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# The Labour Market Return to Permanent Residency


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**Abstract**

A central question in immigration policy is how mobility restrictions affect the wages of temporary foreign workers (TFWs). We study the labor market return to TFWs gaining permanent residency (PR), which loosens mobility restrictions. Using administrative data linking matched employer-employee data in Canada to temporary and permanent visa records from 2004–2014 along with an event-study design, we find that gaining PR leads to a sharp, immediate, and persistent increase in the job switching rate of 21.7 percentage points and an increase in earnings of 3.2 percent three years after PR. These gains are driven primarily by reallocation across firms: workers move to higher-paying firms, and our estimates are consistent with no within-firm effects. To guide and interpret our reduced-form results, we develop a search-and-matching model featuring heterogeneous workers and firms. Permanent residents and native-born workers search for jobs in the same labor market and engage in on-the-job search, while TFWs search separately within a segmented labor market and do not receive outside wage offers. We calibrate the model to match our reduced-form results, and we use it to simulate the long-run effects of PR and consider two counterfactual policies: (1) increasing the cost to firms of posting a TFW vacancy and (2) allowing TFWs to switch employers freely under "open" visas. We evaluate how these policies affect output, wages, profits, and overall social welfare.

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# 1 Introduction

A central question in immigration policy is how mobility restrictions affect wages (Manning, 2025). Many countries—including Australia, Canada, New Zealand, Singapore, South Korea, and the United States (U.S.)—use temporary foreign worker programs with "closed" visas that tie workers to a single employer, limiting job mobility. This has raised concerns among policymakers about the exploitation of workers on closed visas, and potential effects on native-born workers.[1]

Closed visas can reduce wages either by limiting immigrants' outside options (a within-firm bargaining effect) or by trapping workers in less productive firms (a between-firm sorting effect). Distinguishing between these channels is critical for evaluating immigration policy. If the earnings gains from relaxing mobility restrictions are driven by reallocation toward more productive firms, then these policies may generate efficiency gains.[2] By contrast, if the gains occur primarily within firms, they likely reflect changes in bargaining and a redistribution of surplus rather than efficiency gains.

Despite a growing empirical literature documenting that relaxing mobility restrictions increases job mobility and earnings, there is little evidence on the mechanisms underlying these gains. In particular, existing work has been unable to distinguish between within-firm wage effects and between-firm reallocation effects. This is primarily due to the limited availability of administrative data linking temporary visa permits to matched employee-employer data. As a result, it remains unclear whether mobility restrictions primarily affect wage-setting within firms or distort the allocation of workers across firms.

In this paper, we provide causal evidence on the labor market effects of mobility restrictions and show that firm reallocation is the primary mechanism driving immigrants' earnings gains. Our empirical setting is the Canadian Temporary Foreign Worker Program (TFWP) where we observe 200,000 immigrants. Longitudinal visa records linked with matched employee-employer data allow us to examine how labor market outcomes change as immigrants transition from temporary status, which restricts them to a single employer, to permanent residency (PR), which relaxes this mobility constraint. Identification is obtained using difference-in-differences comparing outcomes for cohorts of TFWs with similar skills and time-to-PR profiles who arrive in Canada in different years.

Our main findings indicate that gaining PR leads to a large and immediate increase in job mobility, raising the probability of a job-to-job transition by 21.7 percentage points over the first three years. Alongside the increase in job mobility, earnings increase by 3.2 percent, with effects that emerge quickly and persist over time. We show that these earnings gains are consistent with reallocation across firms: workers move to firms with 3.2 percent higher pay premia, as measured by AKM firm fixed effects. We further show that a significant share of these gains arise from workers switching industries.

The equality between the PR effect on log earnings and the PR effect on AKM firm effects suggests that the average earnings gain is fully accounted for by reallocation to higher-paying firms. To further assess this, we develop novel bounds for the wage effect within firms for "stayers". This is analogous to

[1] For example, U.S. Senator Bernie Sanders has argued that "guest workers are often locked into lower-paying jobs and can have their visas taken away... if they complain about dangerous, unfair, or illegal working conditions" and described guest worker visas as "disastrous for American workers" (Sanders, 2025). In a similar vein, the UN Special Rapporteur's report on Canadian temporary foreign workers expressed that Canada's reliance on closed visas creates a power imbalance where "employers may have limited incentive to ensure decent working conditions, as workers do not have a meaningful choice of alternatives" (Obokata, 2024).

[2] With heterogeneous workers and firms, there are also potential gains from improved worker-firm sorting as a result of PR.

"Lee bounds" for the wage effect for the always-employed (Lee, 2009) but adapted to a difference-in-differences setting with multilayered sample selection (due to the presence of firm heterogeneity). Our bounds are consistent with limited within-firm wage effects for stayers, although we cannot rule out a wage bargaining effect for workers who switch firms.[3]

These findings represent the average effects of PR and mask some important differences across workers. When investigating heterogeneity in treatment effects, we find that the earnings and mobility gains from PR are notably larger for low-skilled workers. This indicates that mobility constraints bind more tightly at the lower end of the skill distribution, consistent with low-skilled workers being disproportionately concentrated in lower-paying firms prior to PR and thus benefiting more from greater access to outside opportunities. Because these low-skilled workers experience the largest gains in AKM firm fixed effects, we find that PR weakens positive assortative matching in the aggregate: the covariance between worker and firm fixed effects for TFWs declines. Beyond skill, we also find that women and younger workers experience larger post-PR earnings gains, suggesting that closed visas may exacerbate the broader mobility barriers and labor market frictions often faced by these groups.

While the reduced-form evidence identifies the mechanism driving earnings gains for immigrants, it does not capture equilibrium effects or the broader incidence of policy changes. To interpret these results and evaluate policy counterfactuals, we develop a search-and-matching model with two-sided worker and firm heterogeneity that extends Lise, Meghir, and Robin (2016) to incorporate TFWs and permanent residents alongside native workers. This allows us to examine the equilibrium effects of visa policies on both immigrants and native workers and firms. Following the institutional features of the TFW program in Canada, we assume that TFWs face employer-specific mobility constraints and do not receive outside offers. By contrast, permanent residents and native workers engage in on-the-job search and can use outside offers to bid up their wages, creating a "job ladder" as in sequential auction models (Postel-Vinay & Robin, 2002).

We first calibrate the model to match our reduced-form estimates of the effects of PR on job mobility, earnings, and firm pay premia, and we use the calibrated model to study the long-run effects of permanent residency. It takes roughly 15 years for TFWs to reach their new steady state after obtaining PR, with long-run gains in earnings and firm pay premia about 85 percent larger than the three-year event-study estimates. These additional gains arise from the continued movement to high-wage firms over time, reinforcing our short-run findings. To gauge the magnitude of this long-run effect, we compare it to the immigrant-native wage gap. Using Census data and controlling for industry, occupation, and demographic characteristics, the wage gap is about twice as large for temporary immigrants compared to permanent residents (30 versus 15 log points). This suggests that roughly 40 percent of the gap between temporary and permanent residents can be attributed to the long-run effect of mobility restrictions.

We next consider the equilibrium consequences of two immigration policy counterfactuals that are motivated by recent policy proposals: increasing the application fee for immigration visas and giving TFWs the freedom to switch jobs.[4] Higher fees for TFW vacancies cause firms to substitute to the

[3]Similar to Lee (2009) who cannot obtain meaningful bounds for the causal effect of a treatment on wages for compliers, we cannot obtain meaningful bounds on the wage effects for workers who switch firms as a result of obtaining PR.

[4]For example, in the U.S., President Trump recently proposed a $100,000 fee on new H-1B visas (Trump, 2025), while in Canada, the federal government is exploring legislation that would allow TFWs to freely switch employers within the same industry (Subramaniam, 2025).

domestic market segment. This increases the demand for domestic workers and raises their wages, while reducing the wages of TFWs. The increase in the application fee reduces profits in the TFW market, and similarly profits are reduced in the domestic market due to greater competition for domestic workers. This highlights the key trade-off of policies that reduce TFW hiring: domestic workers benefit in terms of higher wages (especially low-wage workers), but firm profits are reduced. Defining social welfare as the sum of profits and wages, overall social welfare decreases after increasing application fees because the decline in TFW wages and firm profits is larger than the increase in domestic worker wages.

Turning to the "open visa" counterfactual, TFW wages rise significantly since they can climb the job ladder and upgrade firms. Interestingly, the wage gains for TFWs under this scenario exceed the partial equilibrium effect of an individual TFW obtaining PR. This is driven by the equilibrium effect on firms that now face poaching risk and must compete for labor, which shift bargaining power to workers. The open visa policy also increases wages for domestic workers (especially low-wage workers). Open visas generate two opposing forces for domestic wages. Allowing TFWs to search in the domestic segment increases competition for vacancies and lowers domestic workers' job-finding rates, putting downward pressure on wages. At the same time, domestic workers gain access to a larger set of firms as former TFW firms begin recruiting in the integrated market, which improves outside options and raises wages. Our results imply that the second effect dominates. Taken together, these results show that mobility restrictions can harm both TFWs and domestic workers. In contrast to the wage gains for TFWs and domestic workers, firm profits decline under open visas. Intuitively, integrating the segmented labor markets increases market tightness and raises wages for both groups of workers, which reduces firm profits. The gains in wages for TFWs and domestic workers exceed the loss in profits leading to an increase in social welfare. While these policy counterfactuals rely on the structure of the model and should therefore be interpreted cautiously, the model provides a tractable framework for evaluating the welfare consequences of real-world immigration policies.

Our paper makes several contributions to the literature. First, we contribute to the study of worker mobility restrictions on immigrant labor market outcomes (Naidu, Nyarko, & Wang, 2016; Hunt & Xie, 2019; Brochu, Gross, & Worswick, 2020; Wang, 2021; Ahrens et al., 2024; Domenella, 2025; Townsend & Allan, 2025). Most closely related is Townsend and Allan (2025) which also uses a large administrative dataset to study the loosening of worker mobility restrictions in New Zealand. Our paper complements this paper by focusing on the effects of PR on inter-firm mobility, firm pay premia, and worker-firm sorting.[5] Relative to the existing literature, we provide the first causal evidence that the earnings gains from relaxing mobility restrictions are primarily driven by firm heterogeneity and the reallocation of workers to high-wage firms after PR.[6] Furthermore, we estimate bounds on the within-firm earnings effects of PR that are consistent with no effect, allowing us to effectively rule out increased bargaining power and wage growth within continuing matches as an important source of earnings gains from PR. This further strengthens our conclusion that closed visas limit immigrants' wages primarily by locking

[5]Interestingly, Townsend and Allan (2025) find that loosening restrictions on worker mobility leads to increases in job transitions but no earnings gains. In our setting, by contrast, the increased job mobility leads to both earnings gains and movement up the job ladder to high-wage firms.

[6]While previous work has descriptively shown that new migrants are clustered in low-wage firms (Pendakur & Woodcock, 2010; Skuterud & Su, 2012; Damas de Matos, 2017; Amior & Stuhler, 2023; Dostie et al., 2023; Arellano-Bover & San, 2024; Gyetvay & Keita, 2024; Guo et al., 2025; Lehrer & Rawling, 2025), we provide the first causal evidence that closed visas prevent immigrants from climbing the job ladder to firms with higher wage premia.

them into low-wage firms.[7]

Second, we contribute to research studying the incidence of immigration policies on firms and domestic workers (Kerr and Lincoln, 2010; Peri, Shih, and Sparber, 2015; Beerli et al., 2021; Clemens and Lewis, 2022; Doran, Gelber, and Isen, 2022; Mahajan et al., 2024). We are the first to evaluate the incidence of two policy reforms currently under active debate—namely, increasing TFW application fees and granting open visas to TFWs—in a general equilibrium framework. We find that both policy reforms increase domestic worker wages and reduce firm profits in equilibrium, while TFWs are harmed by higher TFW application fees but benefit greatly from open visas. We also find that open visas increase worker-firm sorting.

Third, our paper contributes to the literature on partial identification. Our approach extends the bounding approaches of Horowitz and Manski (1995), Lee (2009), Rathnayake et al. (2024), and Kroft, Mourifié, and Vayalinkal (2025) to a difference-in-differences setting with heterogeneous firm types, where firm type plays the role of the selection indicator in the standard Lee bounds framework. We derive bounds on the within-firm-type treatment effect of PR for workers who would remain at the same firm type regardless of treatment status. This allows us to assess within-firm wage effects without conditioning on the endogenous decision to stay at a given firm type. Our approach is related to the mechanism-testing framework of Kwon and Roth (2026), but directly estimates the magnitude of within-firm-type effects rather than testing a sharp null of full mediation.

Lastly, our paper is broadly related to recent research that quantifies the importance of firm heterogeneity in understanding the earnings consequences of job displacement (Lachowska, Mas, & Woodbury, 2020; Bertheau et al., 2023; Schmieder, von Wachter, & Heining, 2023; Birinci, Park, & See, 2025), domestic outsourcing (Goldschmidt & Schmieder, 2017) and job training (Kroft, Mourifié, & Vayalinkal, 2025). Like these studies, we find an important role for firm heterogeneity in explaining changes in earnings, which adds to a growing body of evidence that documents the importance of firm effects for understanding the earnings consequences of a wide range of policies and economic shocks (Kline, 2024).

The remainder of the paper proceeds as follows. Section 2 describes the TFW Program in Canada and other relevant institutional details. Section 3 describes the data that we use in our empirical analysis, including the Canadian Employer-Employee Dynamics Database (CEEDD) and the databases on temporary visa records and permanent residents. Section 4 describes our research design and establishes identification of the average treatment effect—the causal effect of PR on labor market outcomes—using a stacked difference-in-differences estimator. In Section 5, we conduct a descriptive analysis that sheds light on worker and firm selection into the TFW Program. In Section 6, we report our reduced-form results estimating the effects of PR on job mobility, earnings, and firm pay premia. In Section 7, we develop the search-and-matching model that builds on the framework in Lise, Meghir, and Robin (2016). In Section 8, we calibrate the model to match our reduced-form results and use the model to simulate the long-run effects of PR and evaluate the equilibrium effects of counterfactual policies. Section 9 concludes.

[7] Our paper is also broadly related to a broader literature on immigrant-native wage gaps and immigrant earnings assimilation (Chiswick, 1978; Lalonde and Topel, 1992; Baker and Benjamin, 1994; Ferrer, Green, and Riddell, 2006; Lubotsky, 2007; Dustmann and Görlach, 2015; Javdani and McGee, 2018; Brinatti and Morales, 2024; Tino, 2025). Relative to this work, we show that the causal effect of mobility restrictions on earnings can account for a large share of the wage gap between natives and temporary immigrants.

## 2 The Temporary Foreign Worker Program

This section describes Canada's Temporary Foreign Worker Program (TFWP) and pathways to PR for TFWs. We focus on program features relevant to our main analysis sample, which consists of TFWs who arrived between 2004 and 2014 with closed work permits and transitioned to PR between 2007 and 2017.[8] For a summary of the TFWP timeline, see Appendix Figure A.1.

The TFWP was established by the Canadian federal government in 1973. The main objective was to help employers address recruiting challenges when they were unable to fill vacancies with domestic workers. The TFWP only admitted high-skilled workers until 2002, at which point the government established two distinct streams for low- and high-skilled TFWs that operated until 2014. A TFW would be designated as a high-skilled or low-skilled worker based on their occupation. Occupations in National Occupation Classification (NOC) group 0 (managerial), A (professional), or B (skilled and technical) were categorized as high-skilled, whereas occupations in NOC group C (intermediate and clerical) or D (elemental and labourer) were categorized as low-skilled.[9]

To hire a TFW, employers were required to first apply for a Labour Market Opinion (LMO) issued by Human Resources and Skills Development Canada (HRSDC). The purpose of the LMO was for HRSDC to determine whether a labor shortage existed (Elgersma, 2014). This included establishing that the employer made a "reasonable effort" to hire a Canadian worker or permanent resident and failed, which required first publicly advertising the job opening to Canadians. Additionally, to receive a positive LMO, employers were required to demonstrate on the application that they intended to pay TFWs wages comparable to those of Canadians in the same occupation and geographic region. Despite this, it has been argued that many employers paid TFWs below market wages and subjected them to inferior working conditions (Thompson, 2016; Brochu, Gross, and Worswick, 2020). There were no significant application fees to request an LMO until 2013, when the government introduced a fee of $275 (Employment and Social Development Canada, 2015). Appendices K.1 and K.2 show example LMO application forms for the low- and high-skilled streams, respectively.

Once an employer received a positive LMO, they could hire a TFW, who would then be issued a temporary work permit. There were three key features associated with these permits (Gross and Schmitt, 2012). First, they were fixed-term employment contracts that typically lasted between one and two years. Second, the permits were "closed" work permits, which meant that TFWs were generally not allowed to switch employers. Changing employers on a closed work permit was an onerous process, requiring a new employer to apply for and obtain a positive LMO, a difficult process given the significant administrative hurdles and often lengthy processing delays. Third, there was a requirement to leave Canada after the expiration of the work permit. Remaining in Canada for longer was only possible for TFWs who renewed their work permits with their existing employer, obtained a new permit, or became permanent residents.[10]

[8]The TFWP is distinct from the seasonal agricultural worker program (SAWP) launched in 1966 and the Live-in Caregiver Program (LCP) which began in 1981. We exclude TFWs in the SAWP or LCP (see Section 3).

[9]As shown in Appendix Figure A.2, the TFWP spans the skill distribution, with each of the broad skill levels (NOC 0, A, B, C, and D) accounting for significant shares of the TFW population between 2004 and 2016. Appendix Table A.1 further highlights this wide occupational diversity using granular 2-, 3-, and 4-digit NOC codes.

[10]In 2012–2013, media reports indicated that employers were exploiting the TFWP by overhiring and becoming overly reliant on TFWs, prompting the federal government to implement a major reform in June 2014 (O'Donnell and Skuterud,

The TFWP is similar to the H-1B program in the U.S., since H-1B visa holders are also temporary workers who are tied to a specific employer. However, the Canadian TFWP covers a broader range of occupations and industries compared to the H-1B program. For example, 37 percent of the TFWP workers in our data are employed in Accommodation and Food Services, while most of the workers on H-1B visas work in computer-related occupations, primarily in the "Professional, scientific, and technical services" industry category.[11] Moreover, in the U.S., employers can hire foreign workers on H-1B visas without going through a labor market test. A labor market test similar to the LMO in Canada is required at a later stage when the employer wants to sponsor an H-1B visa holder for PR. See Appendix E for more information about the H-1B program.

### Pathways to Permanent Residency

Temporary work visas obtained through the TFWP do not guarantee PR. Rather, TFWs must apply for PR through the same pathways as other immigrants. The most common pathways for TFWs with closed work permits are the skilled worker programs (including the *Federal Skilled Workers Program (FSWP)*, the *Canadian Experience Class (CEC)*, the *Federal Skilled Trades Program (FSTP)*, and the *Quebec Skilled Worker Program (QSWP)*), the *Provincial Nominee Program (PNP)*, and the *Family Class*. Appendix A.2 provides a comprehensive overview of these pathways.

There are four main pathways for high-skilled workers: the federal pathways (FSWP, CEC, and FSTP) and the QSWP (for those who intend to reside in Quebec). The FSWP is the oldest federal pathway, implemented under the *Immigration Act* of 1967. It is highly suitable for high-skilled TFWs due to its points-based system rewarding human capital. Applicants are assigned points based on education, age, skilled work experience, language proficiency, adaptability, and whether a Canadian employer has agreed to hire them.[12] In response to FSWP processing backlogs, the government introduced the CEC in 2008 to provide a faster route for those already in the country. Operating on a pass/fail basis rather than a points system, the CEC targets high-skilled TFWs with Canadian experience in NOC 0, A, or B occupations and historically processed applications significantly faster than the FSWP (Immigration, Refugees and Citizenship Canada, 2015).[13] Finally, there is the FSTP, introduced in 2013 in response to labor shortages in the skilled trades (Citizenship and Immigration Canada, 2013). Similar to the CEC, it evaluates applicants on a pass/fail basis but targets specific high-demand NOC B occupations. The QSWP evaluates applicants on a points-based system similar to the FSWP, but with more weight on factors such as French language proficiency.[14]

2022). Appendix A.1 describes the 2014 reform and the TFWP after 2014 in more detail, including the replacement of the LMO with the Labour Market Impact Assessment (LMIA). We note that since the immigrants in our sample arrived in Canada between 2002 and 2014 (inclusive), this reform is unlikely to affect our baseline estimates. As a robustness check, in Section 6 we exclude immigrants who arrived in 2014 and find that our results are very similar.

[11]For low-skilled occupations, the closer U.S. analog is the H-2B visa for temporary non-agricultural workers. However, unlike both the H-1B and TFWP, the H-2B does not allow visa holders to pursue PR.

[12]For example, in 2010, the FSWP awarded up to 25 points for education, 24 for language skills, 21 for work experience, 5 for adaptability (including one year of Canadian experience), and 5 for a job offer, with a minimum eligibility cutoff of 67 points (Table A.2).

[13]Between 2008 and 2014, 80% of CEC cases took 8 to 15 months, while 80% of FSWP cases took 37 to 47 months (Immigration, Refugees and Citizenship Canada, 2015).

[14]Quebec has operated an autonomous immigration system since the Canada-Quebec Accord of 1991. Until 2024, the primary pathway in Quebec was the QSWP, also known as Programme régulier des travailleurs qualifiés (PRTQ) (Moosapeta, 2022). In 2024, it was replaced by a similar program called the *Skilled Worker Selection Program (SWSP)*, or *Programme de sélection des travailleurs qualifiés (PSTQ)*. As detailed in Table A.3, the selection grid awarded a maxi-

The two remaining pathways—the PNP and the Family Class—are available to both low- and high-skilled workers, although they are especially viable for low-skilled workers who are not eligible for one of the skilled worker programs. The PNP allows provinces and territories to design their own immigration streams based on their unique economic and demographic needs. Since 1996, all provinces and territories other than Quebec and Nunavut have opted into the PNP (see Table A.4), resulting in a highly decentralized program with over 50 distinct immigration streams. Many PNP streams target immigrants who have Canadian work experience, work in high-demand occupations in a given province, or have an ongoing job offer from a provincial employer; Table A.5 lists some examples. TFWs who have spouses, dependents, or parents who are Canadian citizens or permanent residents can immigrate through the Family Class if their family members sponsor them for PR.

Table A.6 shows that 57% of the TFWs in our main analysis sample obtain PR through the PNP, 36% through the skilled worker programs (i.e., the FSWP, CEC, FSTP, and QSWP), and 7% through the Family Class. For high-skilled workers, 56% obtained PR through the skilled worker programs and 42% through the PNP. For low-skilled workers, in contrast, 78% obtained PR through the PNP, 15% through the Family Class, and 7% through the skilled worker programs.

## 3 Data and Summary Statistics

### 3.1 The Canadian Employer-Employee Dynamics Database

Our primary dataset is the Canadian Employer-Employee Dynamics Database (CEEDD), a comprehensive matched employer-employee dataset maintained by Statistics Canada. The CEEDD covers the near universe of individuals and firms in Canada from 2001 to 2019.[15] This dataset integrates several sources: the T1 Personal Master File (T1PMF), which provides individual-level demographic information such as age, location, marital status, and gender; the T4 database linked to the record of employment (T4ROE), which includes job-level data on earnings and industry; the National Accounts Longitudinal Microdata File (NALMF), which contains details on firms' financial positions; the Immigrant Longitudinal Database (IMDB), which contains detailed demographic information on Canadian permanent residents; and the Temporary Resident (TR) File, which includes information on individuals' temporary permits.

The CEEDD is built from administrative tax records and consequently lacks information on individuals' education, hours worked, and occupation. However, for the immigrant population, this tax data is supplemented with demographic information from the IMDB for permanent residents and permit data from the TR file for temporary residents. This unique linkage makes the CEEDD particularly well-suited for studying the effects of mobility restrictions on the labor market outcomes of TFWs, as we are able to observe the precise year, month, and day that each closed work permit starts and ends in the TR file and the precise year, month, and day of PR in the IMDB.

mum of 26 points for education and training, 8 for work experience, 22 for language proficiency, 10 for a validated job offer, and 8 points for connections to Quebec, such as a previous stay or family members.

[15] This sample period precludes us from estimating the causal effect of PR for TFWs in the International Mobility Program (IMP). Since these workers are on open permits, examining the effect of PR could serve as a falsification test. However, the IMP was introduced in Canada in 2014, and therefore it is not possible to analyze IMP workers since the CEEDD is only available up to 2019.

The IMDB records the worker's "intended occupation" at the time of PR. This serves as a proxy for an individual's skill since their actual, time-varying occupation is not observed. We classify intended occupations with NOC codes 0, A, and B as high-skilled and codes C and D as low-skilled to be consistent with the low- and high-skilled streams of the TFWP (Section 2). The IMDB also provides information on individuals' country of birth, and we follow Dostie et al. (2023) by classifying individuals as immigrating from "advantaged countries" if they were born in the U.S., the U.K., Australia, New Zealand, or Northern and Western Europe where most people have English as a second language.

A strength of the CEEDD is the detailed information on firms' financial positions drawn from the NALMF, a feature that is uncommon in matched employer-employee databases from other countries. The main firm-level variables we analyze are revenue and value-added. Total revenue is readily available, and we construct value-added using the formula "Value Added = Revenue − Total Expenses + Total Payroll." However, a notable limitation is that the firm data are aggregated to the enterprise level (the business entity that files taxes), precluding any analysis at the more granular establishment level (the specific physical location of employment).

### 3.2 Measuring Earnings, Job-to-Job Transitions, and Firm Pay Premia

In the CEEDD, the T4 database reports total annual earnings from each employer but lacks precise intra-year start and end dates for each job. We define an individual's *primary employer* as the firm paying the highest earnings in a given calendar year, and assign the worker's industry using the primary employer's two-digit NAICS code. Since workers who switch jobs mid-year will mechanically have understated earnings from their primary employer relative to a full 12-month spell, our preferred measure of earnings is the sum of earnings across *all* employers in a given year.

To capture job-to-job transitions accurately using annual data, we focus on changes in employment spells rather than simple year-over-year changes in the primary employer. We define an *employment spell* as consecutive years of strictly positive earnings from the same firm in the T4 database. A job-to-job transition ($J_{it} = 1$) occurs in year $t$ if a spell with one primary employer ends in year $t$ and a new spell with a different primary employer begins in year $t$. This formulation is necessary because defining transitions based solely on a change in the highest-paying firm across calendar years risks systematically misdating mid-year moves.[16]

To estimate firm pay premia in the CEEDD, we implement the following two-way fixed effects model from Abowd, Kramarz, and Margolis (1999) ("AKM"):

$$y_{it} = \alpha_i + \psi_{j(i,t)} + X_{it}'\beta + \varepsilon_{it}, \tag{1}$$

where $y_{it}$ is the log real earnings of individual $i$ at their primary employer $j$ in year $t$ (in constant 2012 dollars), $\alpha_i$ is the worker fixed effect, $\psi_{j(i,t)}$ is the firm fixed effect for firm $j$, $X_{it}$ is a vector of time-varying controls (polynomial in age, marital status, province, and year), and $\varepsilon_{it}$ is an error term. Our AKM sample is constructed to closely follow Dostie et al. (2023) and Li, Dostie, and Simard-Duplain

[16] For example, if a worker switches from Firm A to Firm B in November of year $t$, Firm A may remain the highest-paying firm in year $t$, and Firm B becomes the highest-paying firm in $t + 1$. Our measure $J_{it}$ correctly identifies the transition occurring in year $t$ when the new spell begins, whereas a naive primary-employer change measure would incorrectly date the transition to $t + 1$. Note that we conduct robustness exercises using the naive measure and find similar results.

(2023). First, we exclude self-employed individuals, restrict observations to the primary employer in a given year, and require individuals to earn more than roughly $18,000. Second, we drop the education, health, and public sectors, alongside firms with fewer than two employees, less than $50,000 in annual revenue, or under $100 in value-added per worker. Finally, we restrict the sample to the "connected set" of primary employers—a requirement for AKM estimation—which excludes fewer than 5% of firms. See Appendix C for more details on the AKM sample and estimation.

### 3.3 Main Estimation Sample

To construct our main estimation sample for the empirical analysis below, we begin with the complete set of individuals and firms in the CEEDD and impose the following restrictions.[17] First, we restrict the sample to TFWs whose *first* temporary permit in Canada is associated with an LMO, excluding temporary permits granted through the Seasonal Agricultural Workers Program (SAWP) or Live-in Caregivers Program (LCP).[18] Information on LMOs is only available in the TR file from 2004 onward, so this restricts our sample to the period 2004 to 2019. Second, because our skill proxy (intended occupation) is only observed conditional on obtaining PR, we drop individuals who never transition to PR. Consequently, our empirical strategy relies on the differential timing of PR acquisition among eventual permanent residents, rather than using the "never treated" as a control group. Third, we drop the first year of earnings for each TFW since these are guaranteed to be partial annual earnings.

As a final step, we impose two additional restrictions. First, we restrict the sample to individuals who hold temporary visas for three to five consecutive years prior to obtaining PR. This is because our research design requires that we observe earnings for all TFWs for at least two years before PR (recall we drop the first year), and we drop those who take more than five years to transition due to insufficient sample sizes. Second, we impose the requirement that, from their second year as a TFW through two years after PR, individuals (a) have strictly positive earnings and (b) are linked to a primary employer with an estimated AKM firm effect. This balancing requirement restricts the sample to TFWs who arrive in Canada between 2004 and 2014 and transition to PR between 2007 and 2017. Our final sample consists of roughly 25,000 unique individuals and 191,000 individual-year observations.

### 3.4 Summary Statistics

Table 1 presents summary statistics for our main variables, focusing on the sample of TFWs with temporary permits associated with LMOs and excluding workers in the SAWP and LCP. All reported monetary variables are adjusted for inflation using 2012 as the base year in the consumer price index (CPI). The first three columns of Table 1 present summary statistics for individuals that eventually obtain PR. Column (1) shows summary statistics for all individuals who obtain PR, whereas Column (2) restricts to individuals who take between 3 and 5 years (inclusive) to obtain PR and Column (3) restricts to the "analysis sample" used to estimate our main reduced-form event study model (see Section 3.3). Column (4) presents summary statistics for TFWs who never obtain PR. We do not have demographic information for these TFWs so cannot report these statistics.

[17] The sample size after each restriction is reported in Table A.7.

[18] As described in Footnote 10, the labor market test changed from the Labour Market Opinion (LMO) to the Labour Market Impact Assessment (LMIA) in 2014. However, with the exception of 2014, all our cohorts of TFWs arrived with an LMO. For the 2014 cohort, we include the TFWs who arrived with an LMIA.

Earnings in year two after arrival to Canada tend to be similar across all four samples, ranging from \$53,000 in column (1) to \$49,000 in column (4). Columns (1)-(3) show that, among individuals who obtain PR, all three samples tend to be similar in terms of the share who are high-skilled (60%), the share who are male (70%), the share with a bachelor's degree (45%), and the share from an advantaged country (15%). The average time-to-PR is roughly similar across those three samples and equal to around 3.7 (although the distributions of course differ since the second and third columns restrict to time-to-PR between 3 and 5 years). The table also shows that TFWs initially work in a diffuse set of industries, though nearly a third are concentrated in Accommodation and Food Services (NAICS 72). The distributions of initial industries are similar across Columns (1)-(3), but comparing Column (4) to Column (1) shows that individuals who never get PR are much less likely to work in NAICS 72 and more likely to work in Construction (NAICS 23), Professional, scientific, and technical services (NAICS 54), or a broad set of other industries. This underscores another potential challenge of using the "never treated" as a control group. Next, Table A.8 shows that the log revenue, log value added, and log number of employees for individuals' primary employer in their first year as a TFW are similar across all four samples. Finally, Figure A.3 shows the distribution of industries for TFWs before and after PR. We see that 37% of TFWs are employed in Accommodation and food services (NAICS 72) before PR, with the distribution of industries becoming much more diffuse after PR is obtained.

# 4 Identification and Estimation

Our research design to estimate the effect of PR on labor market outcomes of TFWs is based on a difference-in-differences approach. We rely on a conditional parallel trends assumption, requiring parallel trends only across landing-year cohorts conditional on each cell defined by occupational skill level and time-to-PR. We condition on occupational skill level because the TFWP had distinct high- and low-skilled streams during our sample period, as described in Section 2. Time-to-PR (the number of years between a TFW's first year of earnings and their PR year) may reflect unobserved heterogeneity due to differences in human capital or self-selection into different PR pathways (see Section 2). After conditioning on these variables, the remaining identifying variation comes from the "landing year"—the calendar year in which a TFW obtains PR. We therefore define a cohort by its landing year and conduct all identification and estimation within cells defined by skill level and time-to-PR. Our identification assumption is that, within these cells, selection into a particular landing year is not systematically related to cohort-specific trends in untreated earnings.

We denote the number of years it takes a TFW to obtain PR (time-to-PR) as $k \in \mathcal{K} = \{3, 4, 5\}$, occupational skill level as $s \in \mathcal{S} = \{\text{high}, \text{low}\}$,[19] and the landing year as $g \in \mathcal{G} = \{2007, \ldots, 2017\}$, where the values these sets take reflect sample restrictions described in Section 3.3. We condition implicitly on $(k, s)$ throughout the remainder of this section and suppress it from the notation; all objects defined below are $(k, s)$-specific, and we remind the reader of this throughout.

We let $Y_{it}(g)$ be the potential outcome for individual $i$ in year $t$ if they were externally assigned to landing year $G_i = g$. We also define $Y_{it}(\infty)$ as individual $i$'s potential outcome if they are untreated (do not have PR) through year $t$. We allow potential outcomes to vary only with the landing year, holding

[19]High-skilled corresponds to NOC groups $\{0, A, B\}$ and low-skilled to $\{C, D\}$.

$(k, s)$ fixed. Therefore, the set of potential outcomes is $Y_{it}(2007), \ldots, Y_{it}(2017), Y_{it}(\infty)$. Given this setup, we can represent the observed outcome $Y_{it}$ as:

$$Y_{it} = Y_{it}(G_i) = Y_{it}(\infty) + \sum_{g \in \mathcal{G}} (Y_{it}(g) - Y_{it}(\infty)) \cdot \mathbb{1}\{G_i = g\} \tag{2}$$

**Remark 1.** *As explained in Section 3.2, we exclude each TFW's first year of earnings from the analysis sample because it always reflects partial-year earnings. Therefore, for a given time-to-PR $k$, we restrict to earnings only for $k - 1$ years before PR.*

### 4.1 Assumptions

The standard common trends assumption in difference-in-differences requires common untreated outcome trajectories across all cohorts. We adopt a weaker version that requires common trends only across landing-year cohorts within a given time-to-PR $(k)$ and skill level $(s)$ cell. That is, trends may differ across cohorts with different time-to-PR or skills, but must be common across cohorts with the same time-to-PR and skills.

**Assumption 1** (CT). *For every combination of cohorts $g$ and $g'$ with $g' \neq g$ and any time periods $t, t'$ with $t' \leq t$:*

$$\mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) | G_i = g] = \mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) | G_i = g'] \tag{3}$$

We impose common trends between any pair of time periods $(t, t')$, as in Sun and Abraham (2021) and Borusyak, Jaravel, and Spiess (2024), rather than only between a fixed pre-treatment reference year and any target year. The motivation for assuming this version is discussed in the chaining subsection (Section 4.2).[20]

We next assume that, on average, the treatment effect of obtaining PR in year $g$ is zero before the treatment occurs. This "no anticipation" assumption rules out systematic pre-treatment effects of anticipated PR timing within $(k, s)$ cells and cohorts.

**Assumption 2** (NA). *For every cohort $g \in \mathcal{G}$ and every $t < g$:*

$$\mathbb{E}[Y_{it}(g) \mid G_i = g] = \mathbb{E}[Y_{it}(\infty) \mid G_i = g] \tag{4}$$

Within each $(k, s)$ cell, these assumptions are standard difference-in-differences assumptions. Because time-to-PR and skill level are discrete and low-dimensional, the conditioning described above is implemented nonparametrically by partitioning the data into cells, avoiding the functional form restrictions of regression-based approaches to conditional parallel trends (Lechner, 2011; Caetano & Callaway, 2024). We assess the joint plausibility of Assumption 1 (CT) and Assumption 2 (NA) by examining pre-trends in our empirical specification.

