly greater than four years. This differs from "high attachment" as it does not account for wages earned in these jobs. It differs from the tenure variable in that it does not distinguish the firm of employment.

A worker's average initial income is calculated by taking the average T4 earnings for a given worker in the years 1986-1988 for years in which they had positive earnings. The worker pre-trend is defined as the (log) difference between a worker's 1986 T4 income and their 1988 T4 income. When this is included as a explanatory variable, it requires that even low attachment workers work in the years 1986 and 1988 (but not necessarily 1987).

B.3 Firm Variables

We measure the average level of worker wages at firm level. Starting with the raw data set *LWF_T2LEAP_w_uiearn.dta*, we start by only keeping observations for the years 1986-1988. We then take (unweighted) mean total earnings at the firm level. To create the firm pre-trend, we start with the raw data set *LWF_T2LEAP_w_uiearn.dta*, keep only observations for the years 1986 and 1988, take the (unweighted) mean total earnings at the firm-year level and then take the log change from 1986 to 1988. Logs are then taken.

B.4 Industry Variables

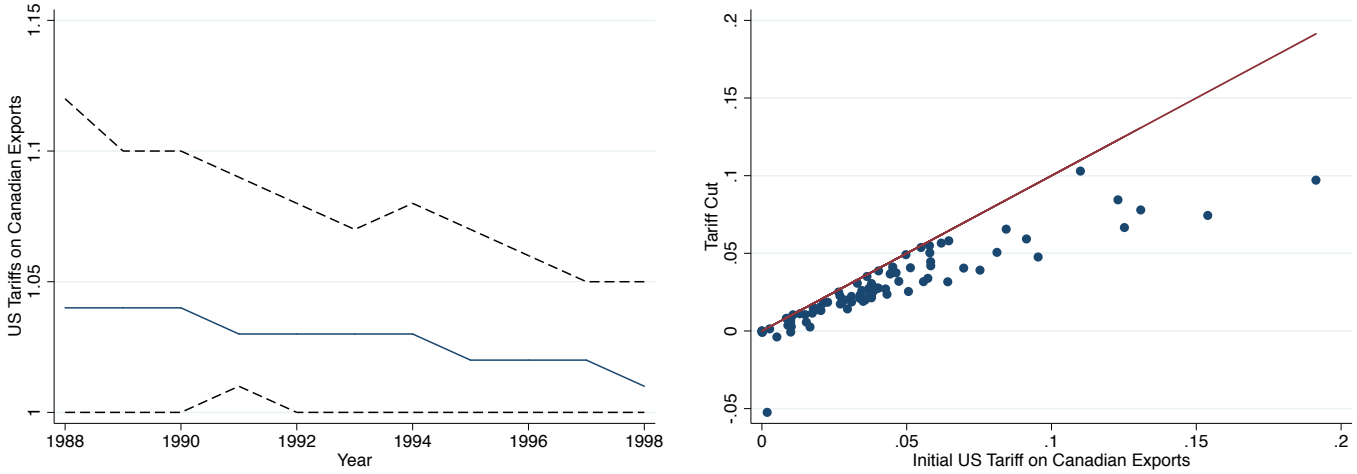
We also measure the average level of worker wages at industry level. Starting with the raw data set *LWF_T2LEAP_w_uiearn.dta*, we start by only keeping observations for the years 1986-1988, We then

take (unweighted) mean total earnings at the NAICS level. To create the industry pre-trend, we start with the raw data set *LWF_T2LEAP_w_uiearn.dta*, keep only observations for the years 1986-1988, take the (unweighted) mean total earnings at the NAICS-year level, and then take the log change from 1986 to 1988. The NAICS four-digit industry's capital-labor ratio is calculated by starting with the raw data set *LWF_T2LEAP_w_uiearn.dta*, removing firm-year duplicates, and then summing both *total_assets* and *nalus* by industry, and then dividing the former by the latter. We measure the share of workers (in our sample) at the NAICS four-digit level in 1988 who earn less than the aggregate median wage (also in 1988). Trends in the importance of the industry are captured by the trend in the industry's share of aggregate employment. It takes the number of workers (in our sample) in the NAICS industry in 1984 and divides it by the total number of workers in 1984. It then takes the (log) difference in this between 1984 and 1988. Finally, we also capture the evolving nature of the industry by the trend in its average wage between 1986 and 1988. This is based on the entire sample in the raw data.