### 4.2 Target Parameter

Our target parameter is the cohort-specific average treatment effect on the treated within a $(k, s)$ cell in a given year. For a given cohort $g$ in calendar year $t$, we denote this as $\text{ATT}_t(g)$. For example,

[20] For example, the assumption holds if $\mathbb{E}[Y_{it}(\infty) | G_i = g] = \alpha_g + \gamma_t$, so that selection into treatment is based on a time-invariant fixed effect.

the treatment effect four years after obtaining PR for cohort $g = 2010$ is denoted $\text{ATT}_{2014}(2010)$. Using potential outcomes notation, our target parameter can be written as follows (adapting from Callaway and Sant'Anna (2021)):

$$\text{ATT}_t(g) \equiv \mathbb{E}[Y_{it}(g) - Y_{it}(\infty) \mid G_i = g] \tag{5}$$

For individuals with $G_i = g$, we observe $Y_{it}(g)$ for $t \geq g$ and $Y_{it}(\infty)$ for $t \in \{g - (k-1), \ldots, g-1\}$.

The identification challenge is that we do not observe counterfactual earnings $\mathbb{E}[Y_{it}(\infty) \mid G_i = g]$ for cohort $g$ after PR, i.e., for all $t \geq g$. Under Assumption 1 (CT) and Assumption 2 (NA), we can recover this counterfactual path of outcomes using a comparison cohort $g'$ that remains untreated through year $t$ (i.e., $g' > t \geq g$), and is observed in both a pre-treatment reference period $t' < g$ and the target year $t$. This yields the standard difference-in-differences estimand:

$$\text{ATT}_t(g) = \mathbb{E}[Y_{it} - Y_{it'} \mid G_i = g] - \mathbb{E}[Y_{it} - Y_{it'} \mid G_i = g'] \tag{6}$$

Appendix B.1 provides the formal derivation.

**The "chaining" approach to identifying long-run treatment effects**

Due to the limited pre-treatment observation window (Remark 1), it may be the case that no single later-treated cohort is observed in both a pre-treatment reference period $t'$ and the target year $t$ when their gap exceeds $k-1$ years ($t - t' \geq k-1$). In this case, the standard difference-in-differences estimator with a single control group cannot identify $\text{ATT}_t(g)$ for all post-treatment periods.[21]

Following the identification results of Balla-Elliott and Norwich (2025), we address this by exploiting the overlap between successive later-treated cohorts to "chain" together counterfactual trends through intermediate periods, extending identification beyond what any single comparison cohort could provide. Assumption 1 (CT) and Assumption 2 (NA) imply that every later-treated cohort provides the same counterfactual trend. Although any single cohort is observed untreated over only a subset of intermediate periods, chaining together their observed trends recovers the counterfactual path of outcomes from $t'$ to $t$. Appendix B.2 provides the formal derivation. The regression specification below pools across all available comparison cohorts, rather than relying on specific pairs, and recovers $\text{ATT}_t(g)$ under the stated assumptions.

## 4.3 Estimation

We express the cohort-time-specific treatment effect $\text{ATT}_t(g)$ in terms of relative time rather than calendar time. We define relative event time as $r = t - g$ and write $\text{ATT}_r(g) \equiv \text{ATT}_{g+r}(g)$ for the ATT for cohort $g$ at relative time $r$. Since we estimate $\text{ATT}_t(g)$ for each calendar year $t$ and cohort $g$, estimation of $\text{ATT}_t(g)$ and $\text{ATT}_r(g)$ is equivalent.

To estimate $\text{ATT}_r(g)$, we follow the spirit of stacking regressions to estimate difference-in-differences parameters. The chaining approach allows us to recover all cohort-by-relative-time treatment effect

[21] The reference period $t'$ is always chosen to be pre-treatment ($t' < g$). While Assumption 1 (CT) permits using different reference periods $t'$ for different target years $t$, this flexibility does not resolve the fundamental constraint. For example, consider $k = 4$ and $g = 2010$, with $t' = 2009$. Then for $t = 2011$, $t - t' = 2011 - 2009 = 2 < k - 1 = 3$ and we can identify $\text{ATT}_{2011}(2010)$ using cohort $g' = 2012$ as the comparison group. But for $t = 2012$, $t - t' = 2012 - 2009 = 3 \geq k - 1 = 3$, and we cannot identify $\mathbb{E}\left[Y_{2012}(\infty) | G_i = g\right]$ with a single cohort.

parameters for a given cohort of interest. The stacked regression enables joint inference across these effects. A formal proof that our regression estimand recovers the parameters of interest is provided in Appendix B.3.

**Subsetting the data into "slices"**

Recovering $\text{ATT}_r(g)$ for a given cohort $g$ requires constructing a "slice" within a cell defined by $(k, s)$. We first restrict the data to all individuals in the cell, i.e., those with time-to-PR equal to $k$ and skill level equal to $s$. We then subset the data to include individuals in our cohort of interest $G_i = g$ and not-yet-treated individuals with $G_i > g$, who serve as our control group. We retain control individuals only in their pre-treatment years ($t < G_i$) to ensure clean controls. Each slice thus consists of $(i, t)$ observations satisfying one of the two criteria below:

$$\begin{aligned} \text{Treatment: } &\{(i,t) : G_i = g \text{ for all observed } t\} \\ \text{Control: } &\{(i,t) : G_i > g \text{ and } t < G_i\} \end{aligned} \tag{7}$$

The slice construction in (7) enables identification of long-run treatment effects through the chaining approach, provided that sequential later-treated cohorts overlap in at least one calendar year (the "connected set" condition of Balla-Elliott and Norwich (2025)).[22] As we discuss below, this condition fails at the earliest relative time for each treated cohort, which restricts the set of identifiable parameters.

**Estimation within a slice**

With the slice defined in (7), we implement the following event-study regression to recover $\text{ATT}_r(g)$ as $\delta_{rg}$:

$$Y_{it} = \sum_{g' \in \mathcal{G}} \gamma_{g'} \mathbb{1}\{G_i = g'\} + \sum_{\ell} \tau_\ell \mathbb{1}\{t = \ell\} + \sum_{r \neq -1} \delta_{rg} \mathbb{1}\{G_i = g, r = t - g\} + \varepsilon_{it} \tag{8}$$

where $\gamma_{g'}$ are cohort fixed effects and $\tau_\ell$ are calendar year fixed effects. The regression specification also includes a quadratic in normalized age, suppressed from Equation (8) for readability; see Appendix C.2 for details on the age normalization. The coefficients $\delta_{rg}$ are our objects of interest.[23] We set $r = -1$ as the typical reference period. The slice, regression, and recovered coefficients $\delta_{rg}$, $\gamma_{g'}$, $\tau_\ell$ are all $(k, s)$-specific.

Separate identification of cohort effects $\gamma_{g'}$ and calendar year effects $\tau_\ell$ requires that each calendar year in the slice includes observations from at least two cohorts. In our setting, where cohorts are observed in consecutive years without gaps, this is equivalent to the connected-set condition described above. This condition binds at the earliest relative time for each treated cohort: by Remark 1, cohort $g$ is first observed in calendar year $g - k + 1$, and any later-treated cohort $g' = g + 1$ is first observed

[22]The slice construction differs from Callaway and Sant'Anna (2021), who restrict to two time periods: a reference year and a single post-treatment year. Accordingly, their approach estimates one cohort-by-time effect parameter per slice. Our construction retains all observed years for treated individuals and all pre-treatment years for later-treated individuals, recovering all cohort-by-relative-time effects for a given cohort of interest.

[23]The relative event-year indicators are defined only for the treated individuals with $G_i = g$. Consequently, we estimate treatment effect parameters $\delta_{rg}$ only for the cohort of interest. A fully saturated specification, as in the interaction-weighted estimator of Sun and Abraham (2021), would include interactions between each cohort and relative time (i.e., $\mathbb{1}\{G_i = g', r = t - g'\}$ for every cohort $g'$ in the slice). However, by construction of the slice, later-treated cohorts contribute only pre-treatment observations, and Assumption 2 (NA) implies these coefficients equal zero.

in year $g' - k + 1$. Consequently, no later-treated cohort appears in the treated cohort's first observable year. Although cohort $g$ is observed from $r = -(k-1)$, the coefficient $\delta_{-(k-1),g}$ is not identified, and we therefore omit the earliest relative-time coefficient from estimation.

Because the relative-time indicators are interacted with the cohort-of-interest indicator $\mathbb{1}\{G_i = g\}$, this specification requires only a single relative-time normalization ($r = -1$). In contrast, standard TWFE specifications without never-treated units require two normalizations due to the collinearity between cohort, calendar year, and relative time indicators.[24]

The specification in Equation (8) recovers $\text{ATT}_r(g)$. Valid standard errors for the aggregated event-study estimate require jointly estimating the variance-covariance matrix across cohorts and relative times.

**Stacking and aggregation**

Following the stacking approach of Deshpande and Li (2019), we iterate over all cohorts within each $(k, s)$ cell and append the slices defined in (7), each corresponding to a $(g, k, s)$ combination, into one "stacked" dataset. Some $(i, t)$ observations from the original dataset are duplicated if they are used as control observations for different treated cohorts. This stacking procedure and estimation of the saturated version of Equation (8), with cohort and calendar year fixed effects interacted with $(g, k, s)$ slice indicators, allows us to obtain the joint variance-covariance matrix for the full set of cohort-by-relative-time estimates $\{\text{ATT}_r(g)\}_{r,g}$ (which also vary across $(k, s)$ cells) in a single regression. We cluster standard errors at the individual level, which accommodates arbitrary within-individual correlation across the duplicated observations in the stacked dataset.

We aggregate the parameters across cohorts in order to present an event study of treatment effects across relative time. Following the interaction-weighted estimator of Sun and Abraham (2021), the aggregation below weights the estimates by each cohort's share of observations at the given relative time.

$$\text{ATT}_r \equiv \sum_g \text{ATT}_r(g)\mathbb{P}\{G_i = g \mid i \text{ observed at relative time } r\} \tag{9}$$

Equation (9) suppresses $(k, s)$ and therefore shows aggregation across cohorts within a $(k, s)$ cell. In practice, we aggregate jointly across $(g, k, s)$, weighting by each triple's share of observations at relative time $r$, to produce the reported $\text{ATT}_r$.

# 5 Descriptive Evidence

To provide context for our causal analysis, this section establishes key stylized facts regarding the earnings and employment patterns of TFWs. We proceed in three steps. First, we document the baseline TFW earnings penalty conditional on job and human capital characteristics, suggesting that visa-related job mobility restrictions contribute to the earnings disparities between TFWs and permanent residents. Next, we characterize selection into the TFW program, finding that low-wage firms disproportionately hire TFWs and that TFW-intensive firms disproportionately hire low-wage workers. Finally, we provide

[24] This identification issue applies to any heterogeneity-robust estimator without never-treated units, including the interaction-weighted estimator of Sun and Abraham (2021) and the imputation approach of Borusyak, Jaravel, and Spiess (2024). See Appendix B.3 for a detailed discussion.

suggestive evidence that firms that hire TFWs have greater monopsony power over their workers, consistent with wage-setting power arising from job mobility restrictions. Together, these patterns set the stage for our causal analysis in Section 6 and model calibration in Section 8.

We begin by estimating the TFW-PR pay gap using cross-sectional data from the 2016 Canadian Census. We use the Census for this baseline analysis because it provides detailed information on education and current occupation, in contrast to the CEEDD which lacks information on education for natives and current occupation for all workers. We restrict the sample to individuals aged 18 to 64 who are employed full time and follow as closely as possible the same set of sample restrictions as our main analysis, excluding students, live-in caregivers (NOC 43-44), and individuals working in the agriculture (NAICS 11), education (NAICS 61), health (NAICS 62), and public (NAICS 91) sectors. Table A.9 presents summary statistics for the sample. TFWs tend to be younger than PRs (65.7 percent are under age 34, compared to 22.0 percent) and are more likely to hold a bachelor's degree or higher (53.2 percent versus 38.7 percent). TFWs are also more likely to work in Accommodation and Food Services or Professional, Scientific, and Technical Services, but less likely to be employed in Manufacturing compared to PRs.

We use Ordinary Least Squares (OLS) to estimate Mincer-style earnings regressions of the form:

$$Y_i = \alpha + \beta_1 TFW_i + \beta_2 PR_i + \mathbf{X}_i'\gamma + \varepsilon_i, \tag{10}$$

where $Y_i$ is log earnings for individual $i$, $TFW_i$ is an indicator for whether individual $i$ is a temporary foreign worker, $PR_i$ is an indicator for whether individual $i$ was ever a permanent resident, and the reference category is native-born individuals.[25] The vector $\mathbf{X}_i'$ includes age categories, gender, an indicator for a bachelor's degree or higher, a binary indicator for whether English is spoken at home, a binary indicator for whether French is spoken at home, and fixed effects for industry and occupation.

Table 2 reports regression estimates for a variety of specifications. Column (1) presents the raw pay gaps and shows that TFWs earn 43.1 log points less and PRs earn 11.5 log points less than native-born workers. Adding baseline controls for age, education, gender, and language in Column (2) leaves the TFW gap relatively unchanged but increases the PR gap (in magnitude) to 0.18. The gaps are slightly reduced when we add industry fixed effects (Column (3)), occupation fixed effects (Column (4)), and both (Column (5)). Overall, this analysis suggests that TFWs face an earnings penalty compared to permanent residents that cannot be explained by differences in human capital or occupation. Instead, this disparity points to the role of visa restrictions, particularly "closed" visas that limit job mobility.

To further investigate the sources of the TFW pay penalty, we turn to a descriptive analysis documenting the nature of selection of firms and workers into the TFWP using matched employer-employee data from the CEEDD. We use the pattern of selection as a moment to match when we calibrate our model in Section 8. To characterize worker and firm types, we estimate a two-way fixed effects (AKM) model of log earnings (see Appendix Section C for details). For firms that hire at least one TFW during our sample period, we classify them based on their TFW employment share, which is calculated as the average (across all years available) of the annual fraction of each firm's workforce composed of TFWs. Figure 1a reports the distribution of firm effects for above-median and below-median TFW firms. The

[25]Note that the "permanent resident" category includes immigrants who were previously permanent residents and have obtained citizenship. Note that we also pool all TFWs, including those with open and closed work permits, since we cannot differentiate between them in the Census.

results indicate that firms with higher TFW shares tend to have lower firm effects, implying negative selection of firms into the TFWP.[26] Figure 1b reports results based on the average of worker effects (across all years available) for the same set of firms and shows that above-median TFW firms tend to employ individuals with lower worker effects. We also report results from a separate worker-level comparison focusing specifically on TFWs. Figure A.4b compares the distribution of worker effects for TFWs with that of other workers, including natives and permanent residents who were never TFWs. Worker effects are generally lower for "ever TFWs"—individuals observed as TFWs at some point in our data—indicating negative worker selection into the TFWP.[27]

Having established that TFW-intensive firms are more likely to have lower AKM firm fixed effects, we next examine whether this pattern reflects lower productivity or monopsony power. The intuition for our test comes from Beauregard et al. (2025) who argue that under certain models of wage setting, the firm fixed effect is equal to match surplus scaled by the worker's rent share. Thus, comparing the firm effects of TFW-firms to non-TFW-firms conditional on productivity is informative about whether the former have more monopsony power. We measure firm productivity using net value-added per worker—computed as the firm's average value added per worker across all available years, winsorized at the 95th percentile with values below the 5th percentile set to zero—and examine its relationship with the firm pay premia from the AKM model. Figure 2a shows a clear positive association between the firm pay premia and net value added per worker, with a slope of roughly 0.13. Figure 2b splits firms by whether their TFW employment share is above or below the median and shows that, conditional on net value added per worker, high-intensive TFW firms have firm effects that are systematically lower than low-intensive TFW firms. In addition, the relationship between net value added per worker and the firm effect is weaker for high-intensive TFW firms, as indicated by the smaller slope of the line of best fit in Figure 2b.

As a last step, we descriptively examine the sorting pattern of TFWs in the labor market. Given that TFWs can climb the job ladder after PR, it follows that the nature of sorting may also vary. Figure A.6a and Figure A.6b plot the distribution of firm effect quintiles by worker effect quintiles for TFWs in our sample before and after they obtain PR. We see that the firm pay premia increase for workers in all worker effect quintiles, although workers in the lower quintiles experience the largest gains. This motivates our investigation into the effect of PR on worker-firm sorting using our research design in Section 6.

# 6 Reduced-Form Results

In this section, we report estimates of the causal effect of PR on labor market outcomes based on Equation (8). We begin with the baseline effects of PR on job mobility and earnings. To unpack the mechanisms driving these earnings gains, we then investigate whether the overall effect is driven by

[26]Figure A.4a shows a similar pattern when we compute the cross-sectional distribution at the individual level of average firm effects of each individual's primary employer (excluding post-PR years for TFWs who obtain PR) and compare it with the same individual-level distribution for the rest of the population (native-born workers and PRs who were never TFWs).

[27]We also compare the worker effects and average firm effects of TFWs who never obtain PR with those who do. Appendix Figure A.5 shows that the distributions of both worker effects and average firm effects are broadly similar across these two groups.

between-firm reallocation versus within-firm earnings growth, and finally explore how this reallocation alters aggregate worker-firm sorting. For each main outcome, we plot event-study estimates from three years prior to three years after PR ($t = -3$ to $t = +3$). These estimates represent the relative time-aggregated estimates derived from Equation (8), with standard errors clustered at the individual level. To provide a concise summary of the overall post-treatment impact, we further aggregate these results by taking a simple unweighted average of the event-time coefficients for $t = 1$, $t = 2$, and $t = 3$.

### 6.1 Job Mobility and Earnings

We begin by establishing the direct impact of lifting the visa's mobility restriction. Figure 3a reports event-study estimates of the effect of PR on the probability of any job transition during the year (defined by $J_{it}$ in Section 3.2). The results reveal a sharp, immediate, and persistent increase in job mobility: the job transition rate jumps by an average of 21.7 percentage points (SE = 1.0) over the first three years. Furthermore, this increased mobility occurs both within and across sectors; Figure 3b shows that the probability of switching industries increases by 12.4 percentage points (SE = 1.0), indicating that more than half of these job transitions are associated with cross-industry moves.

Given that PR causes an increase in job transitions, we next ask whether this reallocation translates into higher earnings. Figure 3c confirms a clear increase in earnings from one year post-PR onward. Because our earnings measure aggregates across all employers in a calendar year, earnings at $t = 0$ include amounts accrued prior to obtaining PR, meaning that any effects at $t = 0$ reflect only partial treatment. Over the first three fully treated years, worker earnings increase by an average of 3.2 percent (SE = 1.1).[28] Benchmarking this initial three-year effect against the TFW-PR pay gap in Column (5) of Table 2 shows that at least 20 percent of the conditional gap is directly caused by mobility restrictions.

### 6.2 Firm Heterogeneity

Are these earnings gains from PR directly resulting from workers switching to higher-paying firms? To determine whether the overall earnings effect is driven by workers climbing the job ladder, we begin by replacing log earnings on the left-hand side of the event study with the estimated AKM firm pay premium of the worker's primary employer ($\hat{\psi}_{j(i,t)}$ from Equation 1). Figure 3d shows a clear upgrade in firm quality following PR with firm pay premia rising by an average of 3.2 percentage points in the first three years (SE = 0.2).[29] This increase is roughly equal in magnitude to the overall increase in earnings and is consistent with AKM, suggesting that post-PR earnings gains are driven by workers moving to higher-premium employers rather than experiencing match-specific earnings growth at their

[28] In a previous version of this paper, we reported larger estimated effects of PR on earnings. Those estimates reflected a subtle error in our earnings imputation procedure. In years when workers changed jobs, the procedure incorrectly scaled earnings at each worker's primary employer to full-year equivalent earnings. Because workers are more likely to change jobs after receiving PR, this error mechanically overstated post-PR earnings and biased the estimated earnings effects upward. We have corrected this issue by no longer using imputed earnings values in the analysis; instead, we only use total annual earnings across all employers in a given year. This correction also eliminates the need for the additional model parameter that we previously introduced to reconcile the larger estimated effect of PR on earnings with the smaller estimated effect on firm pay premia. In the corrected analysis, the estimated effects of PR on earnings and firm pay premia are very similar, consistent with both a standard AKM model and the calibrated model discussed below. We thank refine.ink for alerting us to this error.

[29] The confidence intervals for the firm pay premia event-study estimates do not account for the estimation error in the firm fixed effects themselves, which stem from the auxiliary AKM model.

current jobs.[30]

Thus far, we have seen that over half of post-PR job transitions occur across sectors (Figure 3b) and that firm upgrading is a primary driver of the earnings gains from PR (Figure 3d). A natural question is whether the observed firm upgrading is driven by movement into industries where firms pay more on average. To test this, we replace the firm pay premium of the worker's primary employer with the average pay premium of all firms in the worker's industry as the dependent variable in our event study. Appendix Figure A.7 shows that industry pay premia rise significantly post-PR, confirming that the observed firm upgrading reflects reallocation toward higher-paying sectors.

Finally, having established that PR affects earnings through moves to higher-paying firms, we next examine whether these destination employers are positively selected along dimensions beyond their pay premia. Specifically, we use the rich balance sheet data in the CEEDD to assess how post-PR job mobility changes the composition of workers' firms, replacing the firm pay premium on the left-hand side of the event study with alternative characteristics of the primary employer. Figure 4 shows that workers reallocate to firms with 25.1 percent more employees (SE = 2.6), 41.8 percent higher revenue (SE = 3.3), and 41.8 percent higher value-added (SE = 3.1). Furthermore, they move to firms with higher-earning coworkers, reflected in a 2.9 percentage point increase in average coworker fixed effects (SE = 0.3), which is a predictable consequence of the positive assortative matching of high-earning workers to high-paying firms (Abowd, Kramarz, & Margolis, 1999; Card, Heining, & Kline, 2013). Finally, value-added per worker increases by 2.2 percent (SE = 1.2), aligning with our descriptive evidence in Figure 2a linking firm pay premia to firm productivity.

### 6.3 Within-Firm versus Between-Firm Effects

The results in Section 6.2 indicate that earnings gains from PR are consistent with the AKM model and are primarily driven by workers moving to firms with higher pay premia. In this section, we provide further evidence on the relative contributions of between-firm reallocation and within-firm wage growth to the earnings gains from PR. We begin with descriptive evidence on workers who switch industries between $t = 0$ and $t = 2$ ("industry switchers") and those who do not ("industry stayers"). Figure 5 reveals that earnings increase by 12.9 percent (SE = 1.8) for industry switchers compared to $-0.5$ percent (SE = 2.2) for industry stayers, while firm pay premia increase by 7.1 percentage points (SE = 0.4) for industry switchers compared to 0.3 percentage points (SE = 0.4) for industry stayers.

However, since staying is itself an outcome of PR, the results conditioning on industry stayers may be contaminated by selection bias. To address this, we develop a novel partial identification approach (detailed in Appendix D) that derives sharp bounds on the within-firm-type effect of PR. Our approach, which builds on "Horowitz-Manski-Lee bounds" (Horowitz & Manski, 1995; Lee, 2009), integrates the staggered difference-in-differences adaptation in Rathnayake et al. (2024) with the multilayered bounding framework of Kroft, Mourifié, and Vayalinkal (2025). In our setting, PR is the treatment (indexed by $Z \in \{0, 1\}$), and firm type $D$ corresponds to the selection variable, which we assume takes values in

[30] In the AKM framework (Equation 1), $y_{it} = \alpha_i + \psi_{j(i,t)} + X'_{it}\beta + \varepsilon_{it}$. Taking changes around the PR event gives $\Delta y_{it} = \Delta\psi_{j(i,t)} + \Delta X'_{it}\beta + \Delta\varepsilon_{it}$, since $\alpha_i$ is fixed. Because $\psi_{j(i,t)}$ depends only on the worker's employer, $\Delta\psi_{j(i,t)} = \psi_{j(i,t_1)} - \psi_{j(i,t_0)}$ is nonzero only when the worker changes primary employers. Under the standard AKM assumption that $E[\Delta\varepsilon_{it}] = 0$, and conditioning on observables, it follows that $E[\Delta y_{it}] \approx E[\Delta\psi_{j(i,t)}]$. Thus, a one-to-one mapping between earnings changes and firm premia changes implies that the earnings effect is driven by transitions to higher-premium employers.

$\{0, L, H\}$, where 0 denotes unemployment, $L$ denotes employment at a low-paying firm (estimated AKM pay premium below the median), and $H$ denotes employment at a high-paying firm (estimated AKM pay premium above the median).[31]

Let $D_{t^\star}$ denote a worker's observed firm type in the pre-treatment base period $t^\star$, and let $D_t(0)$ and $D_t(1)$ denote their potential firm types in post-treatment year $t$ without and with PR, respectively. Because $t^\star$ precedes treatment, no anticipation (Assumption 3 (NA) in Appendix D) implies $D_{t^\star}(0) = D_{t^\star}(1) = D_{t^\star}$, so the base-period firm type is observed regardless of PR status. Following Kroft, Mourifié, and Vayalinkal (2025), we define a worker's *response type* as the pair $T_t = (D_t(0), D_t(1))$. A worker at firm type $d$ in the base period whose response type is $T_t = (d, d)$ is called a *baseline-$d$ always-stayer*, denoted $\mathcal{S}_d(t) \equiv \{D_{t^\star} = d, T_t = (d, d)\}$: they were at firm type $d$ in the base period and would remain at firm type $d$ regardless of their PR status. We provide sharp bounds for the within-firm-type treatment effect $\tau_t^d(g)$, defined as the average effect of PR on earnings for baseline-$d$ always-stayers in cohort $g$ in year $t$:[32]

$$\tau_t^d(g) \equiv E[Y_t(1, d) - Y_t(0, d) | \mathcal{S}_d(t), G = g] \tag{11}$$

where $Y_t(z, d)$ denotes potential earnings in year $t$ under PR status $z \in \{0, 1\}$ and firm type $d$. The contrast varies $z$ while holding $d$ fixed, isolating the effect of PR conditional on remaining at firm type $d$.[33]

Identification of $\tau_t^d(g)$ relies on three assumptions, stated formally in Appendix D. First, *conditional parallel sorting*, Assumption 4 (CPS), requires that, conditional on base-period firm type, the probability of remaining at the same firm type under a given PR status is equal across cohorts. This allows us to bridge potential firm-type distributions from not-yet-treated control cohorts to the focal treated cohort. Second, *principal parallel trends*, Assumption 5 (PPT), equates the counterfactual wage growth of baseline-$d$ always-stayers in the focal cohort with that of their counterparts in later-treated cohorts. Third, *strong monotonicity*, Assumption 6 (SM), requires $D_t(1) \geq D_t(0)$ for all workers. Under the restriction $D_t \in \{L, H\}$, this rules out the response type $(H, L)$: PR cannot cause workers to move from higher- to lower-paying firm types.

We show in Appendix D that, under conditional parallel sorting and strong monotonicity, the share of baseline-$d$ always-stayers is point identified from the ratio of the probability of remaining at firm type $d$ in the treated cohort to that among not-yet-treated cohorts. Appendix Table A.10 reports the estimated response type shares by event time. Averaging across event times, the always-stayer response types $T_t = (L, L)$ and $T_t = (H, H)$ account for approximately 80 and 94 percent of workers initially at $L$- and $H$-type firms, respectively. Given the identified shares, we construct upper and lower bounds for $\tau_t^d(g)$ by trimming the empirical distribution of wage changes among observed $d$-stayers (workers at firm type $d$ in both the base period and year $t$). This distribution is a mixture of baseline-$d$ always-stayers (the target subpopulation) and counterfactual switchers, whose firm type depends on their PR status.

[31] The median is computed across worker-year observations in the AKM sample (see Section 3.2).

[32] This parameter corresponds to what Kroft, Mourifié, and Vayalinkal (2025) term the local controlled direct effect (LCDE). See Appendix D for the formal definition and identification argument.

[33] While our setting can accommodate multilayered selection, in practice we assume full employment throughout the analysis, restricting $D_t \in \{L, H\}$. This aligns with our empirical setting where all TFWs are employed at baseline and eventually obtain PR.

The bounds correspond to the two extreme scenarios in which the counterfactual switchers occupy either the top or bottom of the distribution.

Appendix Figure A.8 reports the estimated bounds on $\tau_t^d(g)$ separately for baseline-$H$ and baseline-$L$ always-stayers. After PR, the estimated bounds for both sets of workers include zero, consistent with no within-firm-type effect. For baseline-$H$ always-stayers, we can rule out within-firm-type effects larger than 1.7 percent. The bounds for baseline-$H$ always-stayers are tighter because a larger fraction of observed $H$-stayers are always-stayers (94 versus 80 percent), leaving less of the distribution to trim (see Appendix Table A.10). While these bounds are consistent with reallocation as the channel driving the earnings gains from PR for always-stayers, we cannot rule out a wage bargaining effect for switchers. That said, the descriptive evidence supports reallocation driving their gains as well: the earnings effects of PR are concentrated among industry switchers, and the average earnings effect is roughly equal to the average firm-pay-premia effect (Section 6.2). These findings point to the importance of job mobility for understanding the labor market consequences of visa restrictions: closed visas suppress earnings primarily by preventing TFWs from climbing the job ladder.

### 6.4 Worker Heterogeneity

To provide a more complete picture of the effects of relaxing mobility restrictions, we explore how the impacts of PR vary across observable worker characteristics. We estimate Equation (8) separately across subsamples defined by skill level, gender, age, and country of origin. The estimates reported in this section represent the relative time-aggregated coefficients obtained from these separate regressions.

We first consider worker skill, a natural starting point given the TFWP's historical division into low- and high-skilled streams (see Section 2). Figure 6 shows that low-skilled workers experience greater post-PR increases in job mobility (across firms and industries), earnings, and firm pay premia relative to high-skilled workers. As an alternative measure of skill, we classify workers based on whether their estimated AKM worker fixed effect falls above or below the sample median. Appendix Figure A.9 shows that this measure yields a highly consistent pattern, with below-median workers experiencing larger gains across all outcomes.

Next, we examine the effects of PR across gender and age in Figure 6. For both characteristics, we observe similar empirical patterns: while there is little difference in post-PR mobility rates across gender or age groups, there are notable differences in their earnings trajectories. Women experience larger post-PR earnings gains than men, and younger workers similarly experience larger increases in earnings after transitioning to PR.

Finally, we examine how the impacts of PR vary by country of origin. Workers migrating from lower-income countries may accept worse initial employer matches and remain stuck in these low-paying jobs due to the limited job mobility of closed visas, suggesting that relaxing mobility restrictions could yield larger gains for this group. Appendix Figure A.9 confirms this intuition: workers from lower-income countries experience much larger post-PR increases in job mobility across firms and industries, along with greater gains in earnings and firm pay premia. These patterns complement descriptive evidence showing that permanent residents from lower-income countries experience steeper increases in firm pay premia in the years following immigration (Dostie et al., 2023).

### 6.5 Worker-Firm Sorting

Given our finding that PR disproportionately enables lower-skilled workers to transition into higher-paying firms, the removal of visa mobility constraints may not only improve individual outcomes but reshape the distribution of workers across firms. To capture these distributional shifts, our final analysis examines the effects of PR on worker-firm sorting, which we measure using the covariance between worker and firm fixed effects. Specifically, we replace the dependent variable in our event study with the product of the demeaned worker and firm effects from the AKM model:

$$Y_{it} = (\alpha_i - \bar{\alpha}) \cdot (\psi_{j(i,t)} - \bar{\psi}_t)$$

where $\alpha_i$ is the worker effect for individual $i$, $\psi_{j(i,t)}$ is the firm effect of their primary employer in calendar year $t$, $\bar{\alpha}$ is the mean worker effect within each slice (see Equation (8)), and $\bar{\psi}_t$ is the mean firm effect within each slice and calendar year. For this specification, we estimate the stacked event study model (Equation 8) without conditioning on observable skill in order to capture changes in overall sorting rather than sorting within specific skill groups. Appendix Figure A.10 shows that sorting decreases after PR and remains persistently lower.

To interpret these sorting results, it is useful to distinguish between firm upgrading and changes in the matching gradient. Because worker effects are fixed at the time of PR and demeaned within each slice, the change in the AKM sorting statistic simplifies directly to the covariance between worker ability and the change in firm effects:[34]

$$\Delta E[(\alpha_i - \bar{\alpha})(\psi_{j(i,t)} - \bar{\psi}_t)] = \text{Cov}(\alpha_i, \Delta\psi_{j(i,t)})$$

As discussed in Section 6.4, while workers of all skill levels move to higher-$\psi$ firms following PR, lower-skilled workers experience larger gains on average. Since these individuals disproportionately transition into high-wage firms, the distribution of firm effects shifts upward at the bottom of the worker distribution. Consequently, the covariance term is negative, driving the decline in the AKM sorting statistic and explaining the observed weakening of positive assortative matching.

Importantly, this does not necessarily imply a reduction in allocative efficiency. Rather, it reflects a compression of the matching gradient driven by larger improvements among initially constrained workers. The results discussed above demonstrate that relaxing mobility constraints induces a reallocation to higher-paying and more productive firms, which could increase aggregate efficiency.

### 6.6 Robustness Tests

In this section, we consider the robustness of our main event-study results to alternative measures of job transitions and firm pay premia. We also consider the sensitivity of our estimates to sample restrictions due to a potentially confounding reform to the TFW program, different controls for age, and using a standard two-way fixed effects (TWFE) estimator.

We begin by considering different measures of job-to-job transitions and firm pay premia. Our main measure of job-to-job transitions, $J_{it}$ (defined in Section 3.2), equals one in year $t$ if a job spell ends

[34] The standard decomposition for the change in the product of these variables would be $\Delta E[(\alpha_i - \bar{\alpha})(\psi_{j(i,t)} - \bar{\psi}_t)] = E[\alpha_i - \bar{\alpha}]E[\Delta\psi_{j(i,t)}] + \text{Cov}(\alpha_i, \Delta\psi_{j(i,t)})$. However, because we demean worker effects within each slice, $E[\alpha_i - \bar{\alpha}] = 0$. Consequently, the first term—which captures average firm upgrading—drops out.

and another begins in that year and zero otherwise. Appendix Figure A.11 shows that the effect of PR on job transitions is similar when using an alternative measure that equals one if the individual's primary employer is different in year $t$ compared to year $t-1$ and zero otherwise. Next, the firm effect we estimate using AKM assumes that pay policies at a workplace are similar for TFWs and native workers. This assumption is consistent with the evidence in Dostie et al. (2023). Nevertheless, we evaluate the robustness of our estimates by estimating our model with an *immigrant* firm pay premium as the dependent variable. The *immigrant* firm pay premium is estimated following the approach in Dostie et al. (2023) and applying the AKM model described in Appendix C.[35] Appendix Figure A.12 shows that the effects for the immigrant firm pay premium are slightly larger but broadly similar to the baseline results for the firm pay premium obtained from estimating the AKM model with the full sample.

We next consider the robustness of our main results to various sample restrictions and using a different functional form for age in our estimating equation. As noted in Section 3.3, our main analysis sample includes TFWs who arrived in Canada between 2004 and 2014. However, a major reform of the TFWP was introduced in 2014 (see Section 2). To assess the robustness of our results to this reform, we estimate our event study excluding the 2014 arrival cohort. Appendix Figures A.13 (worker mobility, earnings, firm pay premia) and A.14 (other employer characteristics) show that the results remain very similar when the 2014 arrival cohort is excluded from the sample. Turning to age controls, our main specification includes a quadratic function in age. To assess the robustness of our estimates to this functional form assumption, we re-estimate the event studies using (i) fixed effects for age categories (25–34, 35–44, 45–54, and 55+) or (ii) fixed effects for each single-year age. Appendix Figure A.15 (worker mobility, earnings, firm pay premia) and Appendix Figure A.16 (other employer characteristics) show that the results are very similar compared to our baseline specification.

Lastly, our main results are based on a stacked difference-in-differences approach that addresses the recent critiques of standard TWFE models when there is a staggered treatment and treatment effects are heterogeneous. To investigate the sensitivity of our results, we estimate a TWFE model with fixed effects for year of PR and current year (while also controlling for observable skill level and time-to-PR). Appendix Figure A.17 reports results for worker mobility, earnings, and firm pay premia, while Appendix Figure A.18 reports estimates for other employer characteristics. We find very similar results across all our main outcomes using this alternative estimation approach that is less robust to arbitrary patterns of treatment effect heterogeneity.

# 7 Model

To interpret our reduced-form empirical results and consider counterfactual policies, we develop and estimate a search-and-matching model with heterogeneous workers and firms based on the framework in Lise, Meghir, and Robin (2016).

[35] We restrict the sample to individual-year observations for permanent residents only. This restriction slightly changes the connected set requirement requiring a connected set of immigrants. All other sample restrictions prior to the estimation of the immigrant firm effect follow Appendix C.

### 7.1 Model Setup: Heterogeneous Workers and Firms

**Workers**

We assume an infinitely-lived population of individuals, divided into domestics and immigrants, with a unit mass of each group. We define $x \in [\underline{x}, \overline{x}]$ as worker ability, and we define the ability distributions for domestics and TFWs in the full population as $l(x)$ and $l^{\text{tfw}}(x)$, respectively. In our counterfactual policy simulations, when TFWs are exogenously granted PR, they become observationally equivalent to domestic workers (conditional on $x$).

We define $u(x)$ as the distribution of $x$ among the domestic unemployed, and we define $U \equiv \int u(x)dx$ as the total unemployed domestic population. Similarly, we define $u^{\text{tfw}}(x)$ as the distribution of $x$ among the TFW unemployed. Note that these individuals are immigrants from foreign countries who are assumed to be only searching for TFW jobs.[36] $U^{\text{tfw}} \equiv \int u^{\text{tfw}}(x)dx$ is defined as the total TFW unemployed population.

We assume the markets for domestics and TFWs are segmented: firms choose whether to search in the domestic or TFW market, and workers do not move between markets. In our counterfactual simulations, we exogenously grant employed TFWs PR while keeping their current match fixed. After the shock, these workers are observationally equivalent to domestics of the same type: they engage in on-the-job search and can receive outside offers (see Appendix 8), matching the institutional setting we study.

A distinctive feature of this search-and-matching framework is a novel congestion externality that arises from the marginal firm's hiring decision. When a firm applies for a labor market assessment, it effectively removes a potential vacancy from the domestic labor market, reducing job-finding rates for unemployed and employed domestic workers. This congestion benefits other firms by reducing competition for workers but imposes negative externalities on domestic workers through reduced outside options. We discuss the welfare implications of this externality in Section 7.8.

**Firms (and Jobs)**

Firms are single-worker jobs, and jobs are characterized by a labor productivity parameter which we denote by $y$. Jobs are persistent, but domestic workers can voluntarily leave them through on-the-job search. There is also an exogenous separation rate given by $\xi$ for domestics and $\xi^{\text{tfw}}$ for TFWs. The number of available type-$y$ jobs in the economy is given by $n(y)$, and the total number of jobs is $N \equiv \int n(y)dy$. The number of firms is either fixed exogenously or determined endogenously through a free-entry condition (where the marginal entrant makes zero expected profits).

Jobs are either unfilled or matched. We consider two types of vacancies. First, there are standard vacancies available to domestics. The number of standard type-$y$ job postings is given by $v(y)$ and the total number of vacancies is defined as $V \equiv \int v(y)dy$. Second, there are TFW vacancies, which are posted only if a labor market assessment application is successful. The number of type-$y$ TFW applications is $a(y)$, and the total number of TFW applications is defined as $A \equiv \int a(y)dy$. The number of successful type-$y$ applications is given by $v^{\text{tfw}}(y)$, and the total number of successful applications is given by $V^{\text{tfw}}$. The success rate is given by $p = \frac{V^{\text{tfw}}}{A}$, which does not depend on firm type.

[36] Formally, we assume that if a TFW that is employed loses their job, they become a "potential" TFW and must randomly match with a new employer that has applied for and successfully received a TFW permit.

We define the distribution of $(x, y)$ domestic matches as $h(x, y)$ and TFW matches as $h^{\text{tfw}}(x, y)$. There are separate balance equations for domestics and TFWs, which are given by the following expressions:

$$\int h(x,y)dy + u(x) = l(x)$$

$$\int h^{\text{tfw}}(x,y)dy + u^{\text{tfw}}(x) = l^{\text{tfw}}(x)$$

and

$$\int (h(x,y) + h^{\text{tfw}}(x,y))dx + v(y) + a(y) = n(y) \tag{12}$$

Equation (12) can be interpreted as follows. On the right-hand side is the total number of jobs for a type $y$ firm. These jobs are either filled or unfilled. The first term on the left-hand side is the total number of filled jobs. The second term is the total number of type $y$ vacancies. The last term is the total number of type $y$ applications which accounts for the fact that not all applications are converted to vacancies. The distribution of matches $h(x, y)$ and $h^{\text{tfw}}(x, y)$ reflects endogenous worker-firm sorting driven by production complementarities in $f(x, y)$, whereby higher-ability workers sort into higher-productivity firms.

## 7.2 Meetings and Match Formation

### Meeting Technology

We assume that all meetings between jobs and potential workers occur randomly, with separate matching functions for domestic and TFW markets. For domestics, we define $E$ as the number of employed workers and let $s$ denote the relative search intensity for employed workers relative to unemployed workers (normalizing search intensity for domestic unemployed workers to 1). The aggregate number of meetings between domestic searchers and vacancies is given by $M(U+sE, V)$, which is increasing in both arguments and exhibits constant returns to scale. We define $\kappa \equiv \frac{M(U+sE,V)}{[U+sE]V}$, which indexes the meeting efficiency per matchable pair (one vacancy and one effective searcher). From the worker's perspective, unemployed and employed domestic workers meet a vacancy of type $y$ at rates $\frac{M}{U+sE}\frac{v(y)}{V} = \kappa v(y)$ and $s\frac{M}{U+sE}\frac{v(y)}{V} = s\kappa v(y)$, respectively. From the firm's perspective, a vacancy meets an unemployed worker $x$ at rate $\kappa u(x)$ and an employed worker $x$ currently employed at job $y$ at rate $s\kappa h(x, y)$.

For TFWs, meetings occur only if a firm's labor market assessment application is successful, in which case the firm posts a vacancy and meets a potential TFW unemployed worker at random. The aggregate number of meetings between firms (whose applications were successful) and potential TFWs is given by $M^{\text{tfw}}(U^{\text{tfw}}, V^{\text{tfw}})$, with $\kappa^{\text{tfw}} \equiv \frac{M^{\text{tfw}}(U^{\text{tfw}},V^{\text{tfw}})}{U^{\text{tfw}}V^{\text{tfw}}}$. Since TFWs cannot search on the job, a successful application of type $y$ meets a potential TFW worker $x$ at rate $\kappa^{\text{tfw}}u^{\text{tfw}}(x)$. From the worker's perspective, the rate at which a potential TFW $x$ meets a successful type $y$ application is $\kappa^{\text{tfw}}v^{\text{tfw}}(y)$.

### Value Functions and Match Surplus

Let $W_0(x)$ be the present value of unemployment for an $x$ worker, which includes the flow value of unemployment $b(x)$ plus the option value of matching with a firm. Similarly, let $W_0^{\text{tfw}}(x)$ be the present value of unemployment for a TFW-$x$ worker, which includes the flow value $b^{\text{tfw}}(x)$ plus the option value of matching with a TFW vacancy. Let $\Pi_0(y)$ be the expected value to a job of posting a vacancy in the domestic market, inclusive of the posting cost $c$, and let $\Pi_0^{\text{tfw}}(y)$ be the expected value to a job of posting a TFW application. Let $W_1(w,x,y)$ be the present value of a wage contract for a domestic worker $x$ employed at a job and let $W_1^{\text{tfw}}(w,x,y)$ be the present value of a wage contract for a TFW worker $x$ employed at a job. Finally, let $\Pi_1(w,x,y)$ be the firm's expected profit for a domestic match and let $\Pi_1^{\text{tfw}}(w,x,y)$ be the firm's expected profit for a TFW worker.

The surplus of a match for a domestic is defined as:

$$S(x,y) = \Pi_1(w,x,y) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + W_1(w,x,y) - W_0(x)$$

The surplus of a match for a TFW is defined as:

$$S^{\text{tfw}}(x,y) = \Pi_1^{\text{tfw}}(w,x,y) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + W_1^{\text{tfw}}(w,x,y) - W_0^{\text{tfw}}(x)$$

Although $\Pi_1(w,x,y)$ and $W_1(w,x,y)$ (and their TFW counterparts) each depend on the wage $w$, the surplus $S(x,y)$ does not: the wage only determines how surplus is divided. The firm's outside option $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$ reflects the endogenous choice between posting a vacancy in the domestic or TFW market, a key institutional feature of our setting. This choice depends on the relative payoff of a match, net of vacancy costs, meeting rates, and expected surplus. Because firms' entry decisions collectively determine $V$ in the matching function $M(U+sE,V)$, these choices shape equilibrium meeting rates, wages, and outside options for domestic workers. We examine the efficiency implications in Section 7.8.

### 7.3 Wages

We define the wage for a type-$x$ domestic worker transitioning from unemployment to firm $y$ as $w = \phi_0(x,y)$. We assume that wages are set by Nash bargaining, which leads to the following condition:

$$W_1(\phi_0,x,y) = W_0(x) + \beta S(x,y)$$

We define the wage for a newly employed TFW worker as $w = \phi_0^{\text{tfw}}(x,y)$. Assuming Nash bargaining, this leads to the following expression:

$$W_1^{\text{tfw}}(\phi_0^{\text{tfw}},x,y) = W_0^{\text{tfw}}(x) + \beta S^{\text{tfw}}(x,y)$$

Renegotiation can happen if the worker gets an outside offer (in the case of a domestic worker). In our counterfactual simulations, renegotiation also occurs when TFWs are exogenously granted PR.

**Outside Offers**

As in Lise, Meghir, and Robin (2016), we allow for domestic employed workers to receive outside offers; however, TFWs do not search on the job to receive outside offers, which matches our institutional setting. When domestic workers receive an outside offer, there are three possible outcomes following Lise, Meghir, and Robin (2016): (1) the worker switches firms because the poaching firm outbids the incumbent firm, (2) the worker uses the outside offer to bid up current wage and stays at the incumbent firm, or (3) the wage does not change because the outside offer does not give the worker a credible threat to leave. The equations describing the three cases are given in Appendix F.

### 7.4 Value Functions for Workers and Firms

The value functions for workers and firms, and the resulting expressions for match surplus, follow the structure in Lise, Meghir, and Robin (2016) with two key modifications. First, the firm's outside option is $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$, reflecting the endogenous choice between posting a domestic vacancy or applying for a TFW permit. Second, TFW value functions omit on-the-job search terms, so TFW wages remain constant at $\phi_0^{\text{tfw}}(x, y)$ for a given match. The full Bellman equations and surplus derivations are provided in Appendix F and used in calibrating the model.

The value of unemployment for TFWs and domestic workers reflects the flow value of non-employment plus the option value of matching with a firm. The value of a TFW vacancy reflects the vacancy-posting cost and the expected gain from meeting an unemployed worker. In the domestic market, the vacancy value also includes the expected gain from poaching an employed worker from a lower-surplus match; in the TFW market, this term is absent because TFW firms do not poach workers. The value of employment for a domestic worker reflects the current wage, the expected value of outside offers that can trigger renegotiation or a job change, and the risk of exogenous separation. For TFWs, the value of employment is simpler: there are no outside offers, so the only event that alters the value is exogenous separation.

As in Lise, Meghir, and Robin (2016), the match surplus is independent of the current wage: the competition between incumbent and poaching firms induced by on-the-job search disconnects the worker's outside option from both the value of unemployment and the current wage contract. This property also holds for TFW surplus $S^{\text{tfw}}(x, y)$, where wage independence follows directly from the absence of on-the-job search.

### 7.5 Steady-State Equilibrium

We restrict attention to stationary equilibrium in which all distributions are time-invariant. In a stationary equilibrium, outflows equal inflows separately for domestics and TFWs. Thus, for all $(x, y)$ we have the following two expressions. For domestics, we have:

$$\underbrace{(\xi + s\kappa v(\overline{B}(x,y)))h(x,y)}_{\text{Outflows of domestics}} = \underbrace{[u(x) + sh(x, B(x,y))]\kappa v(y)}_{\text{Inflows of domestics}}$$

where $\overline{B} = \{y' : S(x, y') \geq S(x, y)\}$ is the set of jobs that imply an improvement in match surplus and $B = \{y' : 0 \leq S(x, y') < S(x, y)\}$ is the set of jobs that do not imply an improvement in match surplus.

For TFWs, we have the following expression:

$$\underbrace{\xi^{\text{tfw}} h^{\text{tfw}}(x,y)}_{\text{Outflows of TFWs}} = \underbrace{u^{\text{tfw}}(x)\kappa^{\text{tfw}} v^{\text{tfw}}(y)}_{\text{Inflows of TFWs}}$$

The distribution of matches is determined by these steady-state equations. The unemployment distribution and distribution of vacancies then follows from the balance equations above.

### 7.6 Fixed Firms Versus Free Entry

We allow the number of jobs, $N$, to be determined in one of two ways: (1) fixing the number of firms exogenously, or (2) allowing the number of firms to be determined endogenously through a free-entry condition. We focus on the first case in our main calibrations since our event-study analysis corresponds to a relatively short time window, and we contrast with the results using free-entry condition (reported in the Appendix).

In both cases, the number of jobs in the TFW segment, $N^{\text{tfw}}$, is determined by a segmentation threshold $y^\star$, defined as the firm productivity at which a firm is indifferent between posting a domestic vacancy and applying for a TFW permit (i.e., $\Pi_0(y^\star) = \Pi_0^{\text{tfw}}(y^\star)$). Firms with $y < y^\star$ enter the TFW market, while firms with $y > y^\star$ enter the domestic market, and the number of domestic firms follows from the assumed distribution of firm types. In the first case, the total number of jobs is taken fixed, and the firm-type distribution treated as exogenous. In the second case, we follow Lise, Meghir, and Robin (2016) and allow the total number of jobs to be pinned down by the free-entry condition that the lowest productivity job in the support makes zero profits; i.e., $\Pi_0^{\text{tfw}}(\underline{y}) = 0$.

### 7.7 Wage Renegotiation at PR and the Backloading Effect

In our model simulations and counterfactual experiments (described in Section 8), selected TFWs are exogenously granted PR. At the instant of PR, the worker's ability $x$ and firm type $y$ remain unchanged and the individual continues in their current match. However, the worker gains the ability to search on the job, which we model as the worker entering the domestic labor market. As a result, the worker's present value of unemployment updates from $W_0^{\text{tfw}}(x)$ to $W_0(x)$. The present value of the wage contract updates from $W_1^{\text{tfw}}(\phi_0^{\text{tfw}}, x, y)$ to $W_1(\phi_0^{\text{tfw}}, x, y)$, where the wage $w = \phi_0^{\text{tfw}}(x, y)$ was set when the worker was hired out of unemployment. The firm's expected profit updates from $\Pi_1^{\text{tfw}}(\phi_0^{\text{tfw}}, x, y)$ to $\Pi_1(\phi_0^{\text{tfw}}, x, y)$ because the expected duration of the match changes: the exogenous separation rate changes from $\xi^{\text{tfw}}$ to $\xi$ and the worker can leave through outside offers. Accordingly, the relevant match surplus updates from the TFW surplus $S^{\text{tfw}}(x, y)$ to the domestic surplus $S(x, y)$. Appendix G.1 provides more detail on the change in match surplus from $S^{\text{tfw}}(x, y)$ to $S(x, y)$ at the time of PR.

We assume Nash bargaining over the updated surplus $S(x, y)$, which yields a new wage $w = \phi_0(x, y)$ that delivers the worker their $\beta$ share of surplus, as in Section 7.3. We show in Appendix G.2 that this renegotiation is incentive-compatible for firms, given their outside option of posting a new vacancy. In on-the-job search models, expected wage growth from potential outside offers creates an option value for employed workers. Firms capture part of this value through bargaining, which results in lower initial wages, leading to a backloading effect. TFWs cannot search on the job, which eliminates the competitive bidding that produces wage growth. Consequently, wages for employed TFWs remain constant at $\phi_0^{\text{tfw}}(x, y)$ for a fixed match $(x, y)$. When a TFW receives PR, this backloading mechanism becomes operative.

In general, on-the-job search increases expected wage growth through two channels. First, the worker may receive an outside offer that improves their bargaining position but does not justify switching firms. In this case, wages are renegotiated upward while the match remains fixed, as in Case 2 in Section 7.3. Second, the worker may climb the job ladder by moving to a higher productivity firm, as in Case 1 in Section 7.3. However, for TFWs who obtain PR, wage growth from on-the-job search occurs only through the job-ladder mechanism. In our calibrated model (Section 8), we show that the productivity $y$ of firms entering the TFW market is dominated by the productivity $y'$ of firms entering the domestic market (i.e., $y < y'$ for all TFW-hiring firms $y$ and domestic-hiring firms $y'$). We find that TFWs who are granted PR always move to the poaching firm $y'$ upon receiving their first outside offer in the domestic labor market.

The magnitude of any wage change at PR depends on TFW wages $\phi_0^{\text{tfw}}(x, y)$, which in turn depends on the flow value of TFW unemployment $b^{\text{tfw}}$. If $b^{\text{tfw}} = b$, then the renegotiated wage $\phi_0(x, y)$ at the time of PR would be lower due to backloading. In our calibration (Section 8), we set $b^{\text{tfw}} < b$ to offset this downward pressure on average across stayers, so renegotiation at PR produces no average wage change. Since the magnitude of backloading varies across firm types, a single scalar $b^{\text{tfw}}$ cannot eliminate the wage change at every $(x, y)$. Combined with the market segmentation described above, which implies that stayers are those who have not yet received an outside offer, all increases in earnings are driven by job changers, consistent with our reduced-form results.

### 7.8 Welfare

Following Lise, Meghir, and Robin (2016), we define social welfare as the sum of match output, flow value from unemployment, and vacancy costs across both market segments:

$$W = \int f(x,y)h(x,y)dxdy + \int b(x)u(x)dx - cV$$
$$W^{\text{tfw}} = \int f(x,y)h^{\text{tfw}}(x,y)dxdy + \int b^{\text{tfw}}(x)u^{\text{tfw}}(x)dx - c^{\text{tfw}}(V^{\text{tfw}}/p)$$

where $W$ and $W^{\text{tfw}}$ denote welfare in the domestic and TFW market segments, respectively. In each expression, the three terms represent aggregate match output, aggregate flow value of unemployment, and total vacancy costs.

Since match output can be decomposed into worker wages and firm flow profits, we can express welfare in these equivalent terms. Let $\tilde{w}(x, y)$ denote the average wage among domestic workers in $(x, y)$ matches in steady state, which reflects the distribution of wages arising from heterogeneous worker histories (e.g., arrival from unemployment versus poaching versus renegotiation).

$$W = \underbrace{\int \tilde{w}(x,y)h(x,y)dxdy + \int b(x)u(x)dx}_{\text{Flow value to domestic workers}} + \underbrace{\int \left[f(x,y) - \tilde{w}(x,y)\right] h(x,y)dxdy - cV}_{\text{Firm flow profits (domestic segment)}}$$

For TFWs, wages are deterministic conditional on the match, since TFWs cannot search on the job: all workers in an $(x, y)$ match earn $w = \phi_0^{\text{tfw}}(x, y)$.

$$W^{\text{tfw}} = \underbrace{\int \phi_0^{\text{tfw}}(x,y)h^{\text{tfw}}(x,y)dxdy + \int b^{\text{tfw}}(x)u^{\text{tfw}}(x)dx}_{\text{Flow value to TFWs}}$$
$$+ \underbrace{\int \left[f(x,y) - \phi_0^{\text{tfw}}(x,y)\right] h^{\text{tfw}}(x,y)dxdy - c^{\text{tfw}}(V^{\text{tfw}}/p)}_{\text{Firm flow profits (TFW segment)}}$$

Total social welfare is the sum: $W + W^{\text{tfw}}$.

Recently, Fukui and Mukoyama (2025) showed that even when the Hosios condition holds, the equilibrium can be inefficient in the presence of on-the-job search. This inefficiency stems from two externalities. First, a "worker-stealing" externality arises because poaching firms appropriate surplus created by previous employers and ignore the loss from destroying incumbent matches. Second, match formation generates a congestion externality because the private value of a match, determined under wage bargaining, fails to internalize the change in congestion when workers switch from searching off the job as unemployed to searching on the job as employed.[37] Consistent with this mechanism, in the domestic labor market of our model, where employed workers search on the job, the decentralized equilibrium overvalues match surplus relative to the planner. On-the-job search raises the private value of a domestic vacancy through the prospect of poaching employed workers, who may subsequently receive outside offers and advance along the job ladder. By contrast, the TFW market does not feature on-the-job search and thus does not generate these on-the-job search-related inefficiencies.

Our segmented domestic–TFW structure introduces an additional source of inefficiency: a congestion externality operating across market segments. When a firm chooses between posting a domestic vacancy or applying for a TFW permit, it does so based solely on private returns $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$. However, because domestic meetings are governed by the matching function $M(U + sE, V)$, this decision affects congestion faced by all domestic searchers. The externality operates through two channels. First, when a firm chooses to enter the TFW market instead of posting a domestic vacancy, it reduces $V$, lowering the meeting rate for unemployed and employed domestic workers. Second, reduced meeting rates diminish outside options for employed domestic workers, depressing wages and match surplus through the mechanisms in Section 7.4. Because firms do not internalize these cross-market spillovers, the decentralized equilibrium generally differs from the social optimum.

# 8 Model Calibration and Counterfactual Analysis

## 8.1 Calibration Approach

We calibrate the model by searching for the combination of parameters that allow us to quantitatively match our main reduced-form results on job transitions, earnings, and firm pay premia (Section 6). We use the same functional forms as in Lise, Meghir, and Robin (2016) in our calibration, choosing a CES production function (i.e., $f(x, y) = A(\alpha x^\rho + (1-\alpha)y^\rho)^{1/\rho}$) and a Cobb-Douglas meeting function (i.e., $M = \eta(U + s(1-U))^{1/2}V^{1/2}$). We choose a beta distribution for worker and firm heterogeneity, while allowing for separate distributions for TFWs and domestic workers. For expositional clarity, we discuss two groups of parameters: "initial parameters" which we calibrate using sample moments in the data and external values chosen from the literature, and "additional parameters" which we calibrate by matching our reduced-form results.

Panel A of Table 3 summarizes the calibration approach for each initial parameter. We set worker bargaining power to $\beta = 0.5$ following Shi (2023), which is consistent with the worker share of rents of 49 percent reported in Lamadon, Mogstad, and Setzler (2022). We choose $\rho = 0$ so that the production function is Cobb-Douglas, following Berger, Herkenhoff, and Mongey (2022) and Lamadon, Mogstad, and Setzler (2022). We set the exogenous separation rates to $\xi^{\text{tfw}} = 0.021$ and $\xi = 0.011$ to match the

[37] Fukui and Mukoyama (2025) demonstrate that even when the Hosios condition and a sequential-auction wage mechanism resolve the investment margin's "worker-stealing" externality, the congestion externality remains, so the decentralized equilibrium in a job-ladder model fails to achieve the efficient outcome.

four-year average job tenure for both TFWs and domestic workers, respectively.[38] We set the discount rate $r = 0.05$, following Shi (2023) and Lise, Meghir, and Robin (2016). We choose the parameters of the beta distribution that govern worker heterogeneity to match the domestic-TFW wage gap reported in the Mincer wage regression above.[39] The distribution of firm heterogeneity is set arbitrarily to be $\text{Beta}(10, 10)$ as a normalization, and we calibrate the production function parameter $\alpha$ to match the reduced-form effect of PR on firm pay premia, as discussed below. We set the probability a TFW application is accepted to $p = 0.69$ to match the average application acceptance rate during our sample period (Human Resources and Skills Development Canada, 2012). The remaining parameters in Panel A of Table 3 are the matching efficiency and vacancy cost parameters ($\eta$, $\eta^{\text{tfw}}$, $c$, and $c^{\text{tfw}}$). The meeting function parameters $\eta$, $\eta^{\text{tfw}}$ are chosen so that meeting efficiency is equal to $\kappa = 0.22$ and $\kappa^{\text{tfw}} = 0.17$, which leads to $\eta = 0.065$, $\eta^{\text{tfw}} = 0.06$.[40] The vacancy-posting costs are calibrated to one month of the average annual domestic wage, with a 15 percent premium applied in the TFW segment to capture the extra costs generated by the TFW application process (resulting in $c = 0.175$ and $c^{\text{tfw}} = 0.14$). Note that the expected cost to a firm of a TFW vacancy is the application cost, given by $(c^{\text{tfw}}/p)$, is 15 percent larger than the vacancy cost in the domestic market, $c$.

After choosing our initial parameters in the calibration, there are four remaining parameters in the model ($b$, $b^{\text{tfw}}$, $s$, and $\alpha$). We calibrate these parameters by simulating our model to match the reduced-form effect of PR on job transitions, earnings, and firm pay premia, and we report the results in Panel B of Table 3. First, we set the value of unemployment to $b = 0.38$ in the domestic market so that it is equal to 50 percent of the value of the wage at the lowest productivity firm. As described in Section 7, the model generates a "backloading effect" where wages *decrease* when TFWs obtain PR. To offset this decrease, we set $b^{\text{tfw}} = 0.20$ so that wages do not change for workers who stay at the same firm when they receive PR. This causes the increase in average wages resulting from PR to be entirely driven by the subset of workers who change jobs after PR, in line with our reduced-form results.

Next, we set the on-the-job search parameter to $s = 0.29$ to match the effect of PR on job transitions. Intuitively, $s$ determines the additional search that happens immediately after TFWs obtain PR since they cannot search on the job. Lastly, we calibrate the production function parameter to $\alpha = 0.96$ to match the estimated effect of PR on firm pay premia. To implement this, we first estimate an AKM regression on data simulated from our model and recover the "firm effects" analogous to the estimated firm fixed effects in the matched employee-employer data.[41] We find a very high correlation (greater than 0.9 in both labor market segments) between the (estimated) firm fixed effects and the (true) firm types $y$. Moreover, the R-squared of the AKM regression is greater than 0.9 in both labor market segments,

[38] The reason why $\xi$ is lower than $\xi^{\text{tfw}}$ is because domestic workers can leave their jobs either through exogenous separations or through on-the-job search. Technically, we calibrate $\xi$ so that the average job tenure in the domestic market is the same as the average job tenure in the TFW market given the other model parameters (including the on-the-job search parameter, described below).

[39] Specifically, we choose the two parameters of each beta distribution so that the mean wage of TFWs is normalized to one, the difference in the mean wages between TFWs and domestic workers matches the 0.31 log wage gap estimated in the Mincer wage regression, and the ratio of the standard deviation to the mean wage in each group is equal to 0.7 following Dostie et al. (2023).

[40] We target a higher meeting efficiency in the domestic market segment because of higher recruiting costs associated with searching for TFWs, although we have explored sensitivity to different values of $\kappa$ and $\kappa^{\text{tfw}}$ and found very similar welfare results. Intuitively, changing meeting efficiency primarily affects equilibrium market tightness, with more limited effects on wages, profits, and overall social welfare.

[41] Appendix H provides additional details on the simulation approach we use for the model calibrations.

and we also find a monotonic relationship between the firm effects and the firm types (see Appendix Figure A.19).[42] Next, using these AKM firm effects along with an event study, we estimate the causal effect of PR, similar to our reduced-form analysis. The equilibrium in our calibrated model results in perfect negative selection into the TFW market, with firm types $y \leq y^*$ selecting into the TFW market segment and firm types $y \geq y^*$ selecting into the domestic market segment (matching the empirical pattern of negative firm selection reported in Figure 1).[43] Since TFWs in the model move from lower to higher productivity firms when they obtain PR, choosing higher values of $\alpha$ leads to a greater difference in the mean firm effects for TFWs before versus after PR. Thus, we can choose $\alpha$ so that the simulated effect of PR on firm pay premia matches our reduced-form estimate.

### 8.2 Model Fit

We use simulated data from the model to construct figures analogous to our reduced-form event study estimates. In Figure 7, we plot the simulated effects of randomly giving TFWs PR on job switching and firm pay premia (which are directly targeted in the calibration) and earnings (which is not directly targeted). Figure 7a shows that the calibrated model matches the increase in job transitions, while Figure 7b shows that the calibrated model matches the increase in firm pay premia as well as the increase in earnings. The primary reason that the calibrated model matches the increase in earnings is that the AKM model is a fairly good approximation to the simulated data, which means that we should expect to see similar changes in earnings and firm premia after PR (since any change in earnings from a job transition will on average be very close to the difference in the pay premia between the old and new employer).

### 8.3 Simulating the Long-run Effects of PR

Using our calibrated model, we can simulate the long-run effects of PR. Figure 8 shows the effect of PR on job switching, firm pay premia, and earnings, where the event-study window is extended from 3 years to 15 years. The results show persistent increases in job switching, firm pay premia, and earnings which flatten out over time as the former TFWs gradually approach their new steady-state earnings in the domestic labor market. Quantitatively, we find that the 15-year effect of PR is about 85 percent larger for earnings and firm pay premia as compared to the estimated three-year effects in our reduced-form analysis. These results imply that the earnings gains for former TFWs emerge immediately after PR and continue to grow as the former TFWs continue to search for high-wage jobs and climb the job ladder. These results can be compared to the Mincer regression results reported in Table 2 above, which show that temporary immigrants earn about 15 percent less than permanent residents. This suggests that roughly 40 percent of the gap between temporary and permanent residents can be attributed to the

[42]While the previous literature includes examples where the AKM firm effects can be misleading proxies for underlying firm productivity (see, e.g., Eeckhout and Kircher, 2011), we do not find that this is the case in our calibrations. This comes from our baseline assumptions of $\beta = 0.5$ and $\rho = 0$. With these assumptions, we find in our simulations that the log hiring wage is approximately linear in the worker effect and firm effect.

[43]Computationally, we solve for the threshold $y^*$ where the firms with this productivity are indifferent between searching for a TFW or a domestic worker. Since there are a discrete number of different firm types in the simulation, we solve for the labor market equilibrium by calculating the share of the $y = y^*$ firms making each choice in a way that preserves the indifference for all of the $y = y^*$ firms in each segmented market in equilibrium. Appendix Figure A.20 plots the simulated $\Pi_0(y)$ and $\Pi_0^{\text{tfw}}(y)$ functions and shows that both functions are increasing in $y$ and intersect at $y^*$.

long-run effects of mobility restrictions rather than other factors (such as skill differences) that might vary across the two groups.

### 8.4 Counterfactual Analyses

**Counterfactual: Increasing Expected Cost of TFW Vacancy**

Our first policy counterfactual increases the expected cost of a TFW vacancy by 20 percent. We implement this policy change and then re-simulate the model, allowing firms to re-sort between the two segmented labor markets.

Table 4 summarizes the results. As the expected cost of filling a TFW vacancy rises, firms reallocate away from the TFW market segment and toward the domestic market segment, with exit continuing until the marginal firm is indifferent between hiring in the two segments. As firms exit the TFW market segment, vacancies decrease, and market tightness, $V^{\text{tfw}}/U^{\text{tfw}}$, decreases by 23.6 percent. This, in turn, reduces output and the total wages paid (hereafter, the wage bill) in the TFW segment by 3.3 and 4.3 percent, respectively. Since firms exit the TFW market segment to enter the domestic market segment, domestic vacancies increase, and domestic market tightness, $V/U$, increases by 5.7 percent. This, in turn, increases output and the wage bill in the domestic segment by 0.4 and 0.9 percent, respectively. Since the increase in output in the domestic market segment does not fully offset the decrease in the TFW market, there is an overall reduction in output (as well as the wage bill).

Turning to average wages, TFW wages decrease by 4.3 percent. Intuitively, an exogenous reduction in vacancies reduces the job-finding rate and thus the value of unemployment, and a lower value of unemployment weakens workers' bargaining positions and causes wages to fall. By the same logic, the increase in vacancies in the domestic market causes domestic worker wages to increase by 0.9 percent. Average wages in the combined market decrease by 1.2 percent. Firm profits decrease in both segments—directly in the TFW segment due to the increase in vacancy costs, and indirectly in the domestic segment because of the increased competition from firm entry and higher wages paid to domestic workers. This shows the key economic trade-off of increasing the expected cost of a TFW vacancy: domestic workers may benefit in terms of higher wages (especially low-wage workers), but firm profits are reduced.

We define social welfare as the sum of profits and wages, and we find social welfare decreases by 1.2 percent because the decline in TFW wages and firm profits is larger than the increase in domestic worker wages. Even if the social planner assigns zero weight on TFW wages, there is still a decrease in social welfare because the increase in domestic wages is smaller than the decrease in firm profits.[44]

**Counterfactual: Switching to Open Visas for TFWs**

In our second counterfactual scenario, we allow all TFWs to switch jobs freely, as if they held open visas. This is equivalent to all TFWs gaining PR. We implement this by "merging" the TFW and domestic labor market segments into one labor market and solving for the new steady-state equilibrium in the combined labor market. In this counterfactual, TFWs are perceived by firms as identical to domestic workers conditional on their worker type, $x$.

[44] Table 4 also reports the correlation between worker and firm productivity in both segments of the labor market (before and after the change in the expected cost of a TFW vacancy). We calculate this correlation as the $h(x, y)$-weighted correlation between the true values of $x$ and $y$. We find zero correlation in the TFW market segment and a positive correlation in the domestic market segment. Intuitively, the on-the-job search and poaching in the domestic market allows for greater worker-firm sorting in equilibrium in the domestic market segment.

Table 5 summarizes the results. Allowing TFWs to change jobs results in an increase in TFW wages of 16.3 percent. These results indicate that the wage effects of granting PR to all TFWs is larger than granting PR to a small group of workers. When only a small set of TFWs gets PR, those workers gain the ability to search on the job, access to better firms, and stronger bargaining positions. This raises wages through reallocation to higher-paying firms and renegotiation within current matches. Because the treated group is small, the rest of the market is approximately unchanged: vacancy creation is unchanged, firm search behavior is unchanged, and the wage-setting environment is unchanged. So this experiment isolates the private value of mobility access for treated workers. On the other hand, when all TFWs get PR, treated workers still receive the same private mobility gain. But now the market itself changes. This adds an equilibrium effect that is absent in the small-scale experiment. In particular, every TFW firm now faces poaching risk and must compete for labor. This lowers the value of a vacancy and the firm's threat point deteriorates, shifting surplus toward workers and raising their wages even more.

Turning to the incidence of an open visa policy on domestic workers, there are two opposing forces at play. On the one hand, TFWs can now search in the domestic segment. This increases the number of workers competing for vacancies and lowers the job-finding rate for domestic workers. The lower job-finding rate leads to a lower value of unemployment for domestic workers and this pushes wages down through the standard outside-option channel. This is the standard congestion effect. On the other hand, domestic workers can now be hired by both domestic firms and former TFW firms. Thus, the set of firms they can match with expands, increasing offer arrival rates and improving worker outside options. This acts to increase domestic wages. Our results show that the second channel dominates the first: domestic wages increase by 1.7 percent (with larger wage gains for low-wage workers). This can happen if there are a sufficiently large number of TFW firms who are relatively productive and domestic workers gain access to these firms.

The wage gains for both TFWs and domestic workers leads to a decline in firm profits of 8.0 percent. These results show that firms benefit from the status quo "closed visa" policy at the expense of both TFW and domestic worker wages. This is broadly similar to Amior and Manning (2020), which shows that policies that reduce monopsony power of firms can redistribute from firms to workers and benefit both natives and domestic workers. Our search-and-matching model does not have the same notion of monopsony power, but the economic trade-off is similar.

Overall, there is an increase in total output of 3.8 percent, an increase in the total wage bill by 7.6 percent, and an overall increase in social welfare of 2.3 percent. The increase in social welfare comes partly from the increase in worker-firm sorting. Under the open visa policy, worker-firm sorting in the combined labor market is 0.138 (defined as the $h(x, y)$-weighted correlation between worker and firm types); this is larger than the worker-firm sorting in both the TFW market segment and the domestic market segment prior to the open visa policy. Intuitively, once the market segments are integrated, high-ability TFWs can match with high-productivity firms, whereas under "segmentation", they could only search among the vacancies posted by low-productivity firms.[45] As a result, open visas can increase allocative efficiency of the labor market, which in turn increases social welfare.

[45] Note that these sorting results come from a counterfactual in which *all* TFWs receive PR. They therefore do not necessarily conflict with the partial equilibrium reduced-form results in Appendix Figure A.10 that show a decline in worker-firm sorting after PR.