C Additional Results

C.1 U.S. CUSFTA Tariff Cuts

Figure A1: U.S. CUSFTA Tariff Cuts



Notes: The figure on the left plots the unweighted average NAICS tariff plus one in the U.S. against Canadian exports from 1988 through 1998. Values of 1 represent no tariff. The dotted lines represent 5^{th} and 95^{th} percentiles. The figure on the right plots the initial 1988 tariff on the horizontal axis and the cut from 1988 to 1998 on the vertical axis. Each dot is an industry and the line is a 45 degree line. The dot below the 0-axis on the right hand graph is NAICS 3361 (Motor Vehicle Manufacturing). This is an auto pact sector and is controlled for by our auto pact dummy variable.

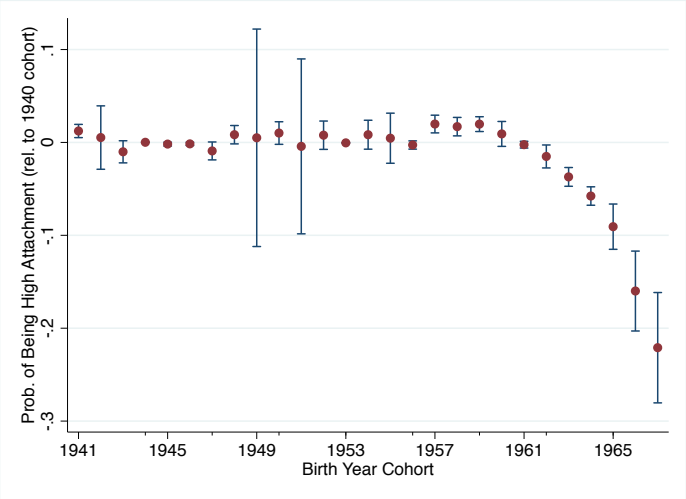
C.2 Correlates of Working at a Large Firm and High Attachment Status

Table A1: Correlates of Working at a Large Firm and High Attachment Status

	(1) $Prob(\mathbb{1}_{if,1988}^{large}=1)$		(2) $Prob(High\ Attach_i = 1)$
$female_i$	0.039***	$female_i$	0.068***
	(0.001)		(0.000)
$\mathbb{1}_i^{tenure\ M}$	-0.01		
	(0.280)		
$\mathbb{1}_i^{tenure\ L}$	-0.011		
	(0.379)		
$\mathbb{1}_i^{experience\ H}$	-0.009		
	(0.279)		
$\ln(w_{i,86-88})$	0.015*	$\ln(w_{i,86-88})$	0.445***
	(0.051)		(0.000)
$\Delta_{88-86}\ln(w_i)$	-0.003	$\Delta_{88-86}\ln(w_i)$	-0.059***
	(0.366)		(0.000)
		$\mathbb{1}_f^M$	-0.001
			(0.781)
		$\mathbb{1}_f^L$	-0.022***
			(0.000)
$\ln\left(K_{f,1988}/L_{f,1988}\right)$	0.055***	$\ln\left(K_{f,1988}/L_{f,1988}\right)$	0.001
	(0.000)		(0.355)
$\ln\left(\overline{w}_{f,1988}\right)$	0.348***	$\ln\left(\overline{w}_{f,1988}\right)$	0.008*
	(0.000)		(0.094)
$\Delta_{88-86}\ln\left(\overline{w}_f\right)$	-0.019	$\Delta_{88-86}\ln\left(\overline{w}_f\right)$	-0.013***
	(0.241)		(0.003)
$\ln(1+\tau_{j,1988}^{CAN})$	-0.442**	$\ln(1+\tau_{j,1988}^{CAN})$	0.019
	(0.022)		(0.672)
$\ln(1+\tau_{j,1988}^{U.S.A})$	0.136	$\ln(1+\tau_{j,1988}^{U.S.A})$	-0.284***
	(0.852)		(0.002)
$auto\ pact_j$	0.198***	$auto\ pact_j$	0.016
	(0.005)		(0.195)
$cyclicality_j$	-0.022**	$cyclicality_j$	0.001
	(0.041)		(0.619)
$share\ below\ median_j$	-0.28***	$share\ below\ median_j$	-0.027**
	(0.004)		(0.035)
$\ln\left(\overline{w}_{j,1988}\right)$	-0.091	$\ln\left(\overline{w}_{j,1988}\right)$	-0.09***
	(0.557)		(0.001)
$\ln\left(K_{j,1988}/L_{j,1988}\right)$	0.028	$\ln\left(K_{j,1988}/L_{j,1988}\right)$	-0.004
	(0.195)		(0.129)
$\ln\left(\frac{emp_{j,1988}}{\sum_j emp_{j,1988}}\right) - \ln\left(\frac{emp_{j,1984}}{\sum_j emp_{j,1984}}\right)$	-0.26	$\ln\left(\frac{emp_{j,1988}}{\sum_j emp_{j,1988}}\right) - \ln\left(\frac{emp_{j,1984}}{\sum_j emp_{j,1984}}\right)$	-0.042**
	(0.127)		(0.041)
$\Delta_{88-86}\ln\left(\overline{w}_j\right)$	-0.228	$\Delta_{88-86}\ln\left(\overline{w}_j\right)$	-0.079*
	(0.327)		(0.053)
Provincial FE	Yes	Provincial FE	Yes
Birth-Year FE	Yes	Birth-Year FE	Yes
Observations	96,720	Observations	96,720
R-squared	0.486	R-squared	0.492

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. Column (1) estimates equation (1) where the dependent variable is an indicator variable if a worker was employed in a large firm (>1,000 workers) in 1988. Column (2) estimates equation (1) where the dependent variable is an indicator variable if a worker was a high attachment worker in 1988. All regressions contains the same vector of control variables discussed in the text except for those explicitly dropped and all tariff cuts are for the period 1988 through 1998. All standard errors are clustered at the 2007 NAICS-4 digit level.

Figure A2: Age Plot



Notes: This table plots birth cohort dummy variables obtained from estimating equation (1) with a high attachment worker dummy as the dependent variable. The omitted birth cohort is 1940. The horizontal axis indicates the birth cohort year. The vertical axis displays the coefficient relative to the omitted birth cohort. Bands indicate 95% confidence intervals based on standard errors are clustered at the 2007 NAICS-4 digit level.

C.3 Non-Work-Shortage Separations

Table A2: Probability of Non-Work-Shortage Separation from Initial Firm

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	-0.0432		5.35e-05	
	(0.562)		(0.999)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		0.021		-0.081
		(0.844)		(0.388)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		0.079		0.026
		(0.591)		(0.819)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		-0.441**		-0.049
		(0.018)		(0.77)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.229		-0.074	
	(0.518)		(0.804)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		-0.384		-0.430
		(0.339)		(0.207)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-0.389		-0.045
		(0.369)		(0.924)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		0.046		-0.111
		(0.936)		(0.796)
Observations	23,482	23,482	73,238	73,238
R-Squared	0.046	0.046	0.034	0.033

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

C.4 Additional Results by Firm Size Bin

Table A3: Transitions by Firm Size Bin for Low Attachment Workers

	(1) Total	(2) Same Ind.	(3) Manuf.	(4) Serv.	(5) Agriculture	(6) Other	(7) Unknown	(8) Unemployment
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	-0.199	0.004	-0.008	-0.03	-0.01	0.035*	-0.002	-0.187*
	(0.136)	(0.77)	(0.726)	(0.336)	(0.281)	(0.087)	(0.256)	(0.067)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	0.091	0.08***	0.033	0.003	-0.007	0.035*	-0.003	-0.05
	(0.338)	(0.001)	(0.192)	(0.916)	(0.214)	(0.091)	(0.371)	(0.407)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	0.354**	0.032	0.075**	0.074**	-0.003	0.049**	0.002	0.125
	(0.021)	(0.204)	(0.029)	(0.035)	(0.697)	(0.041)	(0.352)	(0.267)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	0.671**	0.076*	0.02	0.05	0.014	-0.003	-0.001	0.516**
	(0.037)	(0.1)	(0.781)	(0.496)	(0.689)	(0.953)	(0.943)	(0.033)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	-0.377	-0.097**	-0.051	0.027	0.036	-0.003	0.01	-0.298
	(0.231)	(0.065)	(0.466)	(0.819)	(0.251)	(0.949)	(0.203)	(0.223)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	-1.27***	-0.155	-0.014	-0.315***	0.009	-0.065	0.004	-0.734**
	(0.002)	(0.101)	(0.878)	(0.006)	(0.609)	(0.423)	(0.534)	(0.0312)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.062	0.009	0.007	0.006	0.005	0.012	0.003	0.074