### 8.5 Discussion

We conclude this section by discussing several important limitations of the model calibrations. First, the model calibrations are highly stylized, and the results are naturally sensitive to specific parameters. In the Appendix, we show sensitivity to higher and lower values of worker bargaining power, and we find broadly similar results of increasing the expected cost of a TFW vacancy on output, wages, profits, and welfare (see Appendix Tables A.11 and A.13).[46] Additionally, our main calibration results are based on assuming a fixed number of firms, since our reduced-form event-study results capture the relatively short-run effects of PR. If we instead allow for free entry, we can re-calibrate the model and re-evaluate the same counterfactual policies. The results for increasing cost of a TFW vacancy are fairly similar, although because of free entry the change in overall firm profits is much smaller (since the marginal firm earns zero profits before and after the policy change). For the open visas counterfactual, we find that switching from fixed firms to free entry has a more notable change. In particular, with a fixed number of firms, open visas for TFWs lead to reductions in firm profits and increases in domestic worker wages. Under free entry, however, the change in firm profits is essentially zero—since firms exit in response to a decrease in profits—and, as a result, the negative effects of open visas largely shifts from firms to domestic workers. This highlights that the incidence of open visas (and the ultimate effects on domestic workers) depends partly on how flexibly firms can respond to the policy change.

Second, we assumed a unit mass of domestic workers and TFWs. On the surface, this is at odds with TFWs representing a small share of the overall labor market in Canada (between 0.1 and 0.5 percent of all employment). Our interpretation of the model is that it is informative about the labor market consequences for the domestic workers who search for similar jobs as TFWs. It is straightforward to extend the model to allow for different population sizes.

Third, our search-and-matching model abstracts from a number of other ways that temporary immigrants can affect the labor market, perhaps most importantly through the effects of temporary immigrants on entrepreneurship and innovation (see, e.g., Kerr and Lincoln, 2010 and Hunt and Gauthier-Loiselle, 2010).[47] Our results speak to the trade-off between firm profits, wages for TFWs, and the wages for domestic workers competing for the same set of jobs. Importantly, we assume that increases in temporary immigrants (through, say, a reduction in TFW application costs) do not directly affect the distribution of firm productivity.

## 9 Conclusion

This paper studies how mobility restrictions affect labor market outcomes by examining the transition from temporary status to permanent residency. We find that relaxing these restrictions leads to large increases in job mobility and earnings, and we find that these gains are driven primarily by reallocation across firms rather than within-firm wage growth.

Using a calibrated search-and-matching model, we show that these mechanisms have important equilibrium implications. Allowing open visas generates large gains for TFWs and modest gains for

[46] If we choose $\beta = 0.3$ instead of $\beta = 0.5$, we find a non-monotonic relationship between the estimated firm fixed effects and true firm productivity, and we find that the simulated effect of PR on earnings does not match the reduced-form results as closely as when we choose $\beta = 0.5$. For this reason, we prefer $\beta = 0.5$ in our baseline calibrations.

[47] In the U.S., for example, the H-1B temporary visa program has been used by many innovative leaders in the technology sector including Jensen Huang (at NVIDIA), Sundar Pichai (at Google), and Satya Nadella (at Microsoft).

domestic workers, while reducing firm profits and improving worker-firm sorting. Increasing the cost of hiring TFWs raises domestic wages but reduces TFW wages and firm profits, highlighting a trade-off across workers and firms. These results provide partial support for Senator Sanders' claim that temporary visas are "disastrous for American workers" — while reducing the use of TFWs benefits domestic workers at the expense of TFWs, switching to open visas benefits both TFWs and domestic workers. The equilibrium effects of temporary visas therefore depend on both their application costs and mobility restrictions.

These findings imply that mobility restrictions reduce earnings mainly by distorting the allocation of workers across firms, rather than by suppressing wages within firms. As a result, policies that relax these constraints can improve allocative efficiency by enabling workers to move to more productive matches. By contrast, policies that restrict TFW hiring (such as higher application costs) operate primarily through redistribution, raising domestic wages at the expense of TFWs and firm profits.

More broadly, our results underscore the importance of firm heterogeneity and worker mobility in shaping the labor market outcomes of immigration policy. Policies that restrict mobility do not simply affect wage-setting within firms, they also alter the allocation of workers across firms—with important effects on productivity, wages, and welfare.

We conclude by discussing two extensions that may be useful to explore in future work. First, our framework abstracts from a potentially important channel: the TFW program effectively delegates immigrant screening to firms. Given stronger profit incentives and, in the presence of mobility restrictions, greater ability to retain selected workers, firms may screen on productivity more efficiently than the government. This aligns with evidence in public economics that decentralized mechanisms can outperform centralized ones in screening when it comes to choosing price plans and tax tables (Luttmer & Zeckhauser, 2008).

Second, while we use a search-and-matching framework to simulate the effects of alternative TFW policies on domestic wages and firm profits, a complementary direction is to estimate these policy impacts directly. The administrative data used here, together with historical variation in TFW policies, may provide an empirical setting for such an exercise.

In summary, our findings demonstrate how the specific institutional details of immigrant visas contribute to earnings gaps across temporary immigrants, permanent residents, and domestic workers. These restrictions limit access to higher-quality jobs, with spillovers to firm profits and domestic job opportunities. These spillover effects underscore "why immigration policy is hard" (Manning, 2025). We hope our findings help shift attention away from framing immigration as simply "good" or "bad" for domestic workers and toward analyzing the economic trade-offs implied by specific policy design choices, including the structure of temporary visa programs.

# References


Abowd, J. M., Kramarz, F., & Margolis, D. N. (1999). High wage workers and high wage firms. *Econometrica*, *67*(2), 251–333.

Ahrens, A., Beerli, A., Hangartner, D., Kurer, S., & Siegenthaler, M. (2024). The labor market effects of restricting refugees' employment. *SocArXiv Preprint*.

Amior, M., & Manning, A. (2020). Monopsony and the wage effects of migration [Forthcoming in *Economic Journal*]. *CEP Discussion Paper No. 1690*.

Amior, M., & Stuhler, J. (2023). Immigration, monopsony and the distribution of firm pay. *CEPR Discussion Paper No. 18079*.

Arellano-Bover, J., & San, S. (2024). The role of firms and job mobility in the assimilation of immigrants: Former Soviet Union Jews in Israel. *IZA Institute of Labor Economics Discussion Paper No. 16389*.

Baker, M., & Benjamin, D. (1994). The performance of immigrants in the Canadian labor market. *Journal of Labor Economics*, *12*(2), 369–405.

Balla-Elliott, D., & Norwich, I. (2025). Cohort-chained DiD: Long-run effects with limited pre-treatment data. *Working Paper*. https://pdfs.isaacnorwich.com/CCDID.pdf

Beauregard, P.-L., Lemieux, T., Messacar, D., & Saggio, R. (2025). Why do union jobs pay more? new evidence from matched employer-employee data. *NBER Working Paper No. 33740*.

Beerli, A., Ruffner, J., Siegenthaler, M., & Peri, G. (2021). The abolition of immigration restrictions and the performance of firms and workers: Evidence from Switzerland. *American Economic Review*, *111*(3), 976–1012.

Berger, D., Herkenhoff, K., & Mongey, S. (2022). Labor market power. *American Economic Review*, *112*(4), 1147–1193.

Bertheau, A., Acabbi, E., Barceló, C., Gulyás, A., & Lombardi, S. (2023). The unequal consequences of job loss across countries. *American Economic Review: Insights*, *5*(3), 273–290.

Birinci, S., Park, Y., & See, K. (2025). *The heterogeneous impacts of job displacement: Evidence from canadian job separation records* [Working paper].

Borusyak, K., Jaravel, X., & Spiess, J. (2024). Revisiting Event Study Designs: Robust and Efficient Estimation. *Review of Economic Studies*, *91*, 3253–3285.

Brinatti, A., & Morales, N. (2024). Firm heterogeneity and the impact of immigration: Evidence from German establishments. *Working Paper*. https://agostinabrinatti.github.io/AgostinaBrinatti_Website/Brinatti_Morales.pdf

Brochu, P., Gross, T., & Worswick, C. (2020). Temporary foreign workers and firms: Theory and canadian evidence. *Canadian Journal of Economics*, *53*(3), 871–915.

Caetano, C., & Callaway, B. (2024). Difference-in-differences when parallel trends holds conditional on covariates. https://arxiv.org/abs/2406.15288

Callaway, B., & Sant'Anna, P. H. (2021). Difference-in-Differences with multiple time periods. *Journal of Econometrics*, *225*(2), 200–230.

Card, D., Heining, J., & Kline, P. (2013). Workplace heterogeneity and the rise of West German wage inequality. *Quarterly Journal of Economics*, *128*(3), 967–1015.

Chiswick, B. R. (1978). The effect of Americanization on the earnings of foreign-born men. *Journal of Political Economy*, *86*(5), 897–921.

Citizenship and Immigration Canada. (2013, January). *New federal skilled trades program accepts applications starting today*. Government of Canada. Retrieved March 22, 2026, from https://www.canada.ca/en/news/archive/2013/01/new-federal-skilled-trades-program-accepts-applications-starting-today.html

Clemens, M. A., & Lewis, E. G. (2022). The effect of low-skill immigration restrictions on US firms and workers: Evidence from a randomized lottery [Forthcoming in *American Economic Journal: Applied Economics*]. *NBER Working Paper No. 30589*.

Damas de Matos, A. (2017). Firm heterogeneity and immigrant wage assimilation. *Applied Economics Letters*, *24*(9), 653–657.

Deshpande, M., & Li, Y. (2019). Who is screened out? application costs and the targeting of disability programs. *American Economic Journal: Economic Policy*, *11*(4), 213–48. https://doi.org/10.1257/pol.20180076

Domenella, Y. (2025). The cost of waiting for nationality: Impact on immigrant's labor market outcomes in Spain. *Working Paper*. https://drive.google.com/file/d/1TR4ZV84GNyDfwHqJW6nWT2iSCegyCczu/view

Doran, K., Gelber, A., & Isen, A. (2022). The effects of high-skilled immigration policy on firms: Evidence from H-1B visa lotteries. *Journal of Political Economy*, *130*(9), 2501–2533.

Dostie, B., Li, J., Card, D., & Parent, D. (2023). Employer policies and the immigrant–native earnings gap. *Journal of Econometrics*, *233*(2), 544–567.

Dustmann, C., & Görlach, J.-S. (2015). Selective out-migration and the estimation of immigrants' earnings profiles. In B. R. Chiswick & P. W. Miller (Eds.), *Handbook of the Economics of International Migration, Volume 1* (pp. 489–533). Elsevier.

Eeckhout, J., & Kircher, P. (2011). Identifying sorting — in theory. *Review of Economic Studies*, *78*(3), 872–906. https://doi.org/10.1093/restud/rdq034

Elgersma, S. (2014). Temporary foreign workers. *Library of Parliament Publication No. 2014-79-E*.

Employment and Social Development Canada. (2015). Overhauling the temporary foreign worker program: Putting Canadians first. *Government of Canada Publication Em4-1/2015E-PDF*.

Ferrer, A., Green, D. A., & Riddell, W. (2006). The effect of literacy on immigrant earnings. *Journal of Human Resources*, *41*(2), 380–410.

Fukui, M., & Mukoyama, T. (2025). Efficiency in job-ladder models. *NBER Working Paper No. 33910*.

Goldschmidt, D., & Schmieder, J. F. (2017). The rise of domestic outsourcing and the evolution of the german wage structure. *Quarterly Journal of Economics*, *132*(3), 1165–1217.

Gross, D. M., & Schmitt, N. (2012). Temporary foreign workers and regional labor market disparities in Canada. *Canadian Public Policy*, *38*(2), 233–263.

Guo, N., Zhang, L., Zhang, R., & Zou, B. (2025). Migration restrictions and the migrant-native wage gap: The roles of wage setting and sorting. *HKU Jockey Club Enterprise Sustainability Global Research Institute Paper No. 2025/015*.

Gyetvay, S., & Keita, S. (2024). Competition, mobility and immigration. *Working Paper*. https://www.samgyetvay.com/papers/gyetvaykeita2023.pdf

Horowitz, J. L., & Manski, C. F. (1995). Identification and robustness with contaminated and corrupted data. *Econometrica : journal of the Econometric Society*, *63*(2), 281–302.

Human Resources and Skills Development Canada. (2012). *Evaluation of the labour market opinion streams of the temporary foreign worker program* (tech. rep.). https://publications.gc.ca/collections/collection_2013/rhdcc-hrsdc/HS28-207-2012-eng.pdf

Hunt, J., & Xie, B. (2019). How restricted is the job mobility of skilled temporary work visa holders? *Journal of Policy Analysis and Management*, *38*(1), 41–64.

Hunt, J., & Gauthier-Loiselle, M. (2010). How much does immigration boost innovation? *American Economic Journal: Macroeconomics*, *2*(2), 31–56. https://doi.org/10.1257/mac.2.2.31

Immigration, Refugees and Citizenship Canada. (2015). Evaluation of the Canadian Experience Class. *Evaluation Report Ci4-147/2016E-PDF*.

Javdani, M., & McGee, A. (2018). Labor market mobility and the early-career outcomes of immigrant men. *IZA Journal of Development and Migration*, *8*(20), 1–28.

Kerr, W. R., & Lincoln, W. F. (2010). The supply side of innovation: H-1B visa reforms and U.S. ethnic invention. *Journal of Labor Economics*, *28*(3), 473–508.

Kline, P. (2024). Firm wage effects. In *Handbook of labor economics* (pp. 115–181, Vol. 5). Elsevier.

Kroft, K., Mourifié, I., & Vayalinkal, A. (2025). Horowitz-manski-lee bounds with multilayered sample selection [Working paper].

Kwon, S., & Roth, J. (2026). Testing mechanisms [Working paper].

Lachowska, M., Mas, A., & Woodbury, S. A. (2020). Sources of displaced workers' long-term earnings losses. *American Economic Review*, *110*(10), 3231–3266.

Lalonde, R. J., & Topel, R. H. (1992). The assimilation of immigrants in the U.S. labor market. In G. J. Borjas & R. B. Freeman (Eds.), *Immigration and the workforce: Economic consequences for the United States and source areas* (pp. 67–92). University of Chicago Press.

Lamadon, T., Mogstad, M., & Setzler, B. (2022). Imperfect competition, compensating differentials, and rent sharing in the US labor market. *American Economic Review*, *112*(1), 169–212.

Lechner, M. (2011). The estimation of causal effects by difference-in-difference methods. *Foundations and Trends in Econometrics*, *4*(3), 165–224. https://doi.org/10.1561/0800000014

Lee, D. S. (2009). Training, wages, and sample selection: Estimating sharp bounds on treatment effects. *The Review of Economic Studies*, *76*(3), 1071–1102. https://doi.org/10.1111/j.1467-937X.2009.00536.x

Lehrer, S. F., & Rawling, L. (2025). The implications of sorting for immigrant wage assimilation and changing cohort quality in Canada [Forthcoming in *Canadian Journal of Economics*]. *NBER Working Paper No. 34462*.

Li, J., Dostie, B., & Simard-Duplain, G. (2023). Firm pay policies and the gender earnings gap: The mediating role of marital and family status. *ILR Review*, *76*(1).

Lise, J., Meghir, C., & Robin, J.-M. (2016). Matching, sorting and wages. *Review of Economic Dynamics*, *19*, 63–87.

Lubotsky, D. (2007). Chutes or ladders? A longitudinal analysis of immigrant earnings. *Journal of Political Economy*, *115*(5), 820–867.

Luttmer, E. F., & Zeckhauser, R. J. (2008). Schedule selection by agents: From price plans to tax tables. *NBER Working Paper No. 13808*. https://doi.org/10.3386/w13808

Mahajan, P., Morales, N., Shih, K., Chen, M., & Brinatti, A. (2024). The impact of immigration on firms and workers: Insights from the H-1B lottery. *Working Paper*. https://agostinabrinatti.github.io/AgostinaBrinatti_Website/Brinatti_H1B_lotteries_Census.pdf

Manning, A. (2025). *Why immigration policy is hard: And how to make it better*. Polity.

Moosapeta, A. (2022). *Why does Quebec have its own immigration policy?* Retrieved November 5, 2025, from https://www.cicnews.com/2022/12/why-does-quebec-have-its-own-immigration-policy-1230732.html

Naidu, S., Nyarko, Y., & Wang, S.-Y. (2016). Monopsony power in migrant labor markets: Evidence from the united arab emirates. *Journal of Political Economy*, *124*(6), 1735–1792.

Obokata, T. (2024, July 22). *Visit to Canada: Report of the Special Rapporteur on Contemporary Forms of Slavery, Including Its Causes and Consequences* (UN Document No. A/HRC/57/46/Add.1). United Nations Human Rights Council. Retrieved March 23, 2026, from https://docs.un.org/en/A/HRC/57/46/Add.1

O'Donnell, I., & Skuterud, M. (2022). The transformation of Canada's Temporary Foreign Worker Program. *Canadian Public Policy*, *48*(4), 518–532.

Pendakur, K., & Woodcock, S. (2010). Glass ceilings or glass doors? Wage disparity within and between firms. *Journal of Business and Economic Statistics*, *28*(1), 181–189.

Peri, G., Shih, K., & Sparber, C. (2015). Foreign and native skilled workers: What can we learn from H-1B lotteries? *NBER Working Paper No. 21175*.

Postel-Vinay, F., & Robin, J. (2002). Equilibrium wage dispersion with worker and employer heterogeneity. *Econometrica*, *70*(6), 2295–2350.

Rathnayake, G., Negi, A., Bartalotti, O., & Zhao, X. (2024). Difference-in-differences with sample selection. *arXiv preprint arXiv:2411.09221*. https://doi.org/10.48550/arXiv.2411.09221

Sanders, B. (2025). H-1B Visas Hurt One Type of Worker and Exploit Another. This Mess Must Be Fixed. *Fox News*. Retrieved March 23, 2026, from https://www.foxnews.com/opinion/sen-bernie-sanders-h1-b-visas-hurt-one-type-worker-exploits-another-mess-must-fixed

Schmieder, J. F., von Wachter, T., & Heining, J. (2023). The costs of job displacement over the business cycle and its sources: Evidence from germany. *American Economic Review*, *113*(5), 1208–1254.

Shi, L. (2023). Optimal regulation of noncompete contracts. *Econometrica*, *91*(2), 425–463.

Skuterud, M., & Su, M. (2012). Immigrants and the dynamics of high-wage jobs. *ILR Review*, *65*(2), 377–397.

Subramaniam, V. (2025). Temporary Foreign Workers May Get More Flexibility to Move Jobs as Ottawa Eyes Changes to Program. *The Globe and Mail*. Retrieved March 23, 2026, from https://www.theglobeandmail.com/business/article-temporary-foreign-workers-may-get-more-flexibility-to-move-jobs-as/

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, *225*(2), 175–199.

Thompson, M. (2016). How employers of temporary foreign workers get away with low pay and bad working conditions. *Canadian Centre for Policy Alternatives*. https://www.policynote.ca/how-employers-of-temporary-foreign-workers-get-away-with-low-pay-and-bad-working-conditions/

Tino, S. (2025). Labor market power, firm productivity, and the immigrant-native pay gap. *CLEF Working Paper No. 88*.

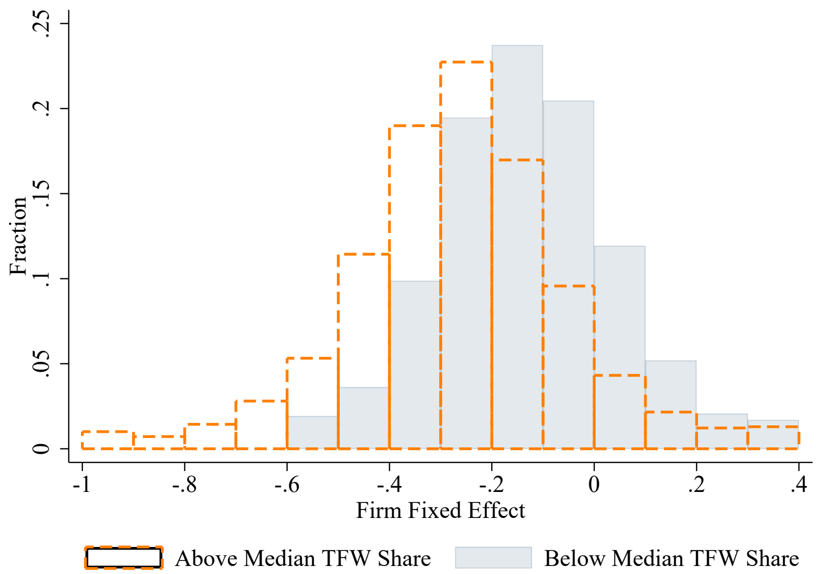
Townsend, W., & Allan, C. (2025). How restricting migrants' job options affects both migrants and existing residents. *Working Paper*. https://wilburtownsend.github.io/papers/visas.pdf

Trump, D. J. (2025, September 19). *Restriction on entry of certain nonimmigrant workers*. The White House. Retrieved March 23, 2026, from https://www.whitehouse.gov/presidential-actions/2025/09/restriction-on-entry-of-certain-nonimmigrant-workers/

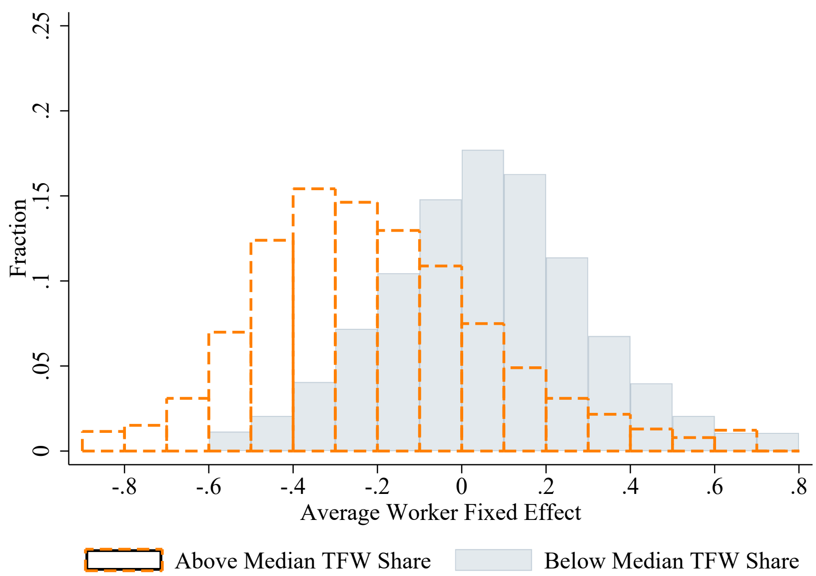
Wang, X. (2021). US permanent residency, job mobility, and earnings. *Journal of Labor Economics*, *39*(3), 639–671.

Figure 1: Firm Selection into the TFW Program: Distribution of Firm and Average Worker Effects by TFW Employment Share for Firms that Hire TFWs

(a) Firm Effect




(b) Average Worker Effect of Employees

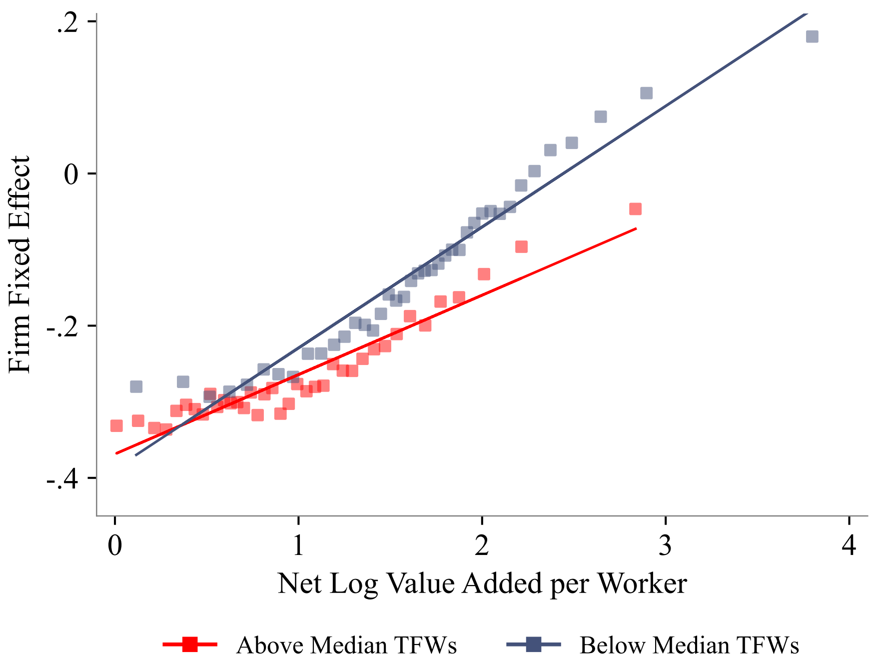



*Notes:* This figure shows the distribution of firm effects and average worker effects for firms that hired at least one TFW during the sample period, comparing firms with above-median versus below-median TFW employment share. The TFW employment share is calculated for each firm as the average, across all observed years, of the annual fraction of its workforce composed of TFWs. The worker and firm fixed effects were estimated using a two-way fixed effect (AKM) model of log earnings (see Appendix C). The average worker effect for each firm is calculated across employees in all observed years. Panel (a) shows the distribution of firm effects, while Panel (b) shows the distribution of average worker effects. Orange bars represent firms with above-median TFW employment shares; navy bars represent firms with below-median TFW employment shares. *Source:* Authors' calculations using the CEEDD.

Figure 2: Firm Fixed Effect versus Value Added per Worker

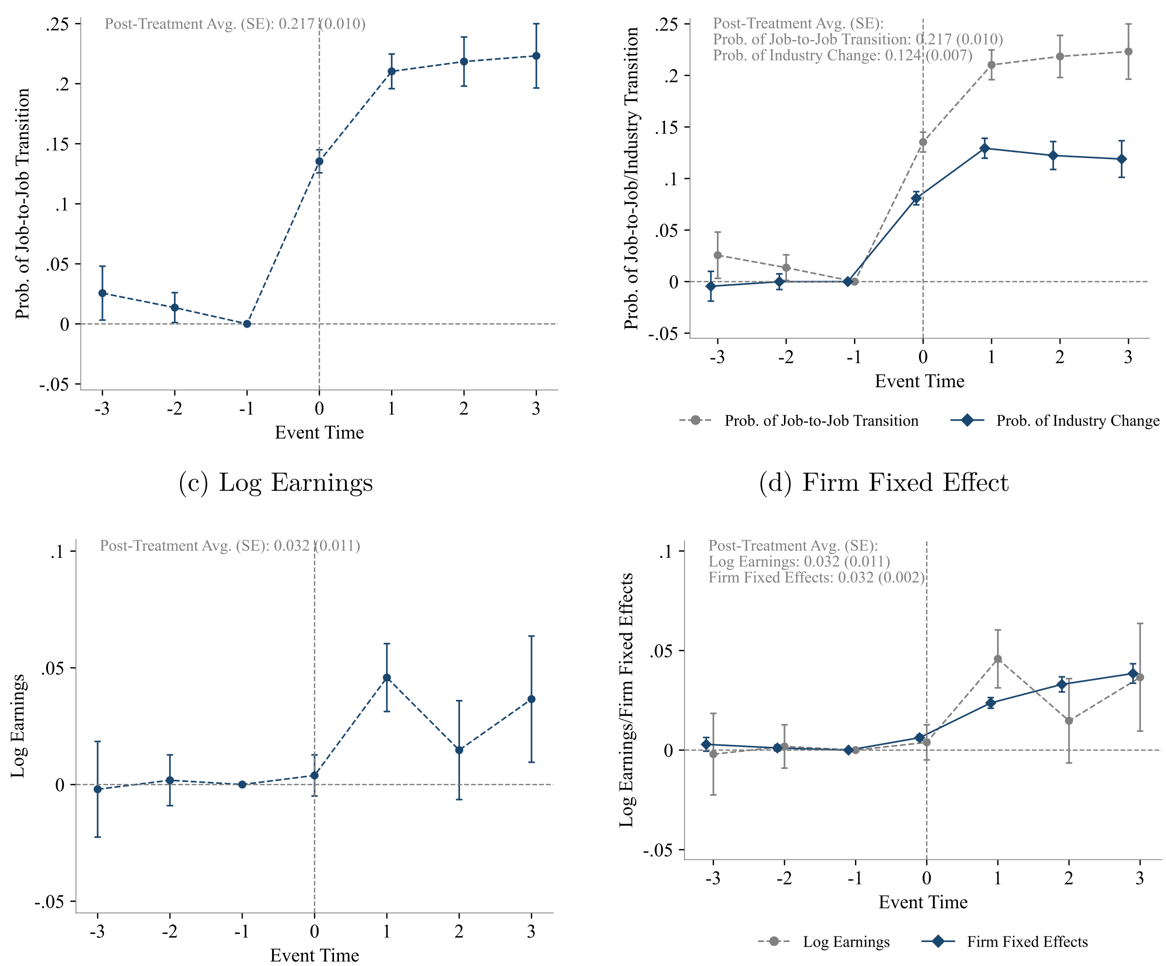
(a) Full Sample


(b) By Median of TFW share




*Notes:* This figure presents the bin scatter plots of firm fixed effects versus net log value added per worker. The firm fixed effects are obtained from a two-way fixed effects (AKM) model of log earnings (see Appendix Section C). Panel (a) is constructed using the full set of firms in the AKM sample (see Section 3.2). Panel (b) contains firms that hire at least one TFW during the sample period. The TFW share for each firm is calculated as the average, across all observed years, of the annual fraction of its workforce composed of TFWs. Firms with a TFW share above the median are classified as "Above Median TFWs," and those below the median as "Below Median TFWs." Value added is calculated as Total Revenue minus Total Expenses plus Total Payroll (in 2012 dollars). Net log value added per worker is calculated as $\max\{0, \log(VAPW) - \tau\}$, where $VAPW$ is the firm's average value added per worker (averaged across all observed years) and $\tau$ is the 5th percentile of $\log VAPW$ across firms. The data on $\log VAPW$ was winsorized at the 95% percentile before constructing the figure. *Source:* Authors' calculations using the CEEDD (Firm-level financial information is obtained from the NALMF).

Figure 3: Worker Mobility Outcomes, Earnings, and Firm Pay Premia




(a) Probability of Job-to-Job Transition

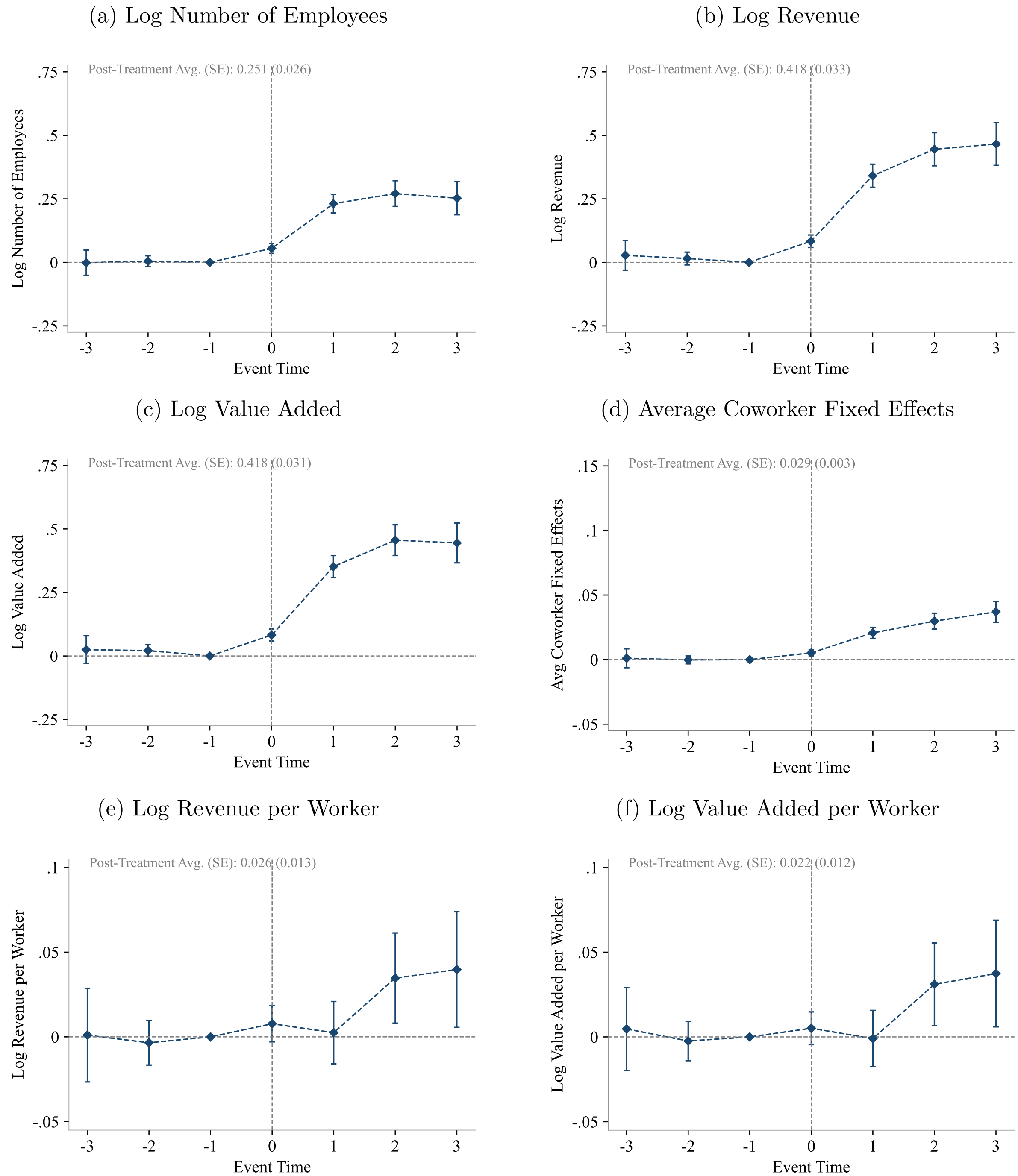
(b) Probability of Industry Change

(c) Log Earnings

(d) Firm Fixed Effect

*Notes:* This figure shows event study estimates for worker mobility outcomes, log earnings, and firm pay premia. Event time 0 represents the year of obtaining permanent residency. Panel (a) shows the probability of job-to-job transitions. Panel (b) shows the probability of changing industries. Panel (c) shows changes in log earnings. Panel (d) shows changes in firm fixed effects of the worker's primary employer, where the firm fixed effects are estimated from an AKM model (see Appendix C). Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure 4: Other Firm Characteristics

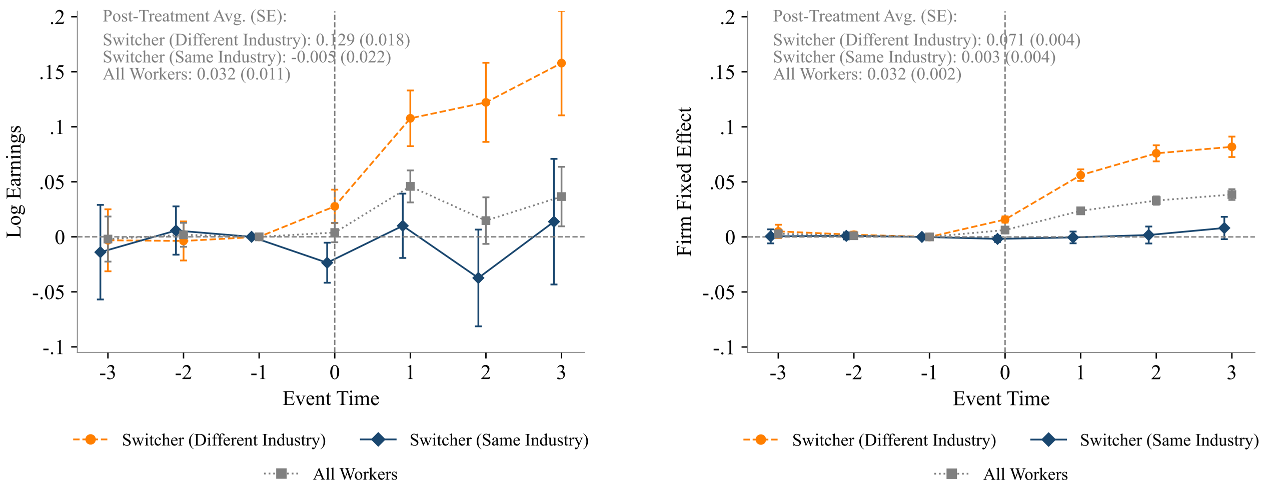



*Notes:* This figure shows event study estimates for firm characteristics of each individual's primary employer. The worker effects are estimated from an AKM model (see Appendix C). Panel (a) shows log number of employees. Panel (b) shows log firm revenue. Panel (c) shows log value added, where value added is calculated as Total Revenue minus Total Expenses plus Total Payroll. Panel (d) shows the average worker fixed effects of coworkers (leave-one-out mean). Panel (e) shows log revenue per worker. Panel (f) shows log value added per worker. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure 5: Earnings and Firm Pay Premia by Industry-Transition Status