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for the probability of a permanent work-shortage related separation. Column (2) presents results for the probability of such a separation where the worker is employed in the same industry in the following year. Column (3) presents results for the probability of such a separation where the worker is employed in a different manufacturing industry in the following year. Column (4) presents results for the probability of such a separation where the worker is employed in Services in the following year. Column (5) presents results for the probability of such a separation where the worker is employed in Agriculture in the following year. Column (6) presents results for the probability of such a separation where the worker is employed in Construction and Mining in the following year. Column (7) presents results for the probability of such a separation where the worker is employed at a firm with a missing NAICS code in the following year. Column (8) presents results for the probability of such a separation where the worker is un/underemployed in the following year. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for low attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

Table A4: Transitions by Firm Size Bin for High Attachment Workers

	(1) Total	(2) Same Ind.	(3) Manuf.	(4) Serv.	(5) Agriculture	(6) Other	(7) Unknown	(8) Unemployment
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	-0.09	-0.019	0.003	-0.059**	-0.005	0.046**	-0.001	-0.055
	(0.357)	(0.499)	(0.919)	(0.05)	(0.53)	(0.027)	(0.839)	(0.18)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	0.183	0.022	0.02	0.055*	-0.014	0.029***	0.006	0.066
	(0.107)	(0.329)	(0.435)	(0.089)	(0.182)	(0.004)	(0.123)	(0.227)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	0.133	0.02	0.049	0.002	-0.003	0.096*	-0.001	-0.03
	(0.394)	(0.439)	(0.221)	(0.941)	(0.582)	(0.098)	(0.512)	(0.753)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	0.142	-0.061	-0.042	0.046	-0.009	0.033	0.007	0.168
	(0.668)	(0.450)	(0.706)	(0.609)	(0.591)	(0.566)	(0.503)	(0.348)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	-0.706***	-0.057	-0.135	-0.2***	0.045	0.02	-0.006	-0.372**
	(0.008)	(0.467)	(0.18)	(0.001)	(0.21)	(0.683)	(0.213)	(0.012)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	-1.193***	-0.231***	-0.149	-0.275***	-0.001	-0.075	0.003	-0.466**
	(0.001)	(0.005)	(0.268)	(0.002)	(0.978)	(0.133)	(0.249)	(0.038)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.033	0.014	0.005	0.004	0.004	0.008	0.001	0.025

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for the probability of a permanent work-shortage related separation. Column (2) presents results for the probability of such a separation where the worker is employed in the same industry in the following year. Column (3) presents results for the probability of such a separation where the worker is employed in a different manufacturing industry in the following year. Column (4) presents results for the probability of such a separation where the worker is employed in Services in the following year. Column (5) presents results for the probability of such a separation where the worker is employed in Agriculture in the following year. Column (6) presents results for the probability of such a separation where the worker is employed in Construction or Mining in the following year. Column (7) presents results for the probability of such a separation where the worker is employed at a firm with a missing NAICS code in the following year. Column (8) presents results for the probability of such a separation where the worker is un/under-employed in the following year. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

Table A5: Cumulative Normalized Earnings by Firm Size for Low Attachment Workers (1989-1993)

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	-1.018	-3.944***	0.04	0.774	1.999***	-0.335**	0.427	0.021
	(0.496)	(0.004)	(0.933)	(0.346)	(0.01)	(0.03)	(0.24)	(0.74)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	-5.121***	-4.099***	-0.391	-0.869	-0.458	-0.103	0.76*	0.0386
	(0.000)	(0.000)	(0.403)	(0.190)	(0.539)	(0.287)	(0.079)	(0.433)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	1.241	-4.989*	-0.297	1.304	4.535**	-0.278	1.042*	-0.0758
	(0.644)	(0.08)	(0.65)	(0.33)	(0.014)	(0.228)	(0.064)	(0.408)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	2.318	8.707**	2.271	-3.408	-6.305	0.62	0.506	-0.073
	(0.619)	(0.052)	(0.237)	(0.115)	(0.111)	(0.221)	(0.694)	(0.719)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	13.04**	7.856	1.863	-1.024	2.154	0.388	1.636	0.168
	(0.026)	(0.112)	(0.258)	(0.635)	(0.554)	(0.474)	(0.255)	(0.289)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	0.161	7.56	-2.116	2.582	-7.396	1.347	-1.883	0.067
	(0.981)	(0.217)	(0.398)	(0.322)	(0.148)	(0.244)	(0.105)	(0.723)
Observations	23,482	23,482	23,482	23,482	23,482	23,482	23,482	23,482
R-squared	0.130	0.055	0.012	0.041	0.113	0.016	0.027	0.007