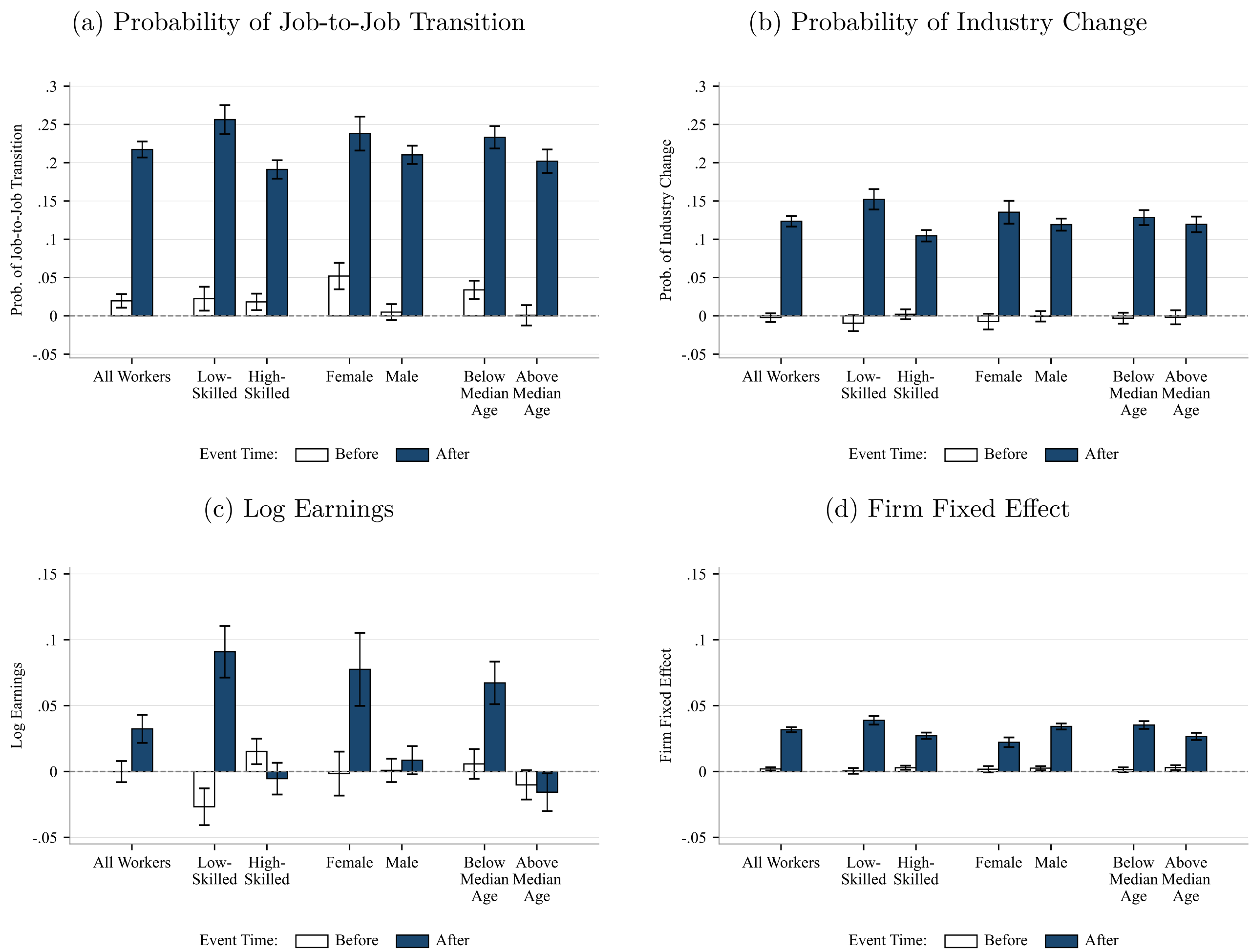
(a) Log Earnings

(b) Firm Fixed Effect




*Notes:* This figure shows event study estimates for the main labor market outcomes separately by industry-transition status of all workers who change jobs at least once through event time 0, 1, or 2. Event time 0 represents the year of obtaining permanent residency. Orange lines represent workers who switched industry; navy lines represent workers who stayed in the same industry. Panel (a) shows log earnings. Panel (b) shows firm fixed effects of the worker's primary employer. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

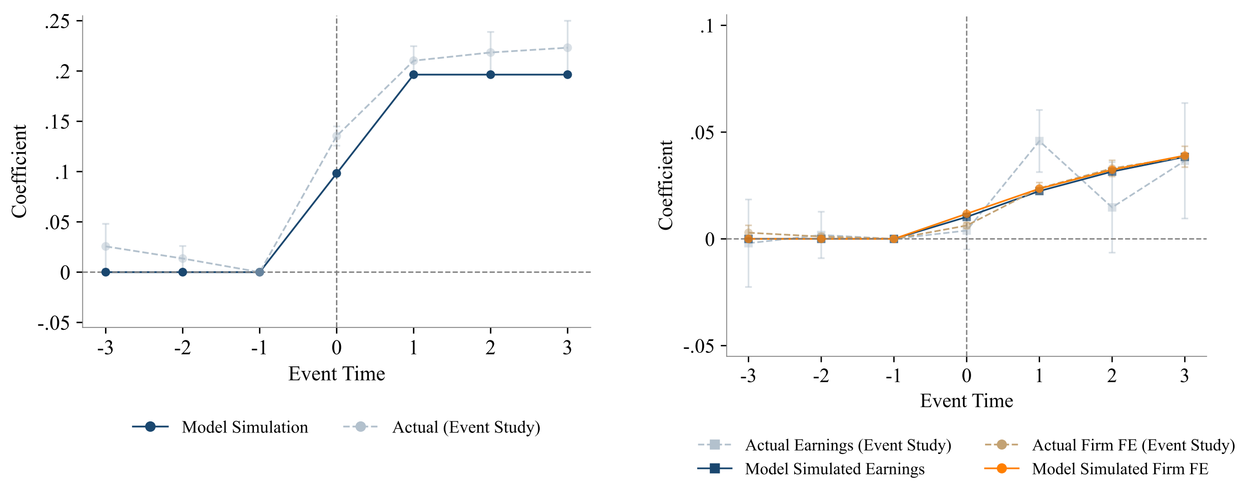
Figure 6: Main Labor Market Outcomes Heterogeneity




*Notes:* This figure shows averaged event study estimates before and after event time 0 for the main labor market outcomes separately by skill level, gender, and age. The classification into low and high skilled workers uses the intended occupation at the time of permanent residency from the IMDB (see Section 3.3). The observations are classified into below- vs above-median initial age (33 years old). Panel (a) shows job-to-job transition probability. Panel (b) shows industry change probability. Panel (c) shows log earnings. Panel (d) shows firm fixed effects of the worker's primary employer. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure 7: Model Calibration: Model Fit

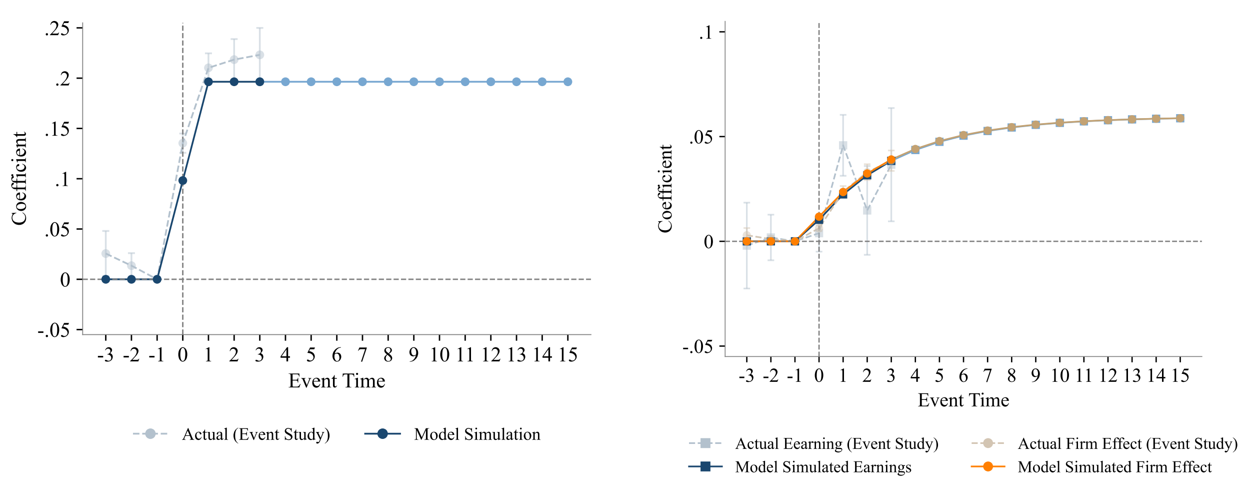
(a) Job Transitions (b) Log Earnings and Firm Fixed Effect




*Notes:* This figure reports simulation-based event study estimates for the effect of randomly giving workers PR. Panel (a) shows the probability of a job-to-job transition. Panel (b) shows the increase in earnings and firm pay premia after PR. The firm pay premia come from an AKM regression on the simulated data. The calibration sets the on-the-job search parameter $s$ and share parameter $\alpha$ to match the observed jump in job transitions and the rise in firm pay premia after obtaining PR. The calibrated model is able to match the increase in job transitions and firm pay premia, but understates the increase in earnings.

Figure 8: Model Calibration: Long-Run Effects of PR

(a) Job Transitions (b) Log Earnings and Firm Fixed Effect




*Notes:* This figure reports simulation-based event study estimates for the effect of gaining PR and uses the model structure to extrapolate the results to 15 years. Panel (a) shows the probability of a job-to-job transition. Panel (b) shows the increase in earnings and firm pay premia after PR. The firm pay premia come from an AKM regression on the simulated data.

Table 1: Summary Statistics by Sample and PR Status

| | **Get PR (Never Get PR = 0)** | | | **Never Get PR = 1** |
|---|---|---|---|---|
| | All | $3 \leq$ Time-to-PR $\leq 5$ | Analysis Sample | All |
| | (1) | (2) | (3) | (4) |
| **Sample Composition** | | | | |
| Analysis sample | 0.22 | 0.42 | 1 | 0 |
| Never get PR | 0 | 0 | 0 | 1 |
| $3 \leq$Time-to-PR $\leq 5$ | 0.53 | 1 | 1 | – |
| Unique individuals (rounded) | 113,000 | 60,000 | 25,000 | 107,000 |
| **Earnings** | | | | |
| Total 2nd-year earnings (2012$) | 53,000 | 51,000 | 51,000 | 49,000 |
| **Demographics** | | | | |
| High skilled | 0.63 | 0.61 | 0.59 | – |
| Male | 0.70 | 0.69 | 0.74 | – |
| Bachelor's degree | 0.43 | 0.45 | 0.43 | – |
| Advantaged country | 0.17 | 0.16 | 0.14 | – |
| **Time to PR** | | | | |
| Average time-to-PR (years) | 3.74 | 3.76 | 3.68 | – |
| $\leq 2$ years | 0.29 | 0 | 0 | – |
| $\geq 6$ years | 0.18 | 0 | 0 | – |
| 3 years | 0.24 | 0.45 | 0.50 | – |
| 4 years | 0.17 | 0.33 | 0.32 | – |
| 5 years | 0.11 | 0.22 | 0.18 | – |
| **Initial Industry** | | | | |
| Accommodation and food services (72) | 0.34 | 0.37 | 0.41 | 0.18 |
| All other industries | 0.23 | 0.21 | 0.17 | 0.28 |
| Professional, scientific, and technical (54) | 0.08 | 0.07 | 0.09 | 0.12 |
| Construction (23) | 0.08 | 0.08 | 0.08 | 0.15 |
| Food Manufacturing (31) | 0.05 | 0.05 | 0.07 | 0.06 |
| Metal Manufacturing (33) | 0.05 | 0.05 | 0.06 | 0.06 |
| Health care and social assistance (62) | 0.05 | 0.04 | 0.00 | 0.03 |
| Transportation and warehousing (48) | 0.05 | 0.05 | 0.04 | 0.05 |
| Retail trade (44) | 0.05 | 0.05 | 0.05 | 0.04 |
| Wholesale trade (41) | 0.03 | 0.03 | 0.03 | 0.05 |

*Notes:* This table presents summary statistics for the sample of TFWs defined in Section 3. Column 1 includes TFWs who eventually receive PR. Column 2 restricts to TFWs who take 3–5 years to receive PR. Column 3 further limits to the main sample that is described in Section 3.3. Column 4 represents workers who never obtain PR, defined as those for whom no year of PR is recorded in the IMDB. The "advantaged countries" include the U.S., UK, Australia, New Zealand, and Northern/Western Europe. The classification into low and high skilled workers uses the intended occupation in the IMDB recorded at the time of PR. Industry codes in parentheses refer to 2-digit NAICS classifications. The industries shown are the top 9 initial industries for TFWs, with the 10th category aggregating all other industries. *Source:* Authors' calculations using the CEEDD (Demographic variables are obtained from the IMDB, while Earnings and Initial Industry variables are obtained from the T4 database).

Table 2: Mincer-style Regressions for Log Earnings using the 2016 Canadian Census Data

| | Baseline Specification | | Additional Fixed Effects | | |
|---|---|---|---|---|---|
| | (1) No controls | (2) With controls | (3) Industry FE | (4) Occupation FE | (5) Ind and Occ FE |
| Temporary resident | -0.431 | -0.394 | -0.332 | -0.349 | -0.306 |
| | (0.023) | (0.023) | (0.022) | (0.022) | (0.022) |
| Permanent resident | -0.115 | -0.180 | -0.164 | -0.163 | -0.153 |
| | (0.005) | (0.006) | (0.006) | (0.006) | (0.006) |
| 25-34 years | | 0.517 | 0.460 | 0.448 | 0.413 |
| | | (0.009) | (0.009) | (0.009) | (0.009) |
| 35-44 years | | 0.795 | 0.716 | 0.693 | 0.639 |
| | | (0.009) | (0.009) | (0.009) | (0.009) |
| 45-54 years | | 0.884 | 0.801 | 0.783 | 0.723 |
| | | (0.009) | (0.009) | (0.009) | (0.009) |
| 55-64 years | | 0.785 | 0.703 | 0.692 | 0.634 |
| | | (0.010) | (0.010) | (0.010) | (0.010) |
| Bachelor's degree + | | 0.442 | 0.355 | 0.315 | 0.260 |
| | | (0.006) | (0.006) | (0.006) | (0.006) |
| Female | | -0.319 | -0.301 | -0.274 | -0.268 |
| | | (0.004) | (0.005) | (0.005) | (0.005) |
| English | | 0.280 | 0.250 | 0.245 | 0.223 |
| | | (0.008) | (0.008) | (0.008) | (0.008) |
| French | | 0.097 | 0.065 | 0.069 | 0.047 |
| | | (0.009) | (0.009) | (0.009) | (0.009) |
| N | 224,061 | 224,061 | 224,061 | 224,061 | 224,061 |
| Fixed effects | None | None | Industry | Occupation | Both |

*Notes:* This table reports results from the estimation of Mincer-style regressions using the Canadian 2016 Census (see Section 5). The sample is restricted to full-time workers aged 18 to 64 who were not students during the nine-month period between September 2015 and May 10, 2016. Individuals working in agriculture (NAICS 11), education (NAICS 61), health (NAICS 62), and public (NAICS 91) sectors are excluded, and we also exclude live-in caregivers by removing individuals working in NOC 43-44. Column (1) estimates a simple regression of log earnings on temporary resident status ($TR_i$) and permanent resident status ($PR_i$) without controls. Column (2) adds the baseline controls. Columns (3)-(5) include fixed effects: column (3) includes industry fixed effects, column (4) includes occupation fixed effects, and column (5) includes both industry and occupation fixed effects. Heteroskedasticity-robust standard errors are in parentheses.

Table 3: Calibrated Parameters for Counterfactual Simulations

| | TFW market segment | Domestic workers market segment | Description |
|---|---|---|---|
| **Panel A: Initially Calibrated Parameters** | | | |
| Worker bargaining parameter, $\beta$ | 0.5 | 0.5 | Follows Shi (2023); consistent with 49% worker share of rents in Lamadon, Mogstad, and Setzler (2022). |
| Complementarity parameter, $\rho$ | 0 | 0 | Assumes Cobb-Douglas production function. |
| Job separation rate, $\xi$ | 0.021 | 0.011 | Chosen to match average job tenure of four years in both segments; lower domestic value reflects OJS and poaching. |
| Discount rate, $r$ | 0.05 | 0.05 | Follows Lise, Meghir, and Robin (2016) and Shi (2023). |
| Worker ability parameters, $(a_x, b_x)$ | | | Chosen to match the domestic–TFW wage gap of 0.31 from Mincer regression and ratio of std dev to mean wage in each group of 0.7 to match Dostie et al. (2023) |
| $a_x$ (or $a_x^{\text{tfw}}$) | 1.2 | 1.15 | |
| $b_x$ (or $b_x^{\text{tfw}}$) | 3.2 | 2.05 | |
| Firm productivity parameters, $(a_y, b_y)$ | | | Chosen arbitrarily as normalizations because we choose $\alpha$ to determine the effect of PR on AKM firm effects |
| $a_y$ | 10 | 10 | |
| $b_y$ | 10 | 10 | |
| Matching parameter, $\eta$ (or $\eta^{\text{tfw}}$) | 0.06 | 0.065 | Chosen to target $\kappa = 0.22$ and $\kappa^{\text{tfw}} = 0.17$. |
| Vacancy cost (domestic), $c$ | — | 0.175 | Chosen to be one month of average earnings in domestic market. |
| Application cost, $c^{\text{tfw}}$ | 0.14 | — | Chosen so that expected cost of vacancy is 15 percent larger than in the domestic market. |
| Probability TFW application accepted | 0.69 | — | Average TFW application acceptance rate reported in Human Resources and Skills Development Canada (2012). |
| **Panel B: Calibrated Parameters Targeted to Reduced-Form Results** | | | |
| Value of unemployment, $b$ | 0.20 | 0.38 | Domestic $b$ makes unemployment worth 50% of wage at lowest-productivity firm; TFW $b$ chosen so PR induces no wage effect. |
| On-the-job search parameter, $s$ | 0 | 0.29 | No on-the-job search in TFW market; domestic $s$ fits PR effect on job transition rates. |
| Share parameter in CES production function, $\alpha$ | 0.96 | 0.96 | Chosen to match estimated effect of PR on AKM firm fixed effects. |

*Notes:* This table summarizes the calibrated parameters in our model simulation. In the main calibrations, we assume that the number of firms is fixed. In the Appendix tables where we allow for free entry instead, we use $\alpha = 0.91$ and $b$ of 0.19 and 0.39 but keep all of the other parameters the same; this is done to be able to continue to match the effects of PR on job mobility and firm pay premia.

Table 4: Counterfactual Analysis Increasing Expected Cost of TFW Vacancy

| | Decentralized equilibrium (DE) with segmented labor markets | Scenario: Increase expected cost for TFW vacancy by 20 percent | % change relative to DE |
|---|---|---|---|
| **Panel A: Market-level outcomes** | | | |
| *TFW market segment:* | | | |
| Output (market production) | 1.046 | 1.012 | -3.25% |
| Wage bill | 0.733 | 0.701 | -4.34% |
| Firm profits | 0.247 | 0.239 | -3.40% |
| Corr$(x, y)$ | 0.000 | 0.000 | |
| Market tightness ($V^{\text{tfw}}/U^{\text{tfw}}$) | 1.252 | 0.957 | -23.56% |
| *Domestic workers market segment:* | | | |
| Output (market production) | 1.439 | 1.444 | 0.36% |
| Wage bill | 1.096 | 1.106 | 0.89% |
| Firm profits | 0.285 | 0.277 | -2.67% |
| Corr$(x, y)$ | 0.134 | 0.133 | -0.01% |
| Market tightness ($V/U$) | 1.578 | 1.668 | 5.71% |
| *Combined totals:* | | | |
| Output (market production) | 2.485 | 2.456 | -1.16% |
| Wage bill | 1.829 | 1.807 | -1.20% |
| Firm profits | 0.532 | 0.516 | -3.01% |
| **Panel B: Average wages** | | | |
| Wages, TFWs | | | |
| TFWs, all | 0.733 | 0.701 | -4.34% |
| TFWs, below-median wages | 0.317 | 0.306 | -3.41% |
| TFWs, above-median wages | 1.148 | 1.097 | -4.43% |
| Wages, domestic workers | | | |
| Domestic workers, all | 1.096 | 1.106 | 0.89% |
| Domestic workers, below-median wages | 0.507 | 0.514 | 1.42% |
| Domestic workers, above-median wages | 1.684 | 1.698 | 0.80% |
| Average wages, all workers | 0.915 | 0.904 | -1.20% |
| **Panel C: Social welfare** | | | |
| Social welfare in TFW market segment | 1.048 | 1.017 | -3.01% |
| Social welfare in domestic workers market segment | 1.508 | 1.509 | 0.06% |
| Total social welfare | 2.556 | 2.525 | -1.20% |

*Notes:* This table presents results from our counterfactual scenario where we increase the expected cost of a temporary foreign worker (TFW) application by 20 percent. After implementing this change, we re-simulate the entire model, allowing firms to switch between the two segmented labor markets. The first column of results presents values from the decentralized equilibrium at baseline; the second column reports the new equilibrium after the counterfactual policy change, and the third column reports the percent change between the two scenarios. The wage bill is the total wages paid to all of the workers in each market segment. The Corr$(x, y)$ is the $h(x, y)$-weighted correlation between worker ability and firm productivity in each market segment. Social welfare is calculated as the sum of the total wages paid (wage bill), firm profits, and the total value of home production.

Table 5: Counterfactual Analysis Converting All TFWs to Permanent Residents

| | Decentralized equilibrium (DE) with segmented labor markets | Scenario: Converting all TFWs to PRs | % change relative to DE |
|---|---|---|---|
| **Panel A: Market-level outcomes** | | | |
| *Combined totals:* | | | |
| Output (market production) | 2.485 | 2.580 | 3.82% |
| Wage bill | 1.829 | 1.968 | 7.57% |
| Firm profits | 0.532 | 0.490 | -7.99% |
| Corr$(x, y)$ | | 0.138 | |
| Market tightness $(V/U)$ | | 1.823 | |
| **Panel B: Average wages** | | | |
| Wages, TFWs | | | |
| TFWs, all | 0.733 | 0.853 | 16.30% |
| TFWs, below-median wages | 0.317 | 0.378 | 19.19% |
| TFWs, above-median wages | 1.148 | 1.327 | 15.63% |
| Wages, domestic workers | | | |
| Domestic workers, all | 1.096 | 1.115 | 1.73% |
| Domestic workers, below-median wages | 0.507 | 0.522 | 3.00% |
| Domestic workers, above-median wages | 1.684 | 1.708 | 1.40% |
| Average wages, all workers | 0.915 | 0.984 | 7.57% |
| **Panel C: Social welfare** | | | |
| Social welfare in TFW market segment | 1.048 | | |
| Social welfare in domestic workers market segment | 1.508 | | |
| Total social welfare | 2.556 | 2.616 | 2.34% |

*Notes:* This table presents results from our counterfactual scenario where all temporary foreign workers (TFWs) obtain permanent residency (PR), effectively giving all TFWs "open visas." After implementing this change, we re-simulate the entire model, solving for a new steady-state equilibrium. The first column of results presents values from the decentralized equilibrium at baseline; the second column reports the new equilibrium after the counterfactual policy change, and the third column reports the percent change between the two scenarios. The wage bill is the total wages paid to all of the workers in each market segment. The Corr$(x, y)$ is the $h(x, y)$-weighted correlation between worker ability and firm productivity in each market segment. Average wages are defined as the wage bill divided by the number of workers (overall and by market segment). Social welfare is calculated as the sum of the total wages paid (wage bill), firm profits, and the total value of home production.

# Online Appendix for "The Labor Market Return to Permanent Residency"

# A Background Information on the Temporary Foreign Worker Program

## A.1 The Reforms to the Temporary Foreign Worker Program in 2014

In 2014, the TFWP was split into two distinct programs: the umbrella term "TFWP," which previously regulated a broad set of TFWs, became known as the program that solely regulated TFWs with closed worker permits. A second program, known as the International Mobility Program (IMP), was implemented to regulate TFWs with open work permits (Employment and Social Development Canada, 2015).[48]

An important change in 2014 was the replacement of the LMO with the Labour Market Impact Assessment (LMIA). The LMIA process is more stringent than the LMO (O'Donnell and Skuterud, 2022). For example, the LMIA requires employers to provide additional details proving that they made a reasonable effort to recruit Canadians, such as the number of Canadian applicants to a job posting, the number interviewed, and justifications for not hiring them (Employment and Social Development Canada, 2015). Employers are also required to attest that hiring the TFW would not result in job losses for domestic workers at worksites employing TFWs. Appendix K.3 shows an example LMIA application form.

Another modification was the division of the TFWP into high-wage and low-wage streams, based on whether the offered wage exceeded the median provincial or territorial wage. These wage-based streams differ from, but are similar to, the previous classification based on skill levels. High-wage positions typically include managerial, scientific, professional, technical, and skilled trades roles, while low-wage positions primarily encompass general laborers, food counter attendants, and sales and service workers (Employment and Social Development Canada, 2015). In 2017, the government also introduced the Global Talent Stream (GTS), specifically designed to facilitate the hiring of highly skilled TFWs required to meet a "unique and specialized condition" and alleviate labor shortages for high-skilled occupations (Kachulis and Pérez-Leclerc, 2020).

There were several other significant reforms to the TFWP in 2014. The application fee increased from \$275 to \$1,000 per position requested.[49] The federal government implemented safeguards to protect TFWs, especially those in the low-wage stream, such as more frequent inspections to verify employer compliance (Employment and Social Development Canada, 2015).[50] In addition, the federal government introduced a cap limiting the proportion of low-wage temporary foreign workers to reduce employers' reliance on TFWs. For employers with at least 10 workers who apply for an LMIA, the cap limited the number of TFWs to 10% of their workforce, phased in from 2015 to 2016 (Employment and Social Development Canada, 2015). Furthermore, the maximum duration for a low-wage permit was reduced

[48] The IMP workers have "open work permits," meaning that they can switch employers without obtaining a new visa. These workers are considered "LMIA-exempt."

[49] Charging TFWs for the application fee or other recruiting costs is illegal (Government of Canada, 2025b).

[50] For TFWs in the low-wage stream, employers have additional obligations. For example, the most recent requirements mandate that the employer provide private health insurance when provincial coverage does not apply, protect workers from workplace hazards, and ensure that suitable housing is available for the TFWs (Government of Canada, 2025b). In general, employers using the TFWP are not required to provide or secure housing for the TFWs (only ensure it is available). Employers in the Seasonal Agricultural Worker Program (SAWP) and the Live-in Caregiver Program (LCP) must provide housing for the foreign workers, and we exclude the SAWP and LCP from our analysis.

to one year in 2014, and a 3-year cap was introduced for high-wage permits. The "four-in, four-out" rule remained until 2016, at which point it was repealed, allowing TFWs to renew their work permits even after 4 years of cumulative duration in Canada.

## A.2 Pathways to Canadian Permanent Residency

Temporary work visas obtained through the TFWP do not guarantee PR. Rather, TFWs must apply for PR through the same pathways as other immigrants. The most common pathways to PR for TFWs are the skilled worker programs (including the *Federal Skilled Workers Program (FSWP)*, the *Canadian Experience Class (CEC)*, the *Federal Skilled Trades Program (FSTP)*, and the *Quebec Skilled Worker Program (QSWP)*), the *Provincial Nominee Program (PNP)*, and the *Family Class*.[51]

The FSWP is one of the oldest pathways to PR, implemented under the *Immigration Act* of 1967. It is a suitable pathway to PR for high-skilled TFWs (outside of Quebec, which has its own system discussed below). Applicants to the FSWP are assigned points based on education, age, skilled work experience, language proficiency in English or French, ability to integrate into Canada, and whether or not a Canadian employer has agreed to hire them after PR. If the total number of points exceeds a cutoff, they are eligible for PR. For example, in 2010 the FSWP awarded up to 25 points for education, 24 points for language skills, 21 points for skilled work experience earned in Canada or abroad, 5 bonus points for one year of work experience *in Canada* (under the category of "adaptability"), 5 points for a job offer, with a minimum eligibility cutoff of 67 points as shown in Table A.2. The FSWP is a viable pathway for high-skilled TFWs because they generally rank high on the points system due to their high human capital.

In 2008, the federal government introduced the CEC as a fast-track pathway for high-skilled TFWs (outside of Quebec) with Canadian experience. Between 2008 and 2014, CEC applications were processed significantly faster than FSWP applications: 80% of CEC cases took 8 to 15 months, while 80% of FSWP cases took 37 to 47 months (Immigration, Refugees and Citizenship Canada, 2015). CEC applicants are evaluated on a pass/fail basis, unlike the FSWP which uses a point system. To qualify, applicants must meet a minimum work experience requirement (reduced from two years to one in 2012) in a high-skilled (NOC 0, A, or B) occupation and demonstrate proficiency in English or French. The CEC is a viable pathway for many high-skilled TFWs who are eligible for the program because of their experience working in a NOC 0, A, or B occupation in Canada.

The FSTP, introduced in 2013, targets skilled trade workers in occupations such as construction, manufacturing, and electrical work. Applicants to the FSTP are evaluated on a pass/fail basis, similar to the CEC. TFWs are eligible if they have a Canadian certification in a skilled trade or if a Canadian employer has agreed to hire them after PR (Immigration, Refugees and Citizenship Canada, 2025). In contrast to the FSWP (which rewards high education) and the CEC (which targets high-skilled Canadian experience), the FSTP is tailored specifically for skilled trades.

The province of Quebec has its own skilled-worker program that is separate from the FSWP, CEC, and FSTP.[52] The QSWP, or *Programme régulier des travailleurs qualifiés (PRTQ)*, was the province's

[51] In 2015, Canada introduced EE to centralize the application process for the FSWP, CEC, and FSTP. Crucially, EE is an application management system, not a standalone immigration pathway. Applicants must first meet the minimum eligibility requirements of the FSWP, FSTP, or CEC to enter the EE pool, where they receive a Comprehensive Ranking System (CRS) score. Applicants in the EE pool with CRS scores above a minimum threshold are invited to apply for PR. See Appendix A.3 for more details.

[52] Quebec's autonomy over immigration stems from the Canada-Quebec Accord, signed with the federal government in 1991.

primary immigration pathway for skilled workers up to 2024 (Moosapeta, 2022).[53] This program operated on a distinct, points-based system with criteria tailored to Quebec's specific economic and demographic needs. As detailed in Table A.3, the selection grid awarded a maximum of 26 points for education and training, 8 for work experience, 22 for language proficiency, 10 for a validated job offer, and 8 points for connections to Quebec, such as a previous stay or family members. The QSWP is a suitable pathway for TFWs who wish to settle in Quebec. High-skilled TFWs tend to score well on the points grid due to their high human capital, while some low-skilled TFWs may also achieve high scores through factors such as fluency in French, work experience, or ties to Quebec, since the selection grid does not directly assess occupational skill level.

The PNP, introduced in 1999, allows provinces and territories to design their own immigration streams with PR criteria tailored to their economic or demographic needs. It is intended for immigrants who have Canadian work experience, work in high-demand occupations in a given province, or have an ongoing job offer from a provincial employer. It is a particularly valuable pathway for low-skilled TFWs who are ineligible for the federal skilled worker programs. Prior to the PNP, Canada did not have a viable economic pathway for low-skill workers; all low-skilled immigration was for family reunification or humanitarian reasons. High-skilled workers may also prefer the PNP due to the less stringent selection criteria and faster processing times.[54] Applicants to the PNP select a stream, and the relevant provincial or territorial government reviews their application.[55] If the province or territory determines that an applicant meets the stream's eligibility criteria, it formally selects the applicant for PR through a process called a *provincial nomination*. Once nominated, the applicant receives the *Provincial Nominee Class (PNC)* designation and the federal government subsequently conducts medical, security, and criminal background checks and confirms that the applicant intends to reside in the nominating province before granting PR.[56]

The Family Class was introduced in 1976 as a pathway to PR for individuals who have family members who are Canadian citizens or permanent residents. Through the Family Class, permanent residents or citizens of Canada can sponsor other family members, including spouses, dependents, and parents, for PR. For family-class applicants who wish to reside in Quebec, the process includes an additional provincial step in which the Quebec government must approve the sponsor before the federal government grants PR. The Family Class program focuses on family reunification, not skills or work experience, so TFWs do not receive priority. It may be a viable PR pathway for low-skilled TFWs who are ineligible for the other pathways.

Table A.6 shows that 57% of the TFWs in our main analysis sample obtain PR through the PNP, 36% through the skilled worker programs (i.e., the FSWP, CEC, FSTP, and QSWP), and 7% through the Family Class. For high-skilled workers, 56% obtained PR through the skilled worker programs and 42% through the PNP. For low-skilled workers, in contrast, 78% obtained PR through the PNP, 15%

[53] The QSWP was replaced by the *Skilled Worker Selection Program (SWSP)*, or *Programme de sélection des travailleurs qualifiés (PSTQ)*.

[54] For instance, between 2005 and 2009, 80% of PNP applications were processed within 12 months, whereas 80% of FSWP applications took approximately 55 months during the same period (Citizenship and Immigration Canada, 2011).

[55] The immigration streams in the PNP are diverse, with over 50 distinct PNP streams across 11 participating provinces and territories in 2011 (Citizenship and Immigration Canada, 2011). Table A.5 provides examples of PNP streams. Since Manitoba signed the first PNP agreement in 1996, all provinces and territories except Quebec and Nunavut have joined the program as shown in Table A.4.

[56] A key condition of the PNP is that nominees must establish a clear intention to reside in the province responsible for their nomination. PNP immigrants are protected by the *Canadian Charter of Rights and Freedoms*, which grants all permanent residents the right to free mobility between provinces. However, they can be accused of "misrepresentation" if they fail to make a good-faith effort to settle in the province that nominated them.

through the Family Class, and 7% through the skilled worker programs.

## A.3 The Express Entry System

In 2015, Canada introduced *Express Entry (EE)* to centralize the application process for its federal high-skilled worker programs. Crucially, EE is an application management system, not a standalone immigration pathway. Applicants must first meet the minimum eligibility requirements of the FSWP, FSTP, or CEC to enter the EE pool, where they receive a Comprehensive Ranking System (CRS) score. EE mandates that individuals apply to certain programs in a specific order, such as the CEC before the FSWP, if eligible for both. Applicants in the EE pool with CRS scores above a minimum threshold are invited to apply for PR. Table A.14 shows the typical minimum thresholds, which change roughly every two weeks and tend to be between 450–500. Table A.15 illustrates how CRS points were awarded in 2015, showing that at most 150 points were awarded for education, 160 for language proficiency, and 80 for Canadian work experience.

In addition, some PNP streams are *EE-aligned*: individuals who apply to the FSWP, FSTP, or CEC through EE are eligible to receive an additional 600 CRS points if they also meet the program requirements of an *EE-aligned* PNP stream and therefore obtain a provincial nomination. For high-skilled workers, EE accelerates processing times and prioritizes candidates with high CRS scores, especially for those with Canadian work experience. Note that there are many PNP streams that are independent of the EE system; these are called *not* EE-aligned.

With the creation of Express Entry in 2015, the government formally introduced the "dual intent" LMIA, which replaced the former Arranged Employment Opinion (AEO) (BC Chamber of Commerce, 2016).[57] The dual intent LMIA is not a distinct pathway to PR; it is a process that integrates the LMIA into the EE system. A dual intent LMIA allows an employer to use a single application to support a foreign national's temporary work permit and, concurrently, their bid for permanent residence. TFWs who use the dual intent LMIA must still apply through one of the federal skilled programs—i.e., the FSWP, CEC, or FSTP—but the LMIA awards applicants with additional points that increases the probability of a successful application to PR (Government of Canada, 2025a). When Express Entry was first introduced, a job offer supported by an LMIA resulted in an additional 600 points, virtually guaranteeing that the TFW would receive an invitation to apply to PR at a time when the minimum CRS for an invitation to apply for PR was around 450 (Immigration, Refugees and Citizenship Canada, 2016b). In 2016, the number of points awarded for a permanent job offer was reduced to 50 for most high-skilled occupations (and 200 for the highest management roles) (Immigration, Refugees and Citizenship Canada, 2016a).

[57] The purpose of the AEO was to formally verify that the applicant had a prearranged job offer.

# B Identification and Estimation Details

This appendix section collects the formal identification and estimation results underlying the empirical design described in Section 4.

## B.1 Derivation of the Difference-in-Differences Estimand

This subsection provides the formal derivation establishing that Assumption 1 (CT) and Assumption 2 (NA) identify the cohort average treatment effect on the treated, $\text{ATT}_t(g)$, using a standard difference-in-differences estimand. As in the main text, we suppress $(k, s)$ throughout.

Recall that our target parameter is defined as:

$$\text{ATT}_t(g) \equiv \mathbb{E}[Y_{it}(g) - Y_{it}(\infty) \mid G_i = g] \tag{13}$$

The identification challenge arises because we observe the treated potential outcome $\mathbb{E}[Y_{it}(g) \mid G_i = g]$ for $t \geq g$, but the counterfactual $\mathbb{E}[Y_{it}(\infty) \mid G_i = g]$ is unobserved in the post-treatment periods $t \geq g$. We recover this counterfactual through a comparison with a not-yet-treated cohort $g'$ that shares the same conditioning cell but obtains PR later ($g' > t \geq g$), and is observed in both the baseline period $t' < g$ and one of the post-treatment periods $t \geq g$.

The derivation proceeds as follows:

$$\begin{aligned}
\text{ATT}_t(g) &= \mathbb{E}[Y_{it}(g) - Y_{it}(\infty) \mid G_i = g] \\
&= \mathbb{E}[Y_{it}(g) \mid G_i = g] - \mathbb{E}[Y_{it}(\infty) \mid G_i = g] \\
&= \mathbb{E}[Y_{it}(g) \mid G_i = g] - (\mathbb{E}[Y_{it'}(\infty) \mid G_i = g] + \mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) \mid G_i = g]) \\
&= \mathbb{E}[Y_{it}(g) \mid G_i = g] - \big(\mathbb{E}[Y_{it'}(\infty) \mid G_i = g] + \mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) \mid G_i = g']\big) \\
&= \mathbb{E}[Y_{it}(g) - Y_{it'}(\infty) \mid G_i = g] - \mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) \mid G_i = g'] \\
&= \mathbb{E}[Y_{it} - Y_{it'} \mid G_i = g] - \mathbb{E}[Y_{it} - Y_{it'} \mid G_i = g']
\end{aligned} \tag{14}$$

The first equality restates the definition. The second step applies the linearity of the expectations operator. The third step adds and subtracts $\mathbb{E}[Y_{it'}(\infty)|G_i = g]$, decomposing the unobserved counterfactual into an observed baseline component and an unobserved trend component. The fourth step invokes Assumption 1 (CT) to equate never-treated trajectories across cohort $g$ and cohort $g'$:

$$\mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) \mid G_i = g] = \mathbb{E}[Y_{it}(\infty) - Y_{it'}(\infty) \mid G_i = g'] \tag{15}$$

The fifth step in Equation (14) consolidates terms. The final step applies Assumption 2 (NA), which allows substitution of realized outcomes for potential outcomes in periods where units are not yet treated. Specifically, for cohort $g$, $Y_{it'} = Y_{it'}(\infty)$ since $t' < g$, and for cohort $g'$, both $Y_{it'} = Y_{it'}(\infty)$ and $Y_{it} = Y_{it}(\infty)$ since $t', t < g'$.

This yields the standard difference-in-differences estimand, comparing the change in outcomes for the treated cohort against the change in outcomes for a not-yet-treated comparison cohort.

## B.2 Details of the Chaining Identification Strategy

This subsection presents the chaining identification result underlying the empirical design in Section 4. When the limited pre-treatment observation window prevents identification of $\text{ATT}_t(g)$ using a single comparison cohort, we chain together observed outcomes from multiple comparison cohorts. As in the main text, we suppress $(k, s)$ throughout.

When $t - t' \geq k - 1$, the comparison cohort $g'$ required for the standard difference-in-differences estimand (Equation (6)) is not observed in both the reference period $t'$ and the target year $t$. Following Balla-Elliott and Norwich (2025), we address this by "chaining" together observed outcomes from multiple comparison cohorts (in the same $(k, s)$ cell as the focal cohort). To illustrate, consider an example with two comparison cohorts $g'$ and $g''$ that are both untreated in a single intermediate period $p \in (t', t)$ such that $p > t - (k - 1)$ and $p < t' + k - 1$. The first comparison cohort $g'$ must have landing year $g' > t$ so that it is observed untreated from $p$ to the target year $t$. The second comparison cohort $g''$ must have landing year $g'' \in (p, t' + k - 1]$ so that it is observed untreated from the reference period $t'$ to $p$. Crucially, both comparison cohorts are observed and untreated in the intermediate period $p$, which allows us to chain their common trends and construct the full counterfactual path of earnings from $t'$ to $t$. This approach generalizes to longer horizons by introducing additional intermediate periods and comparison cohorts.

Formally, when $t - t' \geq k - 1$ so that the standard DID estimand cannot be constructed, we can form the counterfactual $\mathbb{E}[Y_{it}(\infty)|G_i = g]$ using multiple comparison cohorts $g'$ and $g''$:

$$\begin{aligned}
\mathbb{E}[Y_{it}(\infty)|G_i = g] =& \underbrace{\mathbb{E}[Y_{it'}|G_i = g]}_{\text{Observed}} \\
&+ (\underbrace{\mathbb{E}[Y_{it}|G_i = g']}_{\text{Observed}} - \underbrace{\mathbb{E}[Y_{it'}|G_i = g']}_{\text{Not observed}}) \\
=& \mathbb{E}[Y_{it'}|G_i = g] \\
&+ (\mathbb{E}[Y_{it}|G_i = g'] - \mathbb{E}[Y_{ip}|G_i = g']) + (\mathbb{E}[Y_{ip}|G_i = g''] - \mathbb{E}[Y_{it'}|G_i = g''])
\end{aligned} \tag{16}$$

The first equality invokes Assumption 1 (CT) and Assumption 2 (NA) to construct the counterfactual trend for cohort $g$ using the outcomes of comparison cohort $g'$. However, $\mathbb{E}[Y_{it'}|G_i = g']$ is unobserved due to cohort $g'$ having only $k - 1$ years of pre-treatment data. The second equality addresses this by decomposing the comparison cohort's trend into two observed segments: from $t'$ to $p$ (using cohort $g''$) and from $p$ to $t$ (using cohort $g'$). Under Assumption 1 (CT), all components on the right-hand side are observed.

### B.3 Why does $\delta_{rg}$ recover $\text{ATT}_r(g)$?

As in the main text, we suppress $(k, s)$ throughout.

To show formally that the estimand $\delta_{rg}$ recovers the $\text{ATT}_r(g)$ parameter, consider the fully saturated version of (8):

$$Y_{it} = \sum_{g' \in \mathcal{G}} \gamma_{g'} \mathbb{1}\{G_i = g'\} + \sum_{\ell} \tau_\ell \mathbb{1}\{t = \ell\} + \sum_{g' \in \mathcal{G}} \sum_{r \neq -1} \delta_{rg'} \mathbb{1}\{G_i = g', r = t - g'\} \tag{17}$$

where we now have a $\delta_{rg'}$ coefficient for each combination of $g'$ and $r \neq -1$, since there is a double summation over both $g'$ and $r$ values. Combining all not-yet-treated cohorts and using them as a reference group for the relative time coefficients $\delta_{rg}$ recovers the specification in Equation (8).

Now, consider Equation (17) for a given individual with either $t \geq G_i$ (treated individuals) or $t < G_i$ (not-yet-treated individuals):

$$Y_{it} = \begin{cases} \gamma_g + \tau_t & \text{for } t < G_i \\ \gamma_g + \tau_t + \delta_{rg} & \text{for } t \geq G_i \end{cases} \tag{18}$$

By Assumption 1 (CT), $Y_{it}(\infty) = \gamma_g + \tau_t$ and the first case does not include $\delta_{rg}$ since Assumption 2 (NA) implies zero treatment effects for $t < G_i$.

Next, to move from the individual level to the population level, we first use Assumption 1 (CT) to write down the counterfactual untreated outcome for the treated cohort $g$. As in Appendix B.2, let $t'$ denote a pre-treatment reference period and $p$ an intermediate period, so that:

$$\begin{aligned}
\mathbb{E}[Y_{it}(\infty)|G_i = g] =& \mathbb{E}[Y_{it'}|G_i = g] \\
&+ (\mathbb{E}[Y_{it}|G_i = g'] - \mathbb{E}[Y_{ip}|G_i = g']) + (\mathbb{E}[Y_{ip}|G_i = g''] - \mathbb{E}[Y_{it'}|G_i = g'']) \\
=& \gamma_g + \tau_{t'} \\
&+ (\gamma_{g'} + \tau_t) - (\gamma_{g'} + \tau_p) + (\gamma_{g''} + \tau_p) - (\gamma_{g''} + \tau_{t'}) \\
=& \gamma_g + \tau_t
\end{aligned} \tag{19}$$

The common trends assumption allows us to represent the time dummy as a common $\tau_t$, instead of a time dummy for each time-by-cohort combination. Under Assumption 1 (CT), within-cohort trends in untreated potential outcomes are common across cohorts, so a single set of time dummies $\tau_t$ is identified up to a normalization.

Similarly, the observed expected potential outcome for a treated individual for $r = t - g$ is:

$$\mathbb{E}[Y_{it}(g) \mid G_i = g] = \gamma_g + \tau_t + \delta_{rg} \tag{20}$$

Lastly, conditioning on a given $r = t - g$, we can write $\text{ATT}_r(g)$ as the difference between Equation (20) and (19):

$$\begin{aligned}
\text{ATT}_r(g) &= \mathbb{E}[Y_{it}(g) - Y_{it}(\infty) \mid G_i = g, r = t - g] \\
&= (\gamma_g + \tau_t + \delta_{rg}) - (\gamma_g + \tau_t) \\
&= \delta_{rg}
\end{aligned}$$

A useful property of this specification is that it requires only a single relative-time normalization (setting $r = -1$ as the reference period), in contrast to canonical two-way fixed effects (TWFE) specifications with no never-treated units that require two relative-time normalizations due to the age-period-cohort problem. In this setting, the age-period-cohort problem arises from the identity $r = t - g$: relative time, calendar time, and cohort indicators are collinear, which necessitates dropping two event-time dummies (Borusyak, Jaravel, & Spiess, 2024). Our approach breaks this dependency by interacting the relative-time indicators with the cohort of interest indicator ($\mathbb{1}\{G_i = g, r = t - g\}$ in Equation (8)). These interacted dummies equal zero for all later-treated control cohorts (as defined in (7)) and take non-zero values for the cohort of interest, $g$, eliminating the perfect collinearity that arises in TWFE specifications.

Other heterogeneity-robust estimators, including the interaction-weighted estimator of Sun and Abraham (2021) and the imputation approach of Borusyak, Jaravel, and Spiess (2024), also identify treatment effects without a second normalization, though through different mechanisms. Our approach builds on the interaction-weighted estimator of Sun and Abraham (2021): interacting cohort indicators with relative-time indicators eliminates the collinearity described above. Borusyak, Jaravel, and Spiess (2024) achieves the same property through a different mechanism: their imputation estimator relies on no-anticipation to set all pre-treatment effects to zero, supplying the needed normalizations without estimating pre-treatment dynamics.

# C Estimating firm pay premiums using the AKM model

## C.1 Sample details

Prior to estimating the AKM model, the data cleaning closely follows the methodology outlined in Dostie et al. (2023) and Li, Dostie, and Simard-Duplain (2023), who both estimate an AKM model using the CEEDD.[58]

We begin with the full sample of individuals in the CEEDD, including non-immigrants, permanent residents, and temporary residents. Individuals with missing marital status, those who do not identify as male or female, and those outside the working age of 25 to 59 are excluded. Furthermore, the sample is limited to individuals whose employment income is at least as large as their self-employment income, where self-employment income includes earnings from business, farming, fishing, rental, commissions, and professional activities.

Since the CEEDD derives its data from tax records, it lacks specific labor market details such as hourly wages and hours worked. To address this, the sample is narrowed to full-time equivalent (FTE) workers, defined as those earning at least approximately \$18,000 in 2012 dollars. The FTE threshold is calculated by multiplying the minimum wage of \$10.07 (in 2012 dollars) by an average full-time work schedule of 38.8 hours per week over 48 weeks, following Li, Dostie, and Simard-Duplain (2023). Moreover, individuals in the CEEDD may have multiple T4 records if they hold multiple jobs. To manage this, the sample is restricted to each individual's primary job, defined as the job that provides the highest income in any given year.

Following Dostie et al. (2023) and Li, Dostie, and Simard-Duplain (2023), firms in the public sector (NAICS 91), education (NAICS 61), and health sectors (NAICS 62) are excluded from the analysis. The sample is also restricted to incorporated firms that meet several criteria: they must have at least \$50,000 in annual revenue, at least \$100 in value-added per worker, and revenue that is at least as large as the total wage bill. Additionally, these firms must have at least two employees, where employment is defined as the average of all non-zero monthly employment submissions from the PD7.

Note that firm effects are only identified for firms in a "connected set," meaning that there exists a worker who moves between them at some point during the sample period. Thus, an important step prior to estimating the AKM-style model involves restricting the sample to the largest connected set of workers and firms from the matched employer-employee data.[59] Thus, firms that are not in the connected set are excluded.

## C.2 AKM estimation details

The AKM model (Abowd, Kramarz, and Margolis, 1999) assumes that the log of an individual's earnings can be decomposed into the sum of a person effect, a firm effect, a time-varying index of individual characteristics, and a residual. Formally, the AKM model posits that the log earnings of individual $i$ at firm $j$ at time $t$ can be written as:

$$y_{it} = \alpha_i + \psi_{\mathbf{j}(i,t)} + X'_{it}\beta + \varepsilon_{it}, \tag{21}$$

[58] Dostie et al. (2023) estimate an AKM model using the CEEDD to decompose the immigrant-native earnings gap into individual-level and firm-level components. We mainly follow Dostie et al. (2023), only departing from their procedures when we define full-time equivalent (FTE) workers, which we obtain from Li, Dostie, and Simard-Duplain (2023).

[59] To extract the largest connected set of workers and firms, we use the igraph package. The employer-employee data can be viewed as a graph where the firms are nodes and the edges are worker flows between firms. The largest connected set is equivalent to the maximal connected component of the worker-firm graph.

where $\alpha_i$ is the person effect for individual $i$, $\psi_j$ is the firm effect for firm $j$, $X_{it}$ is a vector of time-varying characteristics for individual $i$ at time $t$, $\beta$ is a conformable vector of coefficients, and $\varepsilon_{it}$ is the residual. Included in the vector $X_{it}$ are variables for marital status, province of residence, year effects, and controls for age.

To control for age effects, we include a quartic polynomial in normalized age in the vector of controls $X_{it}$. Since we also include year effects in $X_{it}$, the linear term of the polynomial in age is not identified.[60] Therefore, we omit the linear term of the polynomial in age and also normalize age by subtracting and dividing by the age at which the earnings profile is at a maximum. As explained by Card et al. (2018), omitting the linear term of the polynomial without including the additional normalization of age can bias the person effects upward.

For the estimator of the firm effects to be unbiased, firm-to-firm mobility must be uncorrelated with time-varying unobservables. This is often referred to as the "exogenous mobility assumption." Dostie et al. (2023) provide evidence supporting the exogenous mobility assumption in the CEEDD from 2001 to 2013, a period similar to our main sample.

[60] Age is a linear function of year and birth year, and the person effects are collinear with birth year.

# D Bounding Within-Firm-Type Treatment Effects

A central finding of this paper is that the earnings gains from PR are driven by between-firm reallocation rather than within-firm wage growth. Section 6.2 documents that sorting toward higher-paying firms accounts for roughly 56 percent of the total earnings effect, and Section 6.4 shows that these sorting gains are concentrated among low-skilled workers. However, because treatment-induced sorting changes the composition of workers observed at each firm type, naive comparisons of stayers and switchers are contaminated by selection bias: remaining at the same firm type is itself an endogenous outcome of PR. This appendix develops partial identification bounds on the within-firm-type effect of PR that address this selection problem, combining the staggered difference-in-differences framework of Section 4 with the multilayered bounding approach of Kroft, Mourifié, and Vayalinkal (2025).[61] The resulting bounds, reported in Section 6.3, are consistent with no within-firm-type wage effects, reinforcing the conclusion that job mobility is the primary channel through which PR raises earnings.

## D.1 Setup and notation

We work within a slice as defined in Equation (7), with focal treated cohort $g$ and not-yet-treated controls $G_i > g$. Let $t^\star = g - 1$ denote the base-period calendar year. Throughout, we write $z = 1$ for treatment at the focal year $g$ and $z = 0$ for no treatment through calendar year $t$, corresponding to the potential outcomes $Y_{it}(g)$ and $Y_{it}(\infty)$ in the main text, respectively.

Using the estimated firm pay premia from the AKM model described in Appendix C, we classify each worker's primary employer into one of two types, $d \in \{H, L\}$, based on whether the firm's estimated pay premium falls above or below the median.[62] For each calendar year $t$ and treatment status $z$, let $D_t(z) \in \{H, L\}$ denote the potential firm type—the type of firm a worker would be employed at in year $t$ under treatment status $z$. Within a slice, $D_t(1) \equiv D_t(g)$ denotes the firm type at $t$ under treatment at the focal year $g$, and $D_t(0) \equiv D_t(\infty)$ denotes the firm type under no treatment. Since $t^\star < g$, Assumption 3 ensures that $D_{t^\star} = D_{t^\star}(0) = D_{t^\star}(1)$ for all workers, so the base-period firm type is observed cleanly for both groups.

We define a worker's *response type* at calendar year $t$ as the pair $T_t = (D_t(0), D_t(1))$, which characterizes how treatment affects the worker's firm type. With two firm types, there are four possible response types: $(H, H)$ and $(L, L)$ "always-stayers" who remain at their firm type regardless of treatment, $(L, H)$ workers whom treatment moves from $L$- to $H$-type firms, and $(H, L)$ workers whom treatment moves in the opposite direction.

**Definition.** Workers with $D_{t^\star} = d$ and $T_t = (d, d)$, meaning they would remain at firm type $d$ at calendar year $t$ regardless of treatment status, are called *baseline-$d$ always-stayers*. We denote this event $\mathcal{S}_d(t) \equiv \{D_{t^\star} = d,\, T_t = (d, d)\}$.

Let $Y_t(z, d)$ denote the potential wage at calendar year $t$ under treatment status $z$ at firm type $d$. Within a slice, this object augments the main text's potential outcomes with an explicit firm-type argument: $Y_t(1, d)$ corresponds to wages under $Y_{it}(g)$ evaluated at firm type $d$, and $Y_t(0, d)$ corresponds to $Y_{it}(\infty)$ at firm type $d$.

[61] The bounding exercise is related to the mechanism-testing framework of Kwon and Roth (2026), which develops a test of the "sharp null of full mediation". In our context, this corresponds to the hypothesis that PR affects earnings entirely through firm sorting with no direct within-firm wage effect. Applying their framework to a staggered adoption difference-in-differences setting requires identifying the counterfactual *distributions* of outcomes and mediators for the treated group, not just counterfactual means. This would require stronger assumptions than the standard common trends invoked in our setting (see their Section 5). Our bounding approach can be viewed as directly estimating the magnitude of any violation of the full-mediation hypothesis: within-firm-type effects of PR, if they exist, appear in our bounds.

[62] We restrict attention to employed workers throughout, abstracting from the associated sample selection problem.

The bounding approach shares a common structure with the sample selection framework of Rathnayake et al. (2026), in which firm type plays the role of their selection indicator and baseline-$d$ always-stayers correspond to their "always-observed" subpopulation. However, the present setting differs in three respects. First, because firm type is observed rather than merely binary selection, we obtain bounds for both the $H$- and $L$-firm-type effects under the same assumptions, whereas their framework bounds only the always-observed effect without additional restrictions. Second, the contamination direction reverses across firm types (the treated side is contaminated for $H$ and the control side for $L$), which is a feature that does not arise in standard sample selection. Third, the identification arguments are developed for staggered adoption with not-yet-treated controls, extending beyond the two-period and never-treated setting that is the focus of their main results.

## D.2 Target parameter

For any post-treatment calendar year $t \geq g$, the target parameter is:

$$\tau_t^d(g) \equiv E[Y_t(1,d) - Y_t(0,d)|\mathcal{S}_d(t), G = g] \tag{22}$$

This is the effect of treatment on wages for workers who:

- $\mathcal{S}_d(t)$ are baseline-$d$ always-stayers:
  - $D_{t^\star} = d$ - were at firm type $d$ at the base period
  - $T_t = (d,d)$ - would be at firm type $d$ at calendar year $t$ regardless of treatment
- $G = g$ - are in the treated cohort

## D.3 Assumptions

The identification requires four assumptions. The first, No Anticipation, strengthens the main text's Assumption 2 from mean-level to individual-level restrictions on both firm type and wages. The remaining three, Conditional Parallel Sorting (CPS), Principal Parallel Trends (PPT), and Strong Monotonicity (SM), are specific to the bounding analysis.

The main text's Assumption 2 imposes no anticipation at the mean level. The bounding analysis requires the stronger individual-level version below, which additionally restricts potential firm types.

**Assumption 3** (NA)**.** *For every cohort $g$ and every $t < g$:*

$$D_t(1) = D_t(0) \quad \text{and} \quad Y_t(1,d) = Y_t(0,d) \tag{23}$$

**Assumption 4** (CPS)**.** *Let $t^\star = g - 1$ denote the focal cohort's base-period calendar year. For all $t \geq g$ and $d \in \{H, L\}$:*
*(a) Equality in the untreated counterfactual share of workers at firm type $d$ at calendar year $t$ conditional on base-period firm type:*

$$P(D_t(0) = d|D_{t^\star} = d, G = g) = P(D_t(0) = d|D_{t^\star} = d, G > t) \tag{24}$$

*The right-hand side is directly observable because workers with $G > t$ are untreated at the relevant calendar year $t$, so $D_t = D_t(0)$ by Assumption 3 (NA).*

*(b) Equality in the treated counterfactual share of workers at firm type $d$ at calendar year $t$ conditional on base-period firm type:*

$$P(D_t(1) = d | D_{t^\star} = d, G > t) = P(D_t(1) = d | D_{t^\star} = d, G = g) \tag{25}$$

*The right-hand side is directly observable because workers with $G = g$ are treated at the relevant calendar year $t > g$, so $D_t = D_t(1)$.*

Part (a) bridges untreated potential sorting from controls to the treated cohort: among workers at firm type $d$ at $t^\star$, it equates the rate at which they would remain at $d$ under no treatment across cohorts.

Part (b) bridges treated potential sorting from the treated cohort to controls: it equates the rate at which $D_{t^\star} = d$ workers would remain at $d$ under treatment at the focal year $g$. Part (b) assumes that workers in later cohorts would have exhibited similar sorting responses to treatment had they obtained it at $g$.

This assumption is similar to Assumption B.3 in Rathnayake et al. (2026).

**Assumption 5** (PPT)**.** *For baseline-$d$ always-stayers, workers with $D_{t^\star} = d$ and $T_t = (d, d)$:*

$$E[Y_t(0, d) - Y_{t^\star}(0, d) | \mathcal{S}_d(t), G = g] = E[Y_t(0, d) - Y_{t^\star}(0, d) | \mathcal{S}_d(t), G > t] \tag{26}$$

Absent treatment, baseline-$d$ always-stayers in the focal cohort would have experienced the same average wage growth as baseline-$d$ always-stayers among later-treated controls. This is a within-firm type version of standard parallel trends, restricted to the subpopulation whose firm type is unaffected by treatment.

Several of the identifying assumptions have testable content in pre-treatment periods.

Under Assumption 3 (NA), $D_{t'}(1) = D_{t'}(0)$ for all $t' < g$, so every worker's response type is trivially $T_{t'} = (D_{t'}(0), D_{t'}(0))$. The unobservable conditioning on $T_t = (d, d)$ that makes post-treatment Assumption 5 (PPT) untestable therefore reduces to the observable condition $D_{t'} = d$ in pre-treatment periods. Pre-treatment Assumption 5 (PPT) thus becomes parallel trends conditional on $D_{t^\star} = d$ and $D_{t'} = d$, which is testable via an event-study specification on observations with $D_{t^\star} = d$ and $D_{t'} = d$. Similarly, pre-treatment Assumption 4 (CPS) implies that the firm type shares $P(D_{t'} = d \mid D_{t^\star} = d, G = g)$ and $P(D_{t'} = d \mid D_{t^\star} = d, G > t)$ should be equal for $t' < g - 1$, which is directly verifiable. These pre-treatment checks serve as diagnostics for the plausibility of the post-treatment assumptions.

**Assumption 6** (SM)**.** *For all $t \geq g$:*

$$D_t(1) \geq D_t(0) \tag{27}$$

*where $H > L$. Treatment cannot move a worker from an $H$-type firm to an $L$-type firm.*

Note that Assumption 6 (SM) is a restriction on each worker's potential outcomes and applies regardless of a worker's actual treatment cohort. This matters for the L-firm type identification, which invokes SM for control workers to establish that $T_t = (L, L) \Leftrightarrow D_t(1) = L$ in the control population.

The assumption is about potential outcomes and does not imply anything about observed across-time switching. Workers can still move from an H-type firm to an L-type firm from one period to the next.

Note that the assumption rules out the $(H, L)$ response type for all workers regardless of baseline firm type. Conditioning on $D_{t^\star}$ does not weaken the restriction: the $H$-firm-type identification requires it within the $D_{t^\star} = H$ subpopulation, the $L$-firm-type identification requires it within $D_{t^\star} = L$, and the union of these two subpopulations is the entire population.

## D.4 Point identification of response type proportions

The estimand in Equation (22) conditions on baseline-$d$ always-stayers, but this subpopulation is not directly observed. Bounding the within-firm type treatment effect therefore requires trimming the observed stayer distribution to isolate always-stayers, as in the standard Lee (2009) approach. The trimming proportion $\gamma_t^d$ depends on the always-stayer share $P(T_t = (d, d)|D_{t^\star} = d, G = g)$, so we first establish that this share is identified. As detailed below, the group requiring trimming differs across firm types: treated stayers in the $H$ firm type and control stayers in the $L$ firm type.

As defined in Section D.1, $D_t(1) \equiv D_t(g)$: a control worker is classified as a baseline-$d$ always-stayer if they would remain at firm type $d$ at calendar year $t$ under treatment at the focal year $g$, not at their own treatment date $G_i$. This ensures that the response types used in trimming coincide with those conditioned on in Assumption 5 (PPT).

### D.4.1 Contamination structure under strong monotonicity

The estimand conditions on baseline-$d$ always-stayers, but this subpopulation is not directly observed among workers who remain at firm type $d$. In each firm type, either treated or control consists purely of always-stayers, while the other is a mixture of always-stayers and a second response type. Establishing which side is contaminated and by what types of workers will determine the direction of trimming.

#### H firm type

Among treated workers ($G = g$) with $D_{t^\star} = H$ and $D_t = H$: since these workers are treated, $D_t = D_t(1) = H$. Assumption 6 (SM) requires $D_t(1) \geq D_t(0)$, which is satisfied for any value of $D_t(0)$. These treated stayers therefore comprise both $(H, H)$ always-stayers and $(L, H)$ types whose untreated firm type would be $L$ but whom treatment holds at $H$. The treated side is contaminated.

Among control workers ($G > t$) with $D_{t^\star} = H$ and $D_t = H$: since these workers are untreated at calendar year $t$, Assumption 3 (NA) gives $D_t = D_t(0) = H$. Assumption 6 (SM) then implies $D_t(1) \geq D_t(0) = H$, so $D_t(1) = H$. Every such worker has $T_t = (H, H)$. The control side is clean.

Trimming is therefore applied to the treated side to isolate always-stayers from the $(L, H)$ contaminants.

#### L firm type

Among treated workers ($G = g$) with $D_{t^\star} = L$ and $D_t = L$: since these workers are treated, $D_t = D_t(1) = L$. Assumption 6 (SM) requires $D_t(1) \geq D_t(0)$, so $L \geq D_t(0)$, which forces $D_t(0) = L$. Every treated worker in the $L$ firm type has $T_t = (L, L)$. The treated side is clean.

Among control workers ($G > t$) with $D_{t^\star} = L$ and $D_t = L$: since these workers are untreated, $D_t = D_t(0) = L$. Their treated potential firm type $D_t(1)$ is unobserved and could be either $L$ or $H$. These control stayers therefore comprise both $(L, L)$ always-stayers and $(L, H)$ types who remain at $L$ only because they lack treatment. The control side is contaminated.

Trimming is therefore applied to the control side to isolate always-stayers from the $(L, H)$ contaminants.

The contamination structure has direct implications for the identification of the target parameter $\tau_t^d(g)$. For the $H$ firm type, the control side is clean, so $E[Y_t(0, H)|\cdot]$ is point-identified, while the treated side is contaminated, so $E[Y_t(1, H)|\cdot]$ requires bounding. For the $L$ firm type, the roles reverse:

$E[Y_t(1,L)|\cdot]$ is point-identified and $E[Y_t(0,L)|\cdot]$ requires bounding. In both cases, trimming is applied to the contaminated side.

### D.4.2 H-firm type trimming

Focus on the $D_{t^\star} = H$ firm type. For any post-treatment calendar year $t \geq g$, the target becomes:

$$P(T_t = (H,H)|D_{t^\star} = H, G = g) \tag{28}$$

By Assumption 6 (SM), $T_t = (H,H)$ is equivalent to $D_t(0) = H$: a worker cannot have $D_t(0) = H$ but $D_t(1) = L$, since treatment weakly increases firm type. Thus:

$$P(T_t = (H,H)|D_{t^\star} = H, G = g) = P(D_t(0) = H|D_{t^\star} = H, G = g) \tag{29}$$

The right-hand side involves an unobserved potential outcome for treated workers. For the control group with $G > t$ that is still untreated at calendar year $t$, Assumption 3 (NA) gives $D_t = D_t(0)$.

$$P(D_t(0) = H|D_{t^\star} = H, G > t) = P(D_t = H|D_{t^\star} = H, G > t) \tag{30}$$

where the right-hand side is a conditional frequency in observed data.

Assumption 4 (CPS) bridges from the control group to the treated:

$$P(D_t(0) = H|D_{t^\star} = H, G = g) = P(D_t(0) = H|D_{t^\star} = H, G > t) \tag{31}$$

Combining these steps:

$$P(T_t = (H,H)|D_{t^\star} = H, G = g) = P(D_t = H|D_{t^\star} = H, G > t) \tag{32}$$

where the left-hand side is a cohort-specific share of always-stayers and the right-hand side is observable.

The trimming proportion $\gamma_t^H$ is the ratio of always-stayers to all observed stayers among treated workers:

$$\begin{aligned} \gamma_t^H &= \frac{P(T_t = (H,H)|D_{t^\star} = H, G = g)}{P(D_t = H|D_{t^\star} = H, G = g)} \\ &= \frac{P(D_t = H|D_{t^\star} = H, G > t)}{P(D_t = H|D_{t^\star} = H, G = g)} \end{aligned} \tag{33}$$

As established in Section D.4.1, the denominator is a mixture of $(H,H)$ always-stayers and $(L,H)$ contaminants. Both the numerator and denominator are observable conditional frequencies, so $\gamma_t^H$ is point-identified.

### D.4.3 L-firm type trimming

For the $D_{t^\star} = L$ firm type, the target is $P(T_t = (L,L)|D_{t^\star} = L, G = g)$. By Assumption 6 (SM), $T_t = (L,L)$ is equivalent to $D_t(1) = L$. Thus:

$$P(T_t = (L,L) \mid D_{t^\star} = L, G = g) = P(D_t(1) = L \mid D_{t^\star} = L, G = g) \tag{34}$$

For treated workers, $D_t = D_t(1)$, so the right-hand side is directly observable:

$$P(D_t(1) = L \mid D_{t^\star} = L, G = g) = P(D_t = L \mid D_{t^\star} = L, G = g) \tag{35}$$

Because trimming is applied to the contaminated control side, the numerator of the trimming proportion is $P(T_t = (L, L)|D_{t^\star} = L, G > t)$, which equals $P(D_t(1) = L|D_{t^\star} = L, G > t)$: a treated potential outcome for untreated workers. Response types are defined under the common treatment timing $g$ for all workers in the slice. The always-stayer share identified by Assumption 4 (CPS)(b) is the same object that Assumption 5 (PPT) conditions on when transporting the bounded control always-stayer mean to cohort $g$. Assumption 4 (CPS)(b) bridges from treated to control:

$$P(D_t(1) = L \mid D_{t^\star} = L, G > t) = P(D_t(1) = L \mid D_{t^\star} = L, G = g) \tag{36}$$

$$= P(D_t = L \mid D_{t^\star} = L, G = g) \tag{37}$$

The trimming proportion for the L firm type is therefore:

$$\begin{aligned} \gamma_t^L &= \frac{P(T_t = (L, L) \mid D_{t^\star} = L, G > t)}{P(D_t = L \mid D_{t^\star} = L, G > t)} \\ &= \frac{P(D_t = L \mid D_{t^\star} = L, G = g)}{P(D_t = L \mid D_{t^\star} = L, G > t)} \end{aligned} \tag{38}$$

As established in Section D.4.1, the denominator is a mixture of $(L, L)$ always-stayers and $(L, H)$ contaminants, while treated $L$-stayers in the numerator consist entirely of $(L, L)$ always-stayers. Both the numerator and denominator of $\gamma_t^L$ are therefore observable conditional frequencies, so $\gamma_t^L$ is point-identified.

Note that the trimming direction differs across firm types. In the H firm type, treatment induces some workers to stay who would have left $\gamma_t^H \leq 1$, so we trim the treated side. In the L firm type, treatment pulls some workers to H who would have stayed at L under control, so controls include "excess" stayers and we trim the control side.

### D.4.4 Remarks on the trimming proportions

Under Assumption 4 (CPS) and Assumption 6 (SM), $\gamma_t^H \leq 1$ and $\gamma_t^L \leq 1$. For the $H$ firm type, Assumption 6 (SM) ensures that the control retention rate (numerator) cannot exceed the treated retention rate (denominator), and symmetrically for the $L$ firm type. If an estimated $\hat{\gamma}_t^d$ exceeds 1 in the data, this constitutes a falsification of either Assumption 6 (SM) or Assumption 4 (CPS), and should be investigated before interpreting bounds from that slice. Conversely, $\gamma_t^d = 1$ implies that treatment has no effect on sorting within this firm type at time $t$: the contaminated side consists entirely of always-stayers, no trimming is required, and the bounds collapse to a point-identified treatment effect.

While $\gamma_t^L$ is computable without any cross-cohort assumptions, Assumption 4 (CPS)(b) justifies that $\gamma_t^L$ equals the always-stayer share among control L-stayers, which is the object needed for the trimming proportion to be interpreted causally. Without Assumption 4 (CPS)(b), we could still compute the ratio, but cannot interpret it as the fraction of $(L, L)$ types in the control $L$-stayer population.

### D.4.5 Bounding the within-firm type treatment effect

For compactness, define the wage change from the base period $t^\star$ for workers in the $d$ firm type as:

$$\Delta Y_t(z, d) \equiv Y_t(z, d) - Y_{t^\star}(0, d)$$

where by Assumption 3 (NA), $Y_{t^\star}(0, d) = Y_{t^\star}(1, d)$ since $t^\star$ is pre-treatment.

#### D.4.5.1 H firm type

Recall that the estimand for baseline-$H$ always-stayers in cohort $g$ at time $t$ is:

$$\tau_t^H(g) \equiv E[Y_t(1,H) - Y_t(0,H) \mid \mathcal{S}_H(t), G = g] \tag{39}$$

The estimand consists of the difference in two potential outcomes. As established in Section D.4.1, $E[Y_t(0,H) \mid \cdot]$ is point-identified from control $H$-stayers, while $E[Y_t(1,H) \mid \cdot]$ requires bounding because treated $H$-stayers are contaminated. Recovering the counterfactual wage growth via Assumption 5 (PPT) requires expressing the estimand in terms of wage changes.