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings for the years 1989-1993. Column (2) presents results for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1).All results are for low attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

Table A6: Cumulative Normalized Earnings by Firm Size for High Attachment Workers (1989-1993)

	(1) Total	(2) Same Firm	(3) Same Ind.	(4) Manuf.	(5) Services	(6) Agriculture	(7) Other	(8) Unknown
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$	0.58	0.305	0.009	0.151	-0.149	-0.125*	0.427**	-0.039
	(0.418)	(0.678)	(0.984)	(0.752)	(0.647)	(0.085)	(0.036)	(0.17)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$	-0.249	-0.28	-0.225	-0.182	0.313	-0.041	0.138	0.028*
	(0.659)	(0.713)	(0.334)	(0.655)	(0.463)	(0.251)	(0.231)	(0.055)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$	0.769	-0.627	-0.622	1.187	0.41	-0.08	0.49*	0.011
	(0.339)	(0.636)	(0.213)	(0.138)	(0.260)	(0.126)	(0.1)	(0.391)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$	-0.926	4.056	-0.313	-2.502	-1.662	0.103	-0.691	0.083
	(0.687)	(0.233)	(0.81)	(0.214)	(0.159)	(0.551)	(0.29)	(0.346)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$	2.757	5.6**	-0.116	-1.022	-1.541	-0.009	-0.122	-0.033
	(0.152)	(0.05)	(0.892)	(0.555)	(0.159)	(0.946)	(0.8)	(0.439)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$	-2.446	4.627	-4.292**	-0.135	-1.656*	0.211	-1.217**	0.016
	(0.262)	(0.226)	(0.013)	(0.954)	(0.083)	(0.443)	(0.018)	(0.652)
Observations	73,238	73,238	73,238	73,238	73,238	73,238	73,238	73,238
R-squared	0.078	0.078	0.018	0.039	0.059	0.007	0.024	0.005

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Column (1) presents results for estimating equation (1) for cumulative normalized earnings for the years 1989-1993. Column (2) presents results for cumulative normalized earnings that accrue from the same firm as in the initial year of employment. Column (3) presents results for cumulative normalized earnings that accrue from firms in the same four-digit NAICS industry that are not the initial firm of employment. Column (4) presents results for cumulative normalized earnings that accrue from firms in different four-digit NAICS industry within manufacturing. Column (5) presents results for cumulative normalized earnings that accrue from firms in Services. Column (6) presents results for cumulative normalized earnings that accrue from firms in Agriculture. Column (7) presents results for cumulative normalized earnings that accrue from firms in Construction and Mining. Column (8) presents results for cumulative normalized earnings that accrue from firms with missing NAICS codes. The coefficients in columns (2)-(8) sum to the coefficients in column (1). All results are for high attachment workers. All regressions contains the same vector of control variables discussed in the text and all tariff cuts are for the period 1988 through 1998.

C.5 Provincial Results

Tables A7 through A12 present tables analogous to Table 2 disaggregating by province. Some provinces are pooled to satisfy confidentiality screening requirements for disclosure by Statistics Canada. Canadian territories (the Northwestern Territories, Nunavut, and the Yukon) are not included in the analysis because of small sample sizes that conflict with these requirements.

Table A7: Workers Initially Employed in Alberta

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	-0.392**		-0.312***	
	(0.022)		(0.01)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		-0.487*		-0.410**
		(0.075)		(0.034)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		-0.089		-0.171
		(0.824)		(0.686)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		-0.538		-0.305
		(0.208)		(0.134)
$\Delta_k \ln(1+\tau_j^{U.S.})$	1.218		-0.059	
	(0.215)		(0.934)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		2.183**		0.602
		(0.049)		(0.526)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		0.685		0.594
		(0.605)		(0.576)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		0.538		-0.417
		(0.725)		(0.543)
Observations	1,280	1,280	3,919	3,919
R-Squared	0.079	0.084	0.040	0.041

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in Alberta. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.