Subtract $Y_{t^\star}(0,H)$ from both potential outcomes inside the expectation:

$$E\big[\big(Y_t(1,H) - Y_{t^\star}(0,H)\big) - \big(Y_t(0,H) - Y_{t^\star}(0,H)\big) \mid \mathcal{S}_H(t), G = g\big] \tag{40}$$

Since all workers are untreated at $t^\star < g$, by Assumption 3 (NA) $Y_{t^\star}(1,H) = Y_{t^\star}(0,H)$. Subtracting this common base-period wage from both potential outcomes does not change the difference but rewrites the estimand in terms of wage changes.

Recognizing each parenthetical term as $\Delta Y_t(z,H) \equiv Y_t(z,H) - Y_{t^\star}(0,H)$ and applying linearity of expectations:

$$E[\Delta Y_t(1,H) \mid \mathcal{S}_H(t), G = g] - E[\Delta Y_t(0,H) \mid \mathcal{S}_H(t), G = g] \tag{41}$$

*Control side (clean).* Focusing on the second term above, we rely on Assumption 5 (PPT) since it equates the counterfactual wage growth of treated always-stayers with their control counterparts:

$$E[\Delta Y_t(0,H) \mid \mathcal{S}_H(t), G = g] = E[\Delta Y_t(0,H) \mid \mathcal{S}_H(t), G > t] \tag{42}$$

Since control workers are untreated at calendar year $t$, their wage changes $\Delta Y_t(0,H)$ are observed. As established in Section D.4.1, every control H-stayer has $T_t = (H,H)$, so conditioning on $T_t = (H,H)$ is equivalent to conditioning on $D_t = H$:

$$E[\Delta Y_t(0,H) \mid \mathcal{S}_H(t), G > t] = E[\Delta Y_t(0,H) \mid D_{t^\star} = H, D_t = H, G > t] \tag{43}$$

The right-hand side is a conditional mean in observed data. The estimand therefore reduces to:

$$E[\Delta Y_t(1,H) \mid \mathcal{S}_H(t), G = g] - E[\Delta Y_t(0,H) \mid D_{t^\star} = H, D_t = H, G > t] \tag{44}$$

*Treated side (contaminated).* Turning to the first term in Equation (44), for treated workers $\Delta Y_t(1,H)$ is observed. However, treated $H$-stayers ($D_{t^\star} = H$, $D_t = H$, $G = g$) are a mixture of $(H,H)$ always-stayers (share $\gamma_t^H$) and $(L,H)$ contaminants (share $1 - \gamma_t^H$). Since the first term conditions on $T_t = (H,H)$, it isolates the always-stayer component of this mixture, which is not directly observed. The always-stayer share is identified but the position of contaminants within the wage-change distribution is not.

Following Kroft, Mourifié, and Vayalinkal (2025), we bound the always-stayer mean by considering two extreme cases. If contaminants have the highest wage changes, always-stayers comprise the bottom $\gamma_t^H$ share of the distribution, yielding a lower bound on their mean. If contaminants have the lowest, always-stayers comprise the top $\gamma_t^H$ share, yielding an upper bound. Let $q_\alpha^H$ denote the $\alpha$-quantile of

$\Delta Y_t(1, H)$ among treated H-stayers $\{D_{t^\star} = H, D_t = H, G = g\}$. Then:

$$\begin{aligned} E[\Delta Y_t(1,H) \mid D_{t^\star} = H, D_t = H, G = g, \Delta Y_t(1,H) \leq q^H_{\gamma^H_t}] \\ \leq E[\Delta Y_t(1,H) \mid \mathcal{S}_H(t), G = g] \\ \leq E[\Delta Y_t(1,H) \mid D_{t^\star} = H, D_t = H, G = g, \Delta Y_t(1,H) \geq q^H_{1-\gamma^H_t}] \end{aligned} \tag{45}$$

Subtracting the identified control mean from Equation (44) gives the bounds on $\tau^H_t(g)$:

$$\begin{gathered} E[\Delta Y_t(1,H) \mid D_{t^\star} = H, D_t = H, G = g, \Delta Y_t(1,H) \leq q^H_{\gamma^H_t}] - E[\Delta Y_t(0,H) \mid D_{t^\star} = H, D_t = H, G > t] \\ \leq \tau^H_t(g) \leq \\ E[\Delta Y_t(1,H) \mid D_{t^\star} = H, D_t = H, G = g, \Delta Y_t(1,H) \geq q^H_{1-\gamma^H_t}] - E[\Delta Y_t(0,H) \mid D_{t^\star} = H, D_t = H, G > t] \end{gathered}$$

All quantities on both sides are functions of observed data and the identified trimming proportion $\gamma^H_t$.

#### D.4.5.2 L firm type

The argument for the $L$ firm type is analogous to the $H$ firm type but with the roles of treated and control reversed, reflecting the contamination structure established in Section D.4.1. The estimand is:

$$\tau^L_t(g) \equiv E[Y_t(1,L) - Y_t(0,L) \mid \mathcal{S}_L(t), G = g] \tag{46}$$

which, by the same add-and-subtract argument as above, can be written in terms of wage changes:

$$E[\Delta Y_t(1,L) \mid \mathcal{S}_L(t), G = g] - E[\Delta Y_t(0,L) \mid \mathcal{S}_L(t), G = g] \tag{47}$$

The two differences from the $H$ firm type are as follows. First, the treated side is now clean: by Assumption 6 (SM), $D_t(1) = L$ implies $D_t(0) = L$, so every treated $L$-stayer has $T_t = (L, L)$. Thus $E[\Delta Y_t(1,L) \mid \mathcal{S}_L(t), G = g] = E[\Delta Y_t(1,L) \mid D_{t^\star} = L, D_t = L, G = g]$, which is directly observed. Second, the control side is contaminated: control $L$-stayers include both $(L, L)$ always-stayers and $(L, H)$ types, so the counterfactual wage growth term $E[\Delta Y_t(0,L) \mid \mathcal{S}_L(t), G > t]$—obtained via Assumption 5 (PPT)—is not directly observed. We therefore trim the control wage-change distribution rather than the treated one.

Let $q^L_\alpha$ denote the $\alpha$-quantile of $\Delta Y_t(0, L)$ among control L-stayers $\{D_{t^\star} = L, D_t = L, G > t\}$. Trimming the bottom and top $1 - \gamma^L_t$ shares of this distribution bounds the control always-stayer mean. Since the treatment effect equals the treated mean minus the control mean, a higher control always-stayer mean implies a lower treatment effect, and vice versa. Therefore, the bounds on $\tau^L_t(g)$ are:

$$\begin{gathered} E[\Delta Y_t(1,L) \mid D_{t^\star} = L, D_t = L, G = g] - E[\Delta Y_t(0,L) \mid D_{t^\star} = L, D_t = L, G > t, \Delta Y_t(0,L) \geq q^L_{1-\gamma^L_t}] \\ \leq \ \tau^L_t(g) \ \leq \\ E[\Delta Y_t(1,L) \mid D_{t^\star} = L, D_t = L, G = g] - E[\Delta Y_t(0,L) \mid D_{t^\star} = L, D_t = L, G > t, \Delta Y_t(0,L) \leq q^L_{\gamma^L_t}] \end{gathered}$$

All quantities are functions of observed data and the identified trimming proportion $\gamma^L_t$.

### D.4.6 Aggregation across slices

The bounds derived above are specific to a single slice: a focal treated cohort $g$ at a given post-treatment calendar year $t$. To summarize treatment effects across cohorts at each relative time $r = t - g$, we aggregate slice-level bounds within each (relative time, firm type) combination.

For firm type $d \in \{H, L\}$ at relative time $r$, let $\ell_r^d(g)$ and $u_r^d(g)$ denote the lower and upper bounds on $\tau_{g+r}^d(g)$ from slice $g$. We aggregate using weights proportional to the number of treated workers in each slice, estimated by each cohort's share of treated observations at relative time $r$:

$$\omega_g = \mathbb{P}\{G_i = g \mid G_i \text{ observed at relative time } r\} \tag{48}$$

The aggregated bounds at relative time $r$ for firm type $d$ are then:

$$\ell_r^d \equiv \sum_g \omega_g \cdot \ell_r^d(g), \qquad u_r^d \equiv \sum_g \omega_g \cdot u_r^d(g) \tag{49}$$

This weighting scheme parallels the cohort-size weights used in the main text's aggregation of $\text{ATT}_r(g)$ into $\text{ATT}_r$ (Equation (9)), and allows $\gamma_t^d$ and the outcome distributions to vary across slices while producing a single summary bound for each firm type and relative time.

# E Two-step Immigration Pathways in the United States

In this section, we describe several "two-step" immigration pathways in the United States that involve temporary work visas prior to permanent residency. First, we describe the general process by which individuals can obtain an employment-based permanent visa. Then we discuss several temporary worker visas that can be used as a stepping stone towards a permanent visa application.

## E.1 Employment-Based Permanent Visas

In general, individuals can obtain permanent residency through an employment-based immigration pathway via the following process. First, if required, the employer must obtain a permanent labor certification (PERM), issued by the Department of Labor. In cases where a firm is required to obtain a PERM, the employer must document recruitment efforts at the prevailing wage and attest that no qualified U.S. worker is available (U.S. Department of Labor, 2025c). PERM processing can exceed one year. The PERM certificate is valid for 180 days from the date it is issued. Approximately 95% of the PERM applications are approved by the DOL (U.S. Department of Labor, 2024).

Second, the employer or potential employee must file a petition for the permanent residency via a Form I-140 (U.S. Citizenship and Immigration Services, 2025l) with the Department of Homeland Security to receive the permanent visa. Processing times for these visas generally range between 4 to 6 months. Firms or individuals can pay an additional fee for premium processing to ensure the petition is reviewed within fifteen days. Approval of the petition by the Department of Homeland Security (DHS) establishes the individual's *priority date*, which determines their queue position depending on visa caps and availability. Once through the queue—or immediately if there is no backlog—the individual proceeds to the adjustment of status and/or consular processing stage. The individual receives the green card soon after. Approximately 90% of the submitted I-140 forms are approved by the DHS each year (U.S. Citizenship and Immigration Services, 2023).[63]

The U.S. allocates approximately 140,000 employment-based permanent visas annually across five preference categories (EB-1 through EB-5) (U.S. Citizenship and Immigration Services, 2025s). No single country of origin may receive more than 7% of the total annual allotment of permanent visas. Each preference category is associated with specific criteria that must be met. Due to these criteria, each visa has different processing timelines. Each visa also has slightly different requirements around PERM certification and who can (or cannot) file the DHS petition.

EB-1 (U.S. Citizenship and Immigration Services, 2025c) is allocated approximately 40,040 visas annually and includes three subgroups: workers of extraordinary ability (who may self-petition), outstanding professors or researchers, and multinational executives or managers. The latter two require employer sponsorship, while individuals in the first group can file a petition individually. All EB-1 categories bypass PERM certification. This visa tends to have the smallest backlog due to the strict criteria candidates must meet to qualify.

EB-2 (U.S. Citizenship and Immigration Services, 2025e) is allocated 40,040 visas annually and covers individuals with advanced degrees or exceptional ability. Most require PERM certification (U.S. Department of Labor, 2025b) before the employer files a petition for the worker.

EB-3 (U.S. Citizenship and Immigration Services, 2025f) is allocated 40,040 visas annually and covers skilled workers, professionals with bachelor's degrees, and *other workers* requiring less than two years of

[63]Note that some individuals working in the United States under temporary visas will typically need a conversion to a different visa before pursuing permanent residency, and applying for permanent residency on some temporary visas will jeopardize their temporary status.

training. All EB-3 petitions require PERM certification before the I-140 petition. No more than 10,000 visas may go to individuals in the *other workers* category each year.

EB-4 (U.S. Citizenship and Immigration Services, 2025d) is allocated approximately 10,000 visas and covers special immigrants including religious workers, retirees of certain international organizations, and certain government employees. Does not require a PERM certification, but employer or organization must file petition with DHS.

EB-5 (U.S. Citizenship and Immigration Services, 2025b) is allocated 10,000 visas and provides conditional residence to investors placing $1,050,000 ($800,000 in targeted employment areas) in job-creating enterprises. PERM certification is not required, and the individual files a petition themselves. Instead of a form I-140, individuals file a form I-526. Conditional status is removed after review two years later, after the individual files a form I-829. If the individual does not pass review, permanent residency status is revoked.

## E.2 Temporary Worker Visas as a Pathway to Permanent Residency

The following temporary visas are a couple of examples that allow for the individual to declare an intention to immigrate and serve as pathways to permanent residency.

H-1B (U.S. Citizenship and Immigration Services, 2025i) visas serve specialty occupations requiring at least a bachelor's degree and are the most common temporary work visa in the United States. Employers must pay the prevailing wage for the occupation, ensure that hiring an H-1B worker will not worsen the working conditions of U.S. workers, confirm that there is no strike or lockout in the occupation, and inform their current employees that an H-1B petition is being filed. The annual cap totals 85,000 (65,000 regular plus 20,000 for U.S. master's graduates), distributed by lottery (U.S. Citizenship and Immigration Services, 2025h)—though there are *many* exemptions and waivers that allow the number granted each year to be much higher.[64] Universities and qualifying nonprofit research institutions are cap-exempt. H-1B explicitly permits dual intent, allowing holders to pursue permanent residence without jeopardizing temporary status. Most H-1B holders transition to EB-2 or EB-3 via the pathway previously discussed.

L-1 (U.S. Citizenship and Immigration Services, 2025m) visas serve intra-company transferees and have no annual cap. L-1A covers managers and executives who often transition to EB-1C without labor certification. L-1B covers specialized knowledge workers who typically pursue EB-2 or EB-3. Like H-1B, L-1 permits dual intent.

## E.3 Temporary Worker Visas that Prohibit the Intent to Immigrate

The TN (Canadian/Mexican professionals) (U.S. Citizenship and Immigration Services, 2025r), H-2A (U.S. Citizenship and Immigration Services, 2025j) (agricultural workers), H-2B (U.S. Citizenship and Immigration Services, 2025k) (non-agricultural temporary workers), and P-series (U.S. Citizenship and Immigration Services, 2025n, 2025o) (athletes/entertainers) visas prohibit immigrant intent or impose temporal constraints, typically requiring conversion to H-1B or another temporary visa before pursuing permanent residence (U.S. Citizenship and Immigration Services, 2025g, 2025p, 2025q). In addition, E-3 (U.S. Citizenship and Immigration Services, 2025a) visas are available exclusively to Australian nationals in specialty occupations, with a 10,500 annual cap (U.S. Department of Labor, 2025a). The E-3 visa officially requires non-immigrant intent, so many individuals convert to a different temporary visa that does allow intent to immigrate before applying for permanent residency.

[64] Despite the cap of 85,000, exceptions and waivers push the number of H-1B visas issued each year to be much higher. In 2024, for instance, 219,659 total H-1B visas were issued (U.S. Department of State, 2024).

# F Wage Renegotiation Equations, Bellman Equations, and Additional Derivations

## Wage Renegotiation Equations

As in Lise, Meghir, and Robin (2016), we allow for domestic employed workers to receive outside offers; however, TFWs do not search on the job to receive outside offers, which matches our institutional setting. When domestic workers receive an outside offer, there are three possible outcomes following Lise, Meghir, and Robin (2016):

**Case 1:** $S(x, y') \geq S(x, y)$

If a domestic worker finds an alternative job $y'$ such that $S(x, y') \geq S(x, y)$, then the worker moves to the alternative job. This is because the poaching firm can always outbid the incumbent firm. When the worker switches from $y$ to $y'$ the new bargained wage is $w = \phi_1(x, y, y')$ which satisfies:

$$W_1(\phi_1, x, y') = W_0(x) + S(x, y) + \beta[S(x, y') - S(x, y)]$$

The worker gets the entire surplus of the current match plus a share of the incremental surplus between the two jobs.

**Case 2:** $S(x, y) > S(x, y') > W_1(w, x, y) - W_0(x)$

Alternatively, if the worker finds an alternative job $y'$ that produces less surplus than the current job, but more than the worker's share of the surplus at the current job, $W_1(w, x, y) - W_0(x) < S(x, y') < S(x, y)$, then the worker uses the outside offer to bid up wages.

Wages are bid up because the incumbent firm renegotiates with the worker since the surplus in the current match exceeds that of the poaching firm: $S(x, y) > S(x, y')$.

In this case, the new wage is $w = \phi_2(x, y, y')$ which satisfies:

$$W_1(\phi_2, x, y) = W_0(x) + S(x, y')$$

In other words, after receiving an outside offer from firm $y'$, the worker gets the entire share of the surplus at the poaching firm when staying at their current firm $y$.

In these first two cases, the wage depends on the origin and destination firm type.

**Case 3:** $W_1(w, x, y) - W_0(x) \geq S(x, y')$

The worker has nothing to gain from the competition between $y$ and $y'$ because she cannot make a credible threat to leave, and the wage does not change.

## Unemployed Workers

The value function for unemployed domestics, who receive flow value $b(x)$ from unemployment benefits and non-market activities, can be written as:

$$rW_0(x) = b(x) + \kappa\beta \int S(x, y)^+ v(y) dy$$

where $a^+ \equiv \max\{a, 0\}$, following Lise, Meghir, and Robin (2016).

Similarly, the value function for unemployed TFWs, who receive flow value $b^{\text{tfw}}(x)$, is:

$$rW_0^{\text{tfw}}(x) = b^{\text{tfw}}(x) + \kappa^{\text{tfw}}\beta \int S^{\text{tfw}}(x, y)^+ v^{\text{tfw}}(y) dy$$

### Vacant Jobs

Consider the present value of profits for an unmatched job meeting a worker from unemployment with human capital $x$. Substituting $W_1(\phi_0, x, y) = W_0(x) + \beta S(x, y)$ into the equation for $S(x, y)$, we get:

$$\Pi_1(\phi_0(x, y), x, y) = \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + (1 - \beta)S(x, y)$$

For firms which apply for a TFW, the present value of profits for a firm which meets a TFW from unemployment with human capital $x$ is given by the following:

$$\Pi_1^{\text{tfw}}(\phi_0^{\text{tfw}}(x, y), x, y) = \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + (1 - \beta)S^{\text{tfw}}(x, y)$$

Given the above expression for the bargained wage of a poached worker, the present value of profits for an unmatched job $y$ that posts a vacancy and meets an employed worker with human capital $x$ in a lower surplus match with productivity $y'$ is:

$$\Pi_1(\phi_1(x, y', y), x, y) = \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + (1 - \beta)[S(x, y) - S(x, y')]$$

A firm always prefers matching with an $x$ worker out of unemployment than poaching the same type of worker from another firm. This is simple to see since in this case, they get a share of $S(x, y)$ instead of $S(x, y) - S(x, y')$.

Consider the present value of a vacancy for a type-$y$ job:

$$r\Pi_0(y) = -c + \kappa(1 - \beta) \int S(x, y)^+ u(x)dx + s\kappa(1 - \beta) \iint [S(x, y) - S(x, y')]^+ h(x, y')dxdy'$$

where $c$ is the per-period cost of keeping a domestic vacancy open. The firm can meet either an unemployed individual or an individual employed in a match. Note that in this case, there is no possibility of meeting any TFWs since the firm has not applied for a temporary visa permit.

If a firm wants to hire a TFW, it must apply to the government. We define the cost of an application to be $c^{\text{tfw}}$, the per-period cost of keeping a TFW vacancy open. If a firm tries to hire a TFW from the foreign pool of potential workers, then we have the following expression:

$$r\Pi_0^{\text{tfw}}(y) = -c^{\text{tfw}} + p\kappa^{\text{tfw}}(1 - \beta) \int S^{\text{tfw}}(x, y)^+ u^{\text{tfw}}(x)dx$$

For an unfilled job, the firm compares $\Pi_0^{\text{tfw}}(y)$ to $\Pi_0(y)$, selecting the labor market with higher expected profits. These expressions formalize the congestion externality described in Section 7.1. The firm's choice between domestic and TFW hiring depends solely on private payoffs, $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$, yet this decision imposes externalities on domestic workers by altering the distribution of available vacancies and thus equilibrium meeting rates, wages, and outside options.

### Employed Domestic Workers

The value function for domestics working at wage rate $w$ in a match $(x, y)$ is:

$$[r + \xi + s\kappa v(A(w, x, y))][W_1(w, x, y) - W_0(x)] = w - b(x) - \kappa\beta \int [S(x, y')]^+ v(y')dy'$$
$$+ s\kappa \int_{A(w,x,y)} [\min\{S(x, y), S(x, y')\} + \beta[S(x, y') - S(x, y)]^+]v(y')dy'$$

where $A(w,x,y) = \{y' : W_1(w,x,y) - W_0(x) < S(x,y')\}$ is the set of jobs that can lead to a wage change and $v(A) = \int_A v(y)dy$. The first term on the RHS is wage net of the flow value of unemployment. The second term is the expected excess value to the worker following an outside offer.

## Employed TFWs

The value function for employed TFWs can be decomposed as follows:

$$r[W_1^{\text{tfw}}(w,x,y) - W_0^{\text{tfw}}(x)] = \left( \underbrace{w - b^{\text{tfw}}(x) - \kappa^{\text{tfw}}\beta \int [S^{\text{tfw}}(x,y')]^+ v^{\text{tfw}}(y')dy'}_{\text{flow value of } W_1^{\text{tfw}} - W_0^{\text{tfw}}} \right)$$
$$+\xi^{\text{tfw}} \left( \underbrace{W_0^{\text{tfw}}(x) - W_0^{\text{tfw}}(x)}_{\text{post-separation relative value}} - (W_1^{\text{tfw}}(w,x,y) - W_0^{\text{tfw}}(x)) \right)$$

Re-arranging, the value function for employed TFWs in a match $(x,y)$ working at wage rate $w = \phi_0^{\text{tfw}}(x,y)$ simplifies to:

$$(r + \xi^{\text{tfw}})[W_1^{\text{tfw}}(w,x,y) - W_0^{\text{tfw}}(x)] = w - b^{\text{tfw}}(x) - \kappa^{\text{tfw}}\beta \int [S^{\text{tfw}}(x,y')]^+ v^{\text{tfw}}(y')dy'$$

The right-hand side is the net flow value of employment.

## Match Surplus

Flow output in an $(x,y)$ match is given by $f(x,y)$, which depends on worker type and firm productivity but not on immigration status. We define the joint surplus for domestic and TFW matches, respectively, as:

$$S(x,y) = P(x,y) - W_0(x) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$$
$$S^{\text{tfw}}(x,y) = P^{\text{tfw}}(x,y) - W_0^{\text{tfw}}(x) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$$

where $P(x,y)$ and $P^{\text{tfw}}(x,y)$ are the present values of joint production. Although flow output $f(x,y)$ does not depend on immigration status, the present values of joint production differ because the continuation values reflect different search and separation environments: domestic matches include on-the-job search terms, while TFW matches do not.

### Domestic workers

This follows the derivation in Appendix A of Lise, Meghir, and Robin (2016) with two modifications. First, $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$ is the firm's outside option. Second, we abstract from productivity shocks (denoted $\delta$ in their model, which allow firm types to transition over time):

$$rP(x,y) = f(x,y) + \xi[W_0(x) + \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} - P(x,y)]$$
$$+ s\kappa \int \left[ \max\left\{ P(x,y), \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + W_0(x) + S(x,y) + \beta[S(x,y') - S(x,y)] \right\} - P(x,y) \right] v(y')dy'$$

$$rP(x,y) = f(x,y) - \xi S(x,y) + s\kappa \int \max\left\{0, \beta[S(x,y') - S(x,y)]\right\} v(y')dy'$$
$$= f(x,y) - \xi S(x,y) + s\kappa\beta \int [S(x,y') - S(x,y)]^{+} v(y')dy'$$

Substituting in for $rP(x,y) = rW_0(x) + r\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + rS(x,y)$ and re-arranging, we get:

$$(r+\xi)S(x,y) = f(x,y) - rW_0(x) - \max\{r\Pi_0(y), r\Pi_0^{\text{tfw}}(y)\}$$
$$+ s\kappa\beta \int [S(x,y') - S(x,y)]^{+} v(y')dy'$$

Substituting in the expression for $\Pi_0(y)$ and $\Pi_0^{\text{tfw}}(y)$, we obtain a simplified expression:

$$\begin{aligned}(r+\xi)S(x,y) =& f(x,y) - \Big(b(x) + \kappa\beta \int S(x,y)^{+} v(y)dy\Big) \\ &+ s\kappa\beta \int [S(x,y') - S(x,y)]^{+} v(y')dy' \\ &- \max\Bigg\{ -c^{\text{tfw}} + p\kappa^{\text{tfw}}(1-\beta) \int S^{\text{tfw}}(x,y)^{+} u^{\text{tfw}}(x)dx, \\ &\quad -c + \kappa(1-\beta) \int S(x,y)^{+} u(x)dx + s\kappa(1-\beta) \int [S(x,y) - S(x,y')]^{+} h(x,y')dxdy' \Bigg\}\end{aligned}$$

Note that the surplus of a match for a domestic worker depends on $p$ through $S^{\text{tfw}}(x,y)$.

**TFWs**

For TFWs the derivation is similar, although we can omit the term associated with job-to-job transitions. We have the following expression for the total surplus:

$$rP^{\text{tfw}}(x,y) = f(x,y) + \xi^{\text{tfw}}[W_0^{\text{tfw}}(x) + \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} - P^{\text{tfw}}(x,y)]$$

Following Section F, we obtain:

$$\begin{aligned} rP^{\text{tfw}}(x,y) =& f(x,y) - \xi^{\text{tfw}} S^{\text{tfw}}(x,y) \\ r\Big(W_0^{\text{tfw}}(x) + \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + S^{\text{tfw}}(x,y)\Big) =& f(x,y) - \xi^{\text{tfw}} S^{\text{tfw}}(x,y) \\ (r+\xi^{\text{tfw}})S^{\text{tfw}}(x,y) =& f(x,y) - rW_0^{\text{tfw}}(x) - \max\{r\Pi_0(y), r\Pi_0^{\text{tfw}}(y)\}\end{aligned}$$

Substituting in the expression for $\Pi_0(y)$ and $\Pi_0^{\text{tfw}}(y)$, we obtain a simplified expression:

$$\begin{aligned}(r+\xi^{\text{tfw}})S^{\text{tfw}}(x,y) =& f(x,y) \\ &- \Big(b^{\text{tfw}}(x) + \kappa^{\text{tfw}}\beta \int S^{\text{tfw}}(x,y)^{+} v^{\text{tfw}}(y)dy\Big) \\ &- \max\Bigg\{ -c^{\text{tfw}} + p\kappa^{\text{tfw}}(1-\beta) \int S^{\text{tfw}}(x,y)^{+} u^{\text{tfw}}(x)dx, \\ &\quad -c + \kappa(1-\beta) \int S(x,y)^{+} u(x)dx + s\kappa(1-\beta) \int [S(x,y) - S(x,y')]^{+} h(x,y')dxdy' \Bigg\}\end{aligned}$$

# G Transition to permanent residency

This appendix characterizes the counterfactual policy simulation in which employed TFWs are exogenously granted permanent residency. This transition does not occur in the baseline model, where the two labor markets remain segmented. In the counterfactual analysis, we transition employed TFWs to the domestic market while keeping their current match fixed. We describe how the match surplus changes upon receiving PR and show that wage renegotiation over this new surplus is incentive compatible for the firm.

## G.1 Changes to match surplus

### Worker's present value of unemployment and wage contract

When a TFW worker of type $x$ employed at a firm of type $y$ obtains permanent residency, the surplus of the match instantaneously updates from $S^{\text{tfw}}(x, y)$ to $S(x, y)$. We will show in this section why this is the case.

The present value of unemployment for a TFW worker is $W_0^{\text{tfw}}(x)$. When they become a PR, they are now eligible to be hired by domestic firms either through poaching or if their current match dissolves. In addition, they are eligible for domestic unemployment benefits $b(x)$. Thus, the present value of unemployment for the TFW who obtains PR changes from $W_0^{\text{tfw}}(x)$ to $W_0(x)$.

The TFW's initial wage from unemployment was $w = \phi_0^{\text{tfw}}(x, y)$ as described in Section 7.3. The present value of the job with wage $\phi_0^{\text{tfw}}(x, y)$ at firm type $y$ changes from $W_1^{\text{tfw}}(\phi_0^{\text{tfw}}(x, y), x, y)$ to $W_1(\phi_0^{\text{tfw}}(x, y), x, y)$. This happens since the PR can now search on the job for better offers. Note that this is the present value at the old wage; we have not allowed for renegotiation, since we do not yet know the updated surplus that the worker and firm will renegotiate over.

We would be tempted to replace $W_1(\phi_0^{\text{tfw}}(x, y), x, y) - W_0(x)$ for this new PR with $\beta S(x, y)$ as in Section 7.3, but the wage $\phi_0^{\text{tfw}}(x, y)$ is not the same as the one for domestic workers being hired out of unemployment, $\phi_0(x, y)$. That is because the worker was hired from TFW-unemployment, not domestic unemployment. Their wage was set by Nash bargaining over the surplus when they were hired, $S^{\text{tfw}}(x, y)$.

### Joint match value

In Section 7.4, we defined $P(x, y)$ as the value of joint production of a $(x, y)$ match. The analogous value for a match between a firm and a TFW is $P^{\text{tfw}}(x, y)$, and this value differs since the worker's outside options depend on whether they are a TFW or domestic. When a TFW of type $x$ gets PR, they are observationally equivalent to a domestic of type $x$, and as such the joint production of the match updates from $P^{\text{tfw}}(x, y)$ to $P(x, y)$.

We therefore have two equations for domestic surplus, one using present values of the match and the other using $P$:

$$\begin{aligned} S(x, y) &= \Pi_1(w, x, y) + W_1(w, x, y) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} - W_0(x) \\ &= P(x, y) - W_0(x) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} \end{aligned}$$

Setting the two equations equal and re-arranging gives the following relationship, that the value of joint production is equal to the firm and worker's value from the match. Note that the value does not depend on $w$.

$$P(x, y) = \Pi_1(w, x, y) + W_1(w, x, y)$$

This relationship is necessary for us to understand what happens to the firm's present value of the match, $\Pi_1^{\text{tfw}}$, when the worker obtains PR, which we discuss in the next part.

### Firm present value of the match

From the last two parts, we know that $P(x,y) = \Pi_1(w,x,y) + W_1(w,x,y)$ and that the worker's present value of their existing wage contract is $W_1(\phi_0^{\text{tfw}},x,y)$. Therefore, for consistency and by definition of the joint value, the firm's present value of the match must be $\Pi_1(\phi_0^{\text{tfw}},x,y)$.

Note that the wage is still $w = \phi_0^{\text{tfw}}(x,y)$.

### New match surplus

Denote the match surplus for the firm and worker who just received PR as $S^{\text{PR}}(x,y)$. We have shown that TFW-superscript denoted values $W_0^{\text{tfw}}(x)$, $W_1^{\text{tfw}}$, and $\Pi_1^{\text{tfw}}$ have updated to their domestic counterparts $W_0(x)$, $W_1$, and $\Pi_1$, holding the wage fixed at $w = \phi_0^{\text{tfw}}$. We therefore have the following surplus value:

$$S^{\text{PR}}(x,y) \equiv \Pi_1(\phi_0^{\text{tfw}},x,y) + W_1(\phi_0^{\text{tfw}},x,y) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} - W_0(x)$$

This right-hand side is similar to domestic surplus as defined in Section F, just with a different wage dividing the surplus among firm and worker. Since the surplus does not depend on the wage, we have $S^{\text{PR}}(x,y) = S(x,y)$.

To further demonstrate that this relationship is wage-invariant, we plug in for $P(x,y) = \Pi_1(\phi^{\text{tfw}},x,y)+ W_1(\phi^{\text{tfw}},x,y)$:

$$S^{\text{PR}}(x,y) = P(x,y) - \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} - W_0(x)$$

The right-hand side of this equation is exactly the domestic surplus as defined in Section F. Therefore $S^{\text{PR}}(x,y) = S(x,y)$ and the surplus of the match for a TFW who has just received PR and no outside offers is $S(x,y)$. This surplus does not depend on the wage, since the wage divides the surplus between firm and worker. It will be the surplus that the worker and firm bargain over.

## G.2 Renegotiation is incentive-compatible for the firm

The surplus of the match before the worker obtains PR is $S^{\text{tfw}}(x,y)$ with the worker earning $w = \phi_0^{\text{tfw}}(x,y)$ as in Section 7.3. As established in Appendix G.1, when the worker gets PR, the surplus updates to $S(x,y)$.

Given the firm's bargaining power, $1-\beta$ share of the surplus, it has two options:

- Accept $1-\beta$ share of the updated surplus $S(x,y)$, which would be the same as hiring the worker out of domestic unemployment. The firm's present value of the match continuation under renegotiation is $\Pi_1(\phi_0(x,y),x,y)$.
- Dissolve the match and re-enter either the TFW or domestic market, with present value $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$.

From Section 7.4, the firm's continuation value of the match is:

$$\Pi_1(\phi_0(x,y),x,y) = \max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\} + (1-\beta)S(x,y)$$

We also know that the firm's outside option is $\max\{\Pi_0(y), \Pi_0^{\text{tfw}}(y)\}$, which is embedded in the present value of the firm's profits from continuing the match. So long as $(1-\beta)S(x,y) \geq 0$, the firm will weakly prefer staying in the match.

Therefore, renegotiation is incentive-compatible if $S(x,y) \geq 0$. The firm will prefer to dissolve the match anytime $S(x,y) < 0$.

# H Model Simulation Details

This section describes how we simulate and solve the search-and-matching model described in the main text. To summarize our simulation approach, we first discretize the beta distributions for worker and firm heterogeneity, and we then solve for the steady-state equilibrium of the model using an iterative algorithm to calculate the fixed point solutions to the Bellman equations for $S(x,y)$ and $h(x,y)$ (see Section 7.4) and the equations that define $V$, $N$, and $\kappa$ in terms of the other model parameters (and $S(x,y)$ and $h(x,y)$). Lastly, we solve for the endogenous threshold $y^*$ that determines which firms self-select into the TFW and domestic market segments.

## H.1 Worker and firm heterogeneity

We assume a Beta distribution for firm heterogeneity and worker heterogeneity (with a separate distribution TFWs and domestic workers). We approximate the continuous Beta distribution using 20 discrete types, equally spaced along the unit interval so that the vector of values is given by $(0.025, 0.075, ..., 0.925, 0.975)$. The probability mass for each type is given by the integral of the Beta distribution across each interval (e.g., the mass for $x = 0.025$ type is the integral of Beta distribution between 0 and 0.05).

## H.2 Iterative algorithm

**TFW market**

We solve for equilibrium in TFW market by first taking as given the set of firms that have decided to search in the TFW market. That is, we take a candidate threshold $y^*$ and assign all firms with $y < y^*$ to search in the TFW market and a share $\sigma$ of $y = y^*$ firms to search in the TFW market.

Given this set of firms, we then solve for the market equilibrium following a similar iterative algorithm described in Appendix B of Lise, Meghir, and Robin (2016). Specifically, we follow the following steps:

1. Initialize $\kappa^{\text{tfw}}$ as well as initial values of $S^{\text{tfw}}(x,y)$ and $h^{\text{tfw}}(x,y)$; note that $S^{\text{tfw}}(x,y)$ and $h^{\text{tfw}}(x,y)$ are 20-by-20 matrices given the discrete heterogeneity.

2. Given these values, we then calculate $U^{\text{tfw}}$ from $h^{\text{tfw}}(x,y)$, calculate $V^{\text{tfw}}$ as $V^{\text{tfw}} = (\kappa^{\text{tfw}}/\eta^{\text{tfw}})^{-2}/(U^{\text{tfw}})$.

3. Update values of $S^{\text{tfw}}(x,y)$ and $h^{\text{tfw}}(x,y)$ based on Bellman equations (given the values of $\kappa^{\text{tfw}}$, $U^{\text{tfw}}$, $V^{\text{tfw}}$, and $N^{\text{tfw}}$).

4. Update value of kappa given new values of $S^{\text{tfw}}(x,y)$ and $h^{\text{tfw}}(x,y)$ in the direction satisfying $N^{\text{tfw}} = V^{\text{tfw}}/p + 1 - U^{\text{tfw}}$.

5. Repeat steps (2.) through (4.) until all fixed-point conditions are satisfied.

**Domestic market**

Using the same threshold $y^*$ used in solving for the TFW market equilibrium, we calculate the set of firms in the domestic market, which is all firms with $y > y^*$ and a share $(1-\sigma)$ of firms with $y = y^*$. Intuitively, we calculate $N^{\text{tfw}}$ by taking the total number of firms as fixed, and we the adjust $\sigma$ to solve for the equilibrium between the TFW market and domestic market by solving for parameters that give $\Pi_0^{\text{tfw}}(y^*) = \Pi_0(y^*)$. Given the value of $N^{\text{tfw}}$ calculated in the TFW market above, we fix the value of the number of firms in the domestic market, $N^{\text{domestic}}$, so that the total number of firms across both market segments is consistent with the Beta distribution of firms and the total fixed number of firms. Specifically, we define $\lambda$ as the share of the discretized Beta distribution accounted for by the TFW firms, which is the sum of all firms with $y < y^*$ plus $\sigma$ times the share of firms with $y = y^*$. Given this definition, we set $N^{\text{domestic}} = N^{\text{tfw}} * (1 - \lambda)/\lambda$. Using this value of $N^{\text{domestic}}$, we use the following algorithm:

1. Initialize value of $\kappa$ as well as initial values of $S(x, y)$ and $h(x, y)$.
2. Given these values, we then calculate $U$ from $h(x, y)$ and calculate $V$ as $V = (\kappa/\eta)^{-2}/(U + s(1-U))$ (and we do not update $N$ since that is taken as fixed).
3. Update values of $S(x, y)$ and $h(x, y)$ based on Bellman equations (given the values of $\kappa$, $U$, $V$, and $N$).
4. Calculate $U$ and $h(x, y)$ again and update value of $\kappa$ based on $V = (\kappa/\eta)^{-2}/(U + s(1 - U))$
5. Repeat steps (2.)-(4.) until all fixed-point conditions are satisfied.

**Full labor market equilibrium**

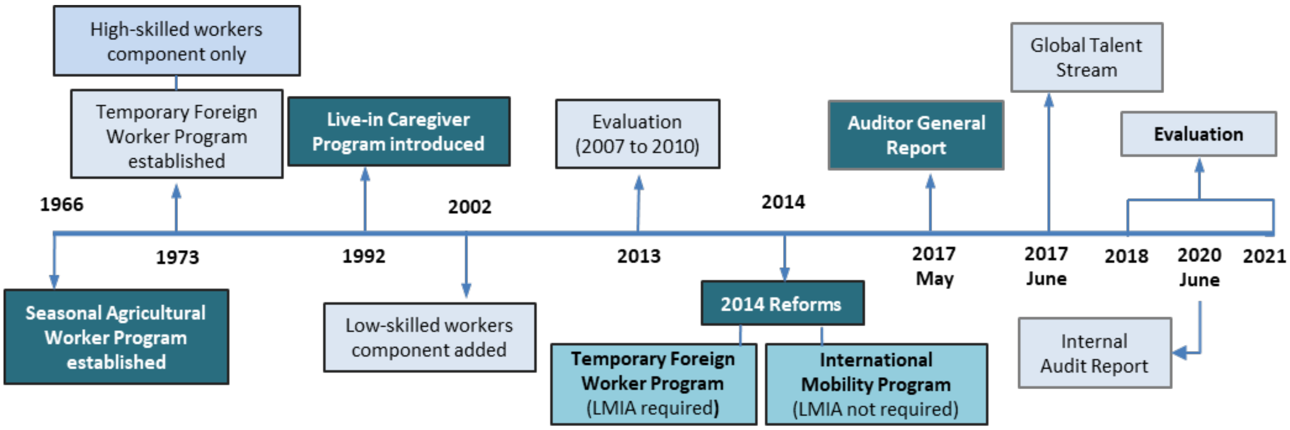
After solving the iterative algorithm above in the TFW market and the domestic market, we then compare the simulated $\Pi_0^{\text{tfw}}(y^*)$ and $\Pi_0(y^*)$ values, and we adjust the $\sigma$ parameter in the direction of bringing the two values closer together (e.g., if $\Pi_0^{\text{tfw}}(y^*) > \Pi_0(y^*)$, then we increase $\sigma$ so that there are fewer firms in the domestic market). We then repeat the iterative algorithm in each market again, and we continue to adjust $\sigma$ until $\Pi_0^{\text{tfw}}(y^*) = \Pi_0(y^*)$. If this algorithm does not converge, we then try different values of $y^*$ until we find convergence. In all of our simulations, we have always found a unique value of $y^*$ given the other calibrated parameters.

**Free-entry condition**

In our sensitivity analysis, we allow for the number of firms to be determined endogenously through free-entry condition. The same iterative algorithm above can be used, but it needs to be modified because in the case of free entry, the number of firms is an additional endogenous outcome determined by the condition that the lowest productivity firm earns zero expected profits. This adds an additional fixed point equation that can be solved in the same algorithm. The domestic market algorithm is the same (since $N$ is already taken as fixed), but the TFW market now updates $N$ each step in the direction towards satisfying the free-entry condition.

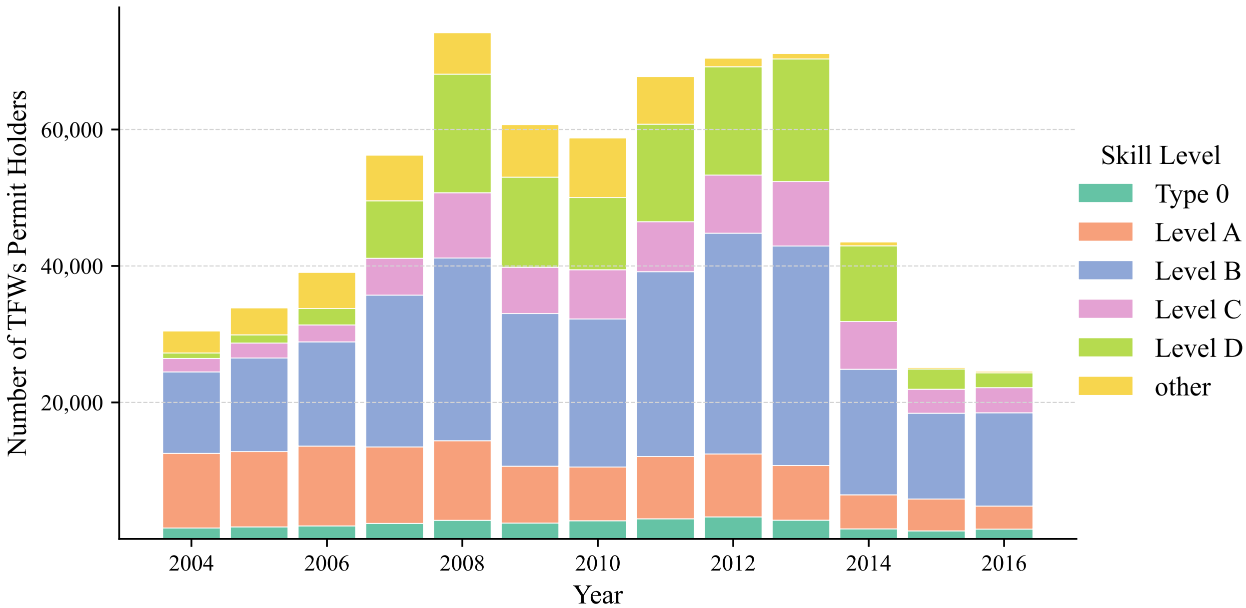
# I Appendix Figures

Figure A.1: Temporary Foreign Worker Program (TFWP) Timeline



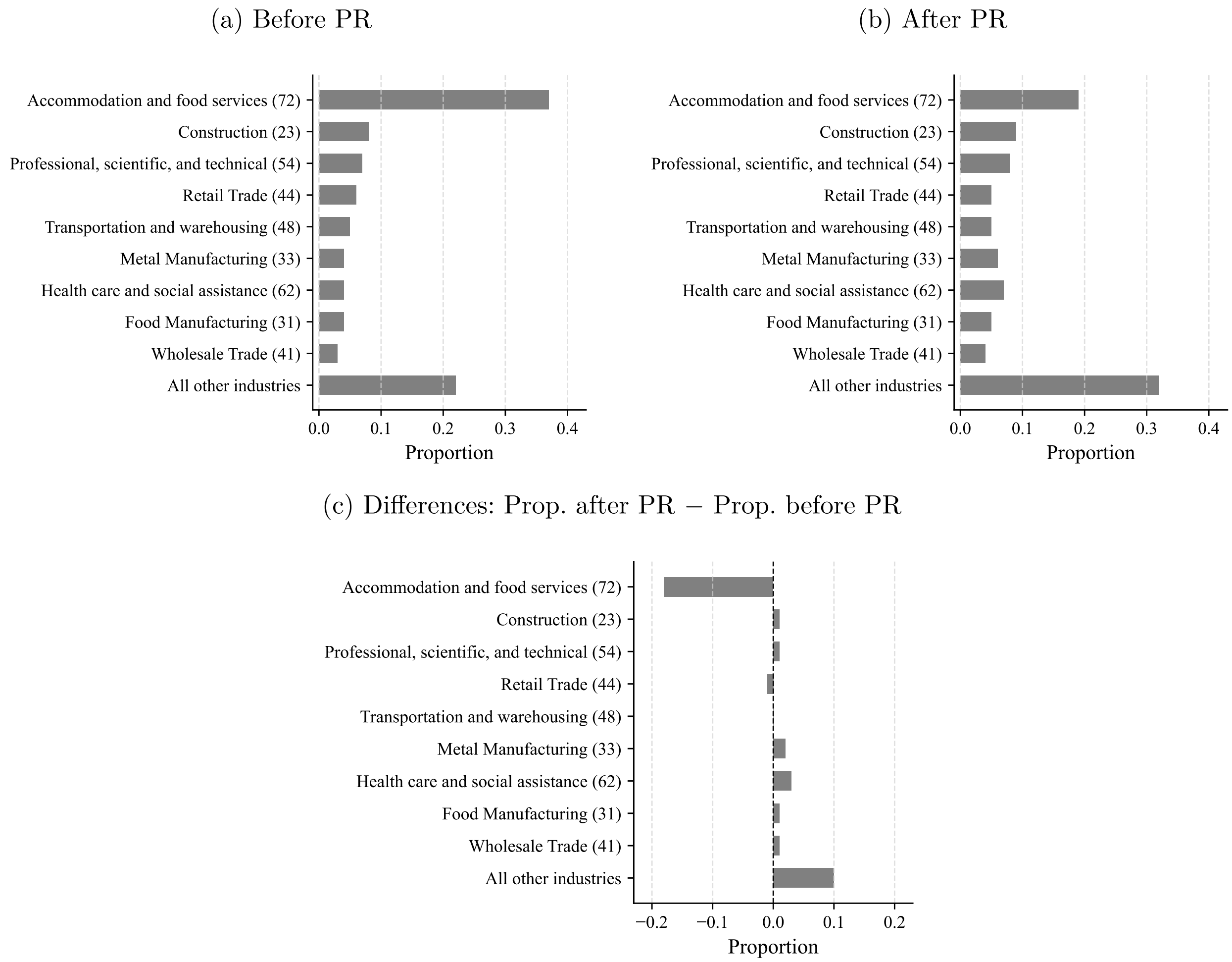

*Notes:* This figure shows the timeline of major policy changes to the Temporary Foreign Worker Program (TFWP) in Canada. Note that although the figure includes changes to the Seasonal Agricultural Worker Program (SAWP) and Live-in Caregiver Program (LCP), our analysis focuses on workers with a Labour Market Opinion (LMO) *excluding* the SAWP and LCP (see Section 3). *Source:* Figure 2 in Employment and Social Development Canada (2021).

Figure A.2: Number of TFWs with LMO by Skill Level, 2004–2016




*Notes:* This figure shows the distribution of TFWs with an LMO by their skill types, using NOC 2016 codes. Skill Type 0: management job, e.g., restaurant managers, mine managers, shore captains (fishing); Skill Level A: professional jobs that usually call for a degree from a university, e.g., doctors, dentists, architects; Skill Level B: technical jobs and skilled trades that usually call for a college diploma or training as an apprentice, e.g., chefs, plumbers, electricians; Skill Level C: intermediate jobs that usually call for high school and/or job-specific training, e.g., industrial butchers, long-haul truck drivers, food and beverage servers; Skill Level D: labor jobs that usually give on-the-job training, e.g., fruit pickers, cleaning staff, oil field workers. For more detailed information on the top occupations of TFWs using NOC 2016 codes, see Table A.1. *Source:* Authors' calculations using data from Immigration, Refugees and Citizenship Canada (2017b).

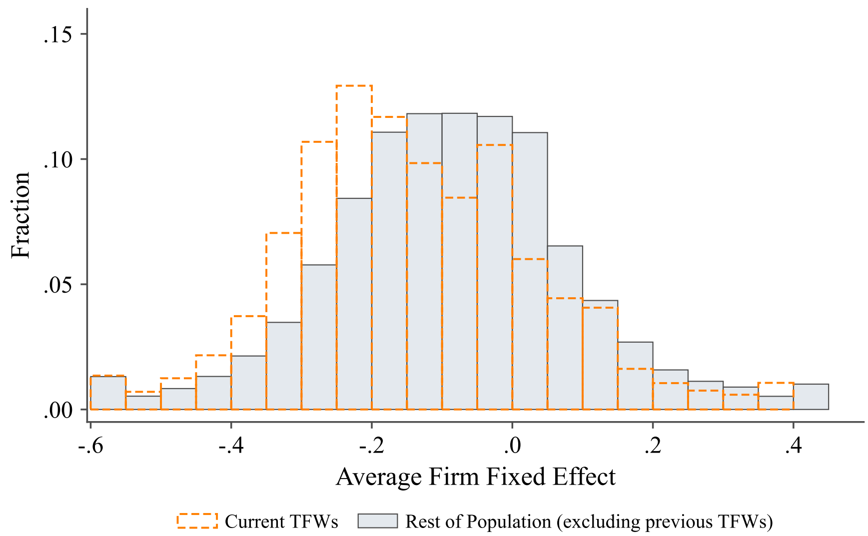
Figure A.3: Distribution of Industries Before and After Permanent Residency



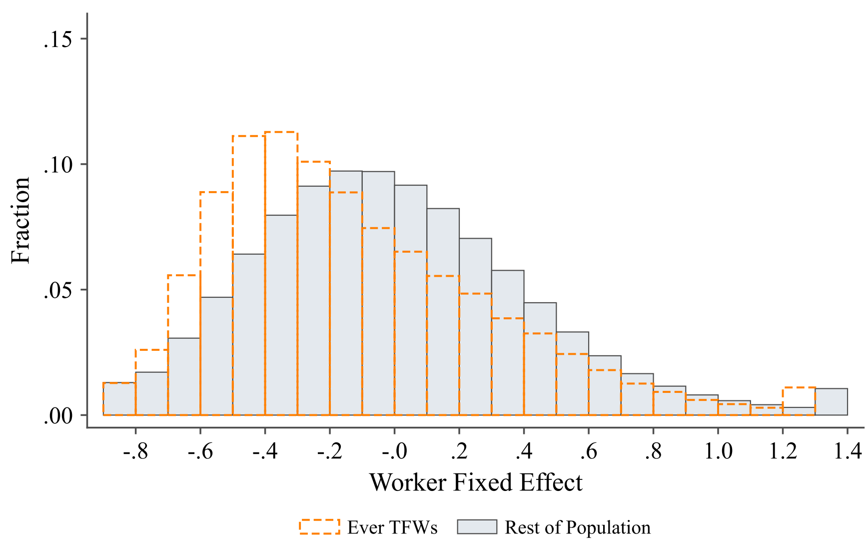

*Notes:* This figure shows the share of TFWs in each industry before and after permanent residency. The codes in parentheses are 2-digit NAICS codes. Industries are ranked in descending order according to the proportion of TFWs in their initial year in each industry; the figure shows the top nine industries, with the tenth category aggregating all others. Panel (a) shows the distribution before PR. Panel (b) shows the distribution after PR. Panel (c) takes the differences by subtracting the proportion before PR from after PR for each industry. *Source:* Authors' calculations using the CEEDD.

Figure A.4: Worker Selection into the TFWP: Distribution of Average Firm Effects and Worker Effects for TFWs vs. Rest of Population

(a) Average Firm Effect of Primary Employer



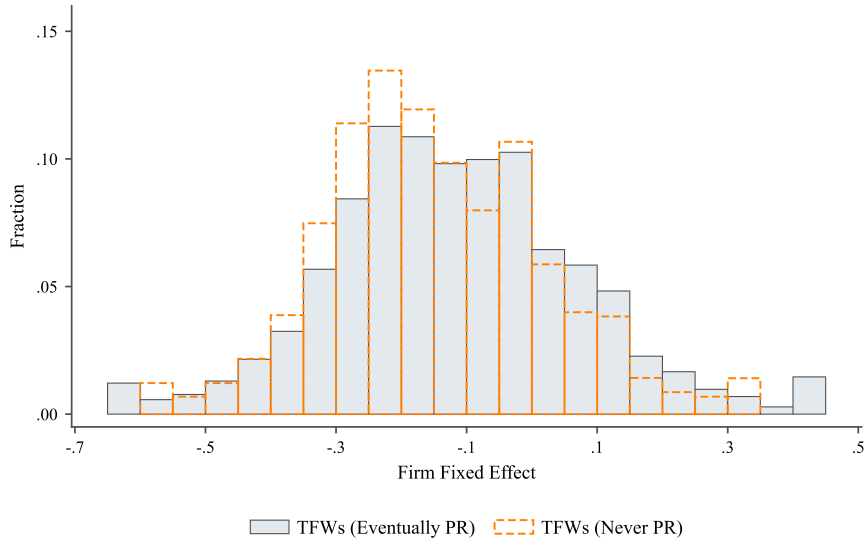

(b) Worker Effect



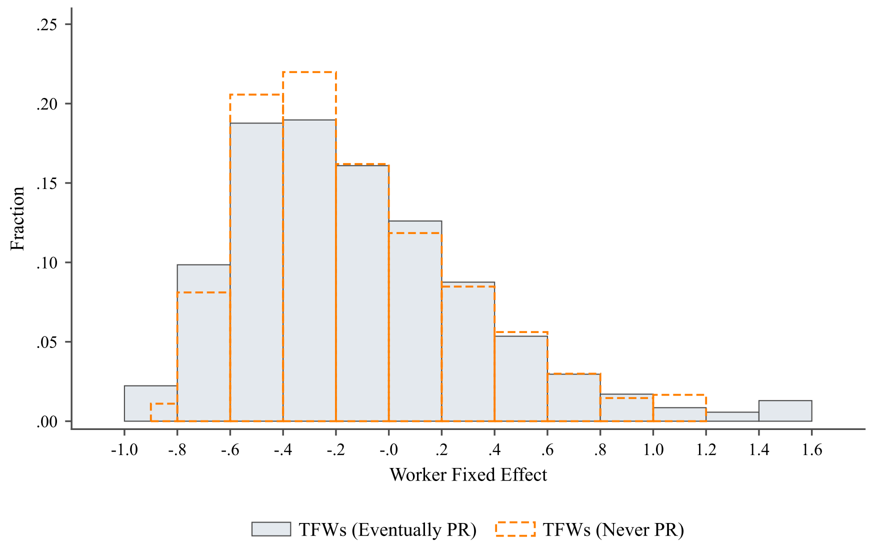

*Notes:* This figure compares the distribution of average firm effects and worker effects for TFWs compared to the rest of population (native-born individuals and other permanent residents who were never TFWs). The worker effects and firm effects were estimated using a two-way fixed effects (AKM) model of log earnings (see Appendix C). Panel (a) shows the distribution of average firm fixed effects, calculated for TFWs over all years in which they have a valid temporary permit (excluding any post-PR observations), and for all other individuals over all of their observed years. Orange dashed bars represent current TFWs; navy solid bars represent the rest of the population excluding previous TFWs. Panel (b) shows the distribution of worker effects for "ever TFWs," defined as individuals who were TFWs at some point during the sample period, compared to the rest of the population. Note that we focus on ever TFWs for panel (b) because the worker effects do not change over time (i.e., for TFWs that obtain PR, the worker effects are the same before and after PR). Orange dashed bars represent ever TFWs; navy solid bars represent the rest of the population.

Figure A.5: Distribution of Worker and Firm Fixed Effects between Never PR and Eventually PR

(a) Firm Fixed Effect




(b) Worker Fixed Effect



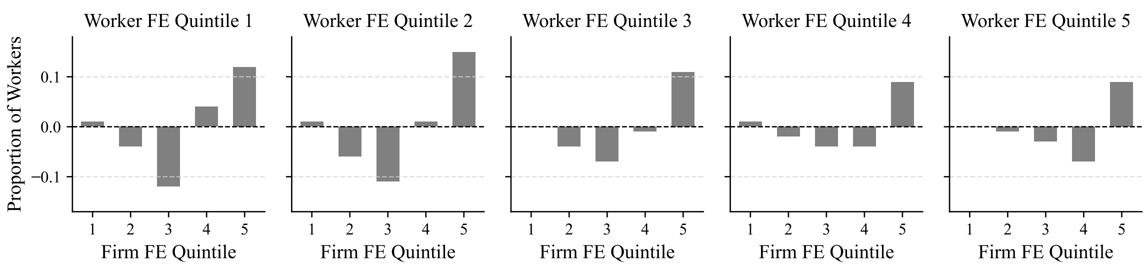

*Notes:* This figure compares the distribution of worker effects and average firm effects of the employer between TFWs who never get PR and TFWs who eventually get PR. Workers are classified as eventually obtaining PR if they have a recorded year of PR in the IMDB; those without a recorded year are classified as never obtaining PR. The worker effects and firm effects were estimated using an AKM model (see Appendix C). Panel (a) shows the distribution of average firm fixed effects for the TFWs' primary employers. Panel (b) shows the distribution of worker fixed effects. Orange dashed bars represent TFWs who never get PR; navy solid bars represent TFWs who eventually get PR. *Source:* Authors' calculations using the CEEDD.

Figure A.6: Worker Sorting Before and After PR: AKM Firm Fixed Effects by Quintiles of Worker Fixed Effects

(a) Before PR

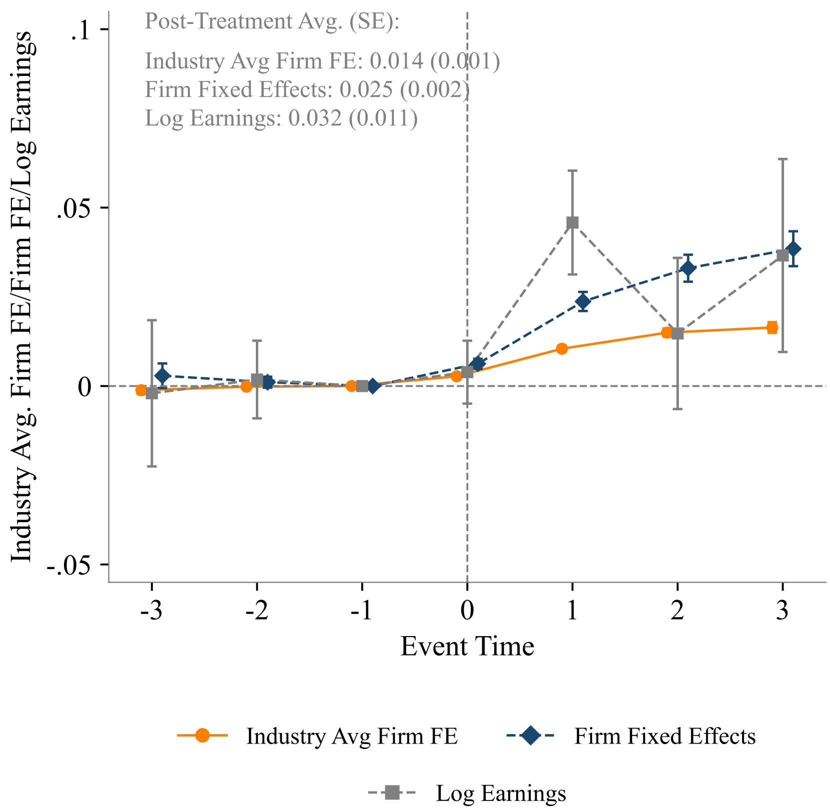

(b) After PR


(c) Differences: Prop. after PR − Prop. before PR




*Notes:* This figure shows the distribution of firm fixed effects by quintiles of worker fixed effects of TFWs from an AKM regression (see Section C) before and after obtaining permanent residency. Panel (a) shows the distribution before PR. Panel (b) shows the distribution after PR. Panel (c) takes the differences by subtracting the proportion before PR from the proportion after PR for each worker FE quintile. *Source:* Authors' calculations using the CEEDD.

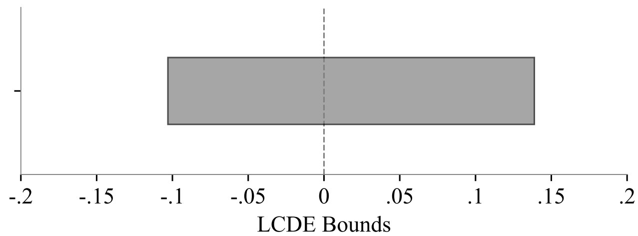
Figure A.7: Industry Average Firm Fixed Effect



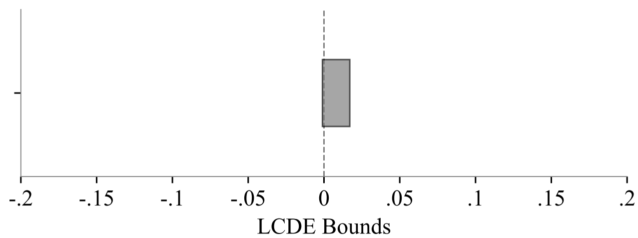

*Notes:* The figure compares event study estimates for AKM firm fixed effects vs. industry-level averages and log earnings (see Section 6.5). Event time 0 is the year of permanent residency. The navy line represents the firm fixed effects, the orange line represents the industry-level average firm fixed effect, and the gray line represents the log earnings. Firm fixed effects are for the worker's primary employer, and the industry-level average firm fixed effect is the average across all primary employers in the worker's industry. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.8: Bounds on the Within-Firm-Type Treatment Effect ($\tau_t^d(g)$)

(a) Low-paying initial firms



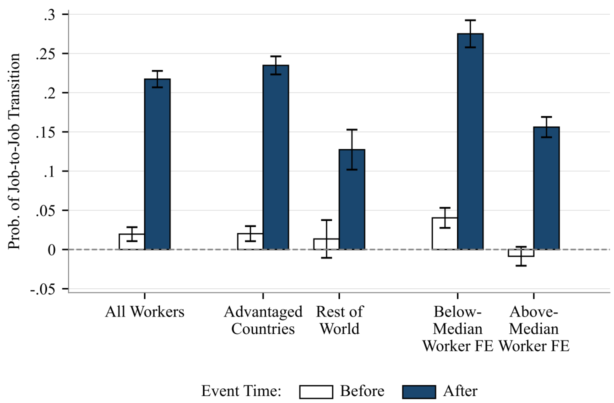

(b) High-paying initial firms



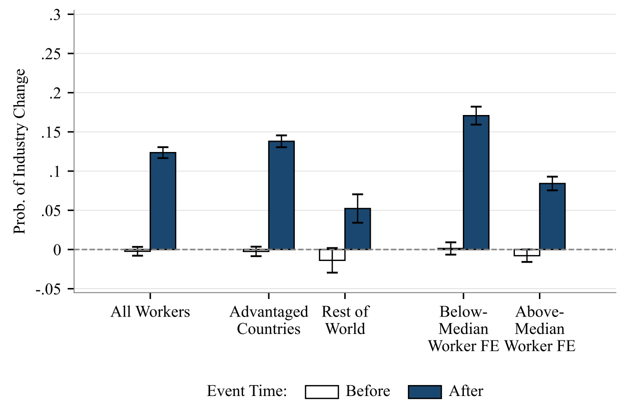

*Notes:* This figure reports estimated bounds on the within-firm-type average treatment effect $\tau_t^d(g)$ for workers who were initially at firm type $d$ before PR and would remain at $d$ regardless of treatment status ("baseline-$d$ always-stayers"). Bounds are aggregated across cohorts using weights proportional to cohort size at each event time (see Appendix D for details) and then averaged across event times. Firms are classified as low-paying or high-paying based on whether their estimated AKM pay premium falls below or above the median. Panel (a) reports bounds for workers initially employed by low-paying firms. Panel (b) reports bounds for workers initially employed by high-paying firms. Bars denote the identified bounds and the dashed vertical line marks zero. *Source:* Authors' calculations using the CEEDD.

Figure A.9: Main Labor Market Outcomes by Country of Origin and AKM Worker Fixed Effect

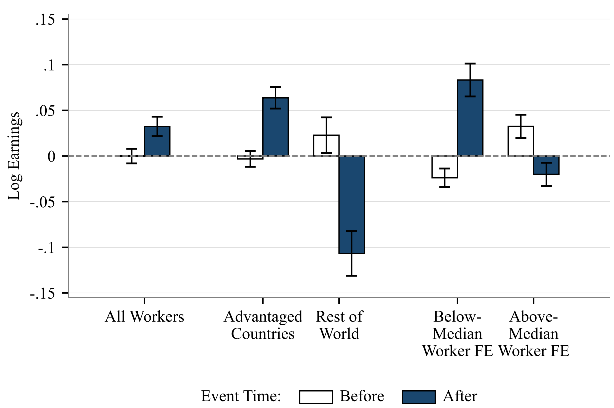
(a) Probability of Job-to-Job Transition



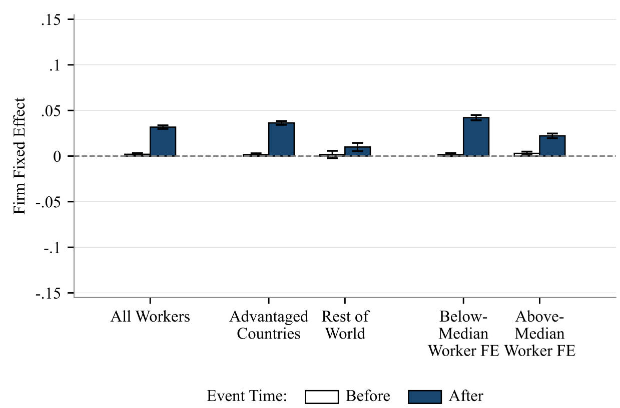

(b) Probability of Industry Change




(c) Log Earnings

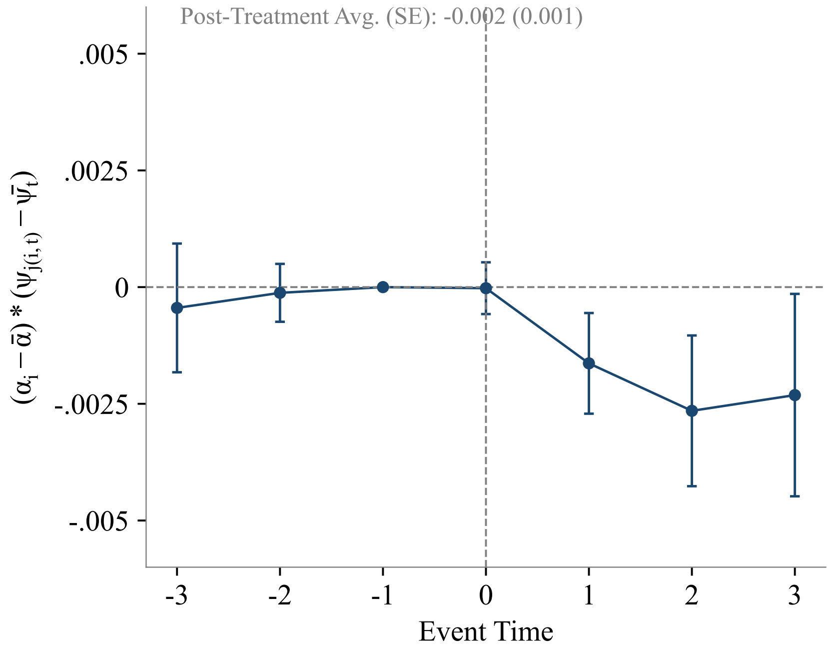



(d) Firm Fixed Effect




*Notes:* This figure shows averaged event study estimates before and after event time 0 for the main labor market outcome separately by origin country and above- and below-median worker fixed effects. The worker fixed effects were estimated using an AKM model (see Appendix C); the classification into advantaged vs rest-of-world countries follows Dostie et al. (2023). The list of "advantaged countries" includes the U.S., the U.K., Australia, New Zealand, and countries in Northern/Western Europe where most people have English as a second language, including Germany, France, the Netherlands, and the Nordic countries. Panel (a) shows job-to-job transition probability. Panel (b) shows industry change probability. Panel (c) shows log earnings. Panel (d) shows firm fixed effects of the worker's primary employer. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

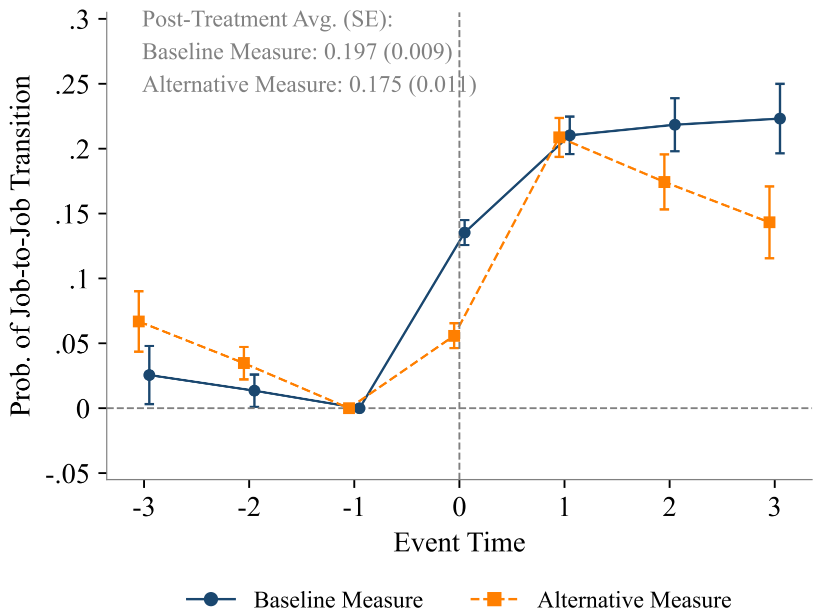
Figure A.10: Covariance of Worker and Firm Effects



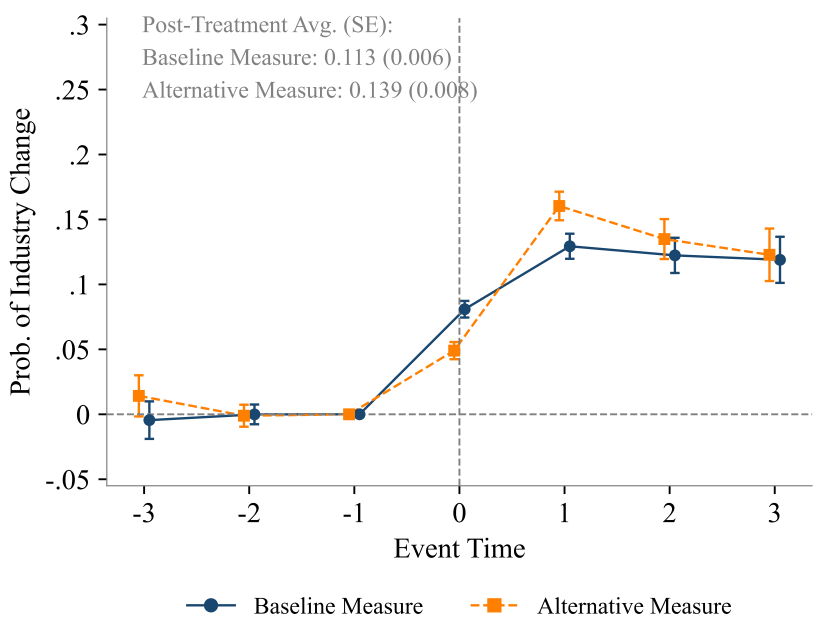

*Notes:* The figure shows the event study for covariance between worker and firm fixed effects, where $\alpha_i$ is the worker effect from the AKM model for individual $i$ and $\psi_{j(i,t)}$ is the firm effect of their primary employer at time $t$ (see Section 6.5). We demean the worker effects