Table A8: Workers Initially Employed in British Columbia

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.198		0.195	
	(0.374)		(0.155)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		-0.435		-0.543*
		(0.146)		(0.076)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		0.587		0.166
		(0.363)		(0.311)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		2.728**		1.738***
		(0.011)		(0.001)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-1.165		-0.596	
	(0.312)		(0.522)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		0.496		1.187
		(0.668)		(0.140)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-1.315		-0.260
		(0.326)		(0.754)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		-3.745		-2.541
		(0.179)		(0.141)
Observations	1,739	1,739	6,817	6,817
R-Squared	0.074	0.093	0.060	0.071

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in British Columbia. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.

Table A9: Workers Initially Employed in the Atlantic Provinces

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.063		-0.141	
	(0.685)		(0.297)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		-0.522**		-0.394**
		(0.035)		(0.044)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		0.375		-0.126
		(0.156)		(0.485)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		0.826		0.001
		(0.124)		(0.998)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.491		0.041	
	(0.484)		(0.951)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		0.577		1.967**
		(0.564)		(0.012)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-0.752		-0.963
		(0.418)		(0.217)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		-0.801		-0.214
		(0.3)		(0.779)
Observations	2,612	2,612	4,089	4,089
R-Squared	0.108	0.113	0.187	0.190

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in Newfoundland and Labrador, New Brunswick, Nova Scotia, or Prince Edward Island. Provinces are pooled to satisfy Statistics Canada disclosure requirements. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.

Table A10: Workers Initially Employed in Ontario

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.153		0.06	
	(0.106)		(0.608)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		0.238**		0.036
		(0.032)		(0.75)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		-0.002		0.083
		(0.987)		(0.531)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		-0.091		0.007
		(0.614)		(0.973)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.292		-0.942***	
	(0.486)		(0.008)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		0.247		-0.27
		(0.554)		(0.58)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		0.264		-0.351
		(0.577)		(0.38)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		-1.177**		-1.438***
		(0.041)		(0.005)
Observations	10,021	10,021	35,389	35,389
R-Squared	0.022	0.025	0.022	0.023

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in Ontario. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.

Table A11: Workers Initially Employed in Manitoba and Saskatchawan

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.248		0.352***	
	(0.299)		(0.004)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		0.171		0.034
		(0.664)		(0.897)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		-0.617		-0.093
		(0.255)		(0.704)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		0.11		0.219
		(0.825)		(0.385)
$\Delta_k \ln(1+\tau_j^{U.S.})$	-0.03		0.445	
	(0.967)		(0.301)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		-0.772		0.63
		(0.537)		(0.585)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-0.051		-0.155
		(0.967)		(0.85)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		1.19		1.034
		(0.24)		(0.191)
Observations	1,091	1,091	3,021	3,021
R-Squared	0.062	0.072	0.062	0.068

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in Manitoba or Saskatchewan. Provinces are pooled to satisfy Statistics Canada disclosure requirements. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.

Table A12: Workers Initially Employed in Québec

	Low Attachment		High Attachment	
	(1)	(2)	(3)	(4)
$\Delta_k \ln(1+\tau_j^{CAN})$	0.05		0.163	
	(0.809)		(0.247)	
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^S$		-0.244		-0.002
		(0.416)		(0.989)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^M$		0.102		0.503**
		(0.703)		(0.037)
$\Delta_k \ln(1+\tau_j^{CAN}) * \mathbb{1}_f^L$		0.754***		-0.101
		(0.001)		(0.587)
$\Delta_k \ln(1+\tau_j^{U.S.})$	0.331		-0.682	
	(0.615)		(0.127)	
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^S$		0.914		0.139
		(0.179)		(0.742)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^M$		-0.086		-1.176**
		(0.896)		(0.025)
$\Delta_k \ln(1+\tau_j^{U.S.}) * \mathbb{1}_f^L$		-0.847		-0.826
		(0.405)		(0.212)
Observations	6,739	6,739	20,003	20,003
R-Squared	0.020	0.023	0.026	0.028

Notes: ***: $p < 0.01$, **: $0.01 \leq p < 0.05$, *: $0.05 \leq p < 0.1$. p-values are in parentheses and are based on standard errors clustered at the 2007 NAICS-4 digit level. Columns (1) and (3) presents results for estimating equation (1) on worker outcomes 1989-1998 for low and high attachment workers, respectively, initially employed in Québec. Columns (2) and (4) present analogous regressions interacting the tariff cuts with firm size indicators. All regressions contains the same set of control variables discussed in the text with the exception of provincial dummies and all tariff cuts are for the period 1988 through 1998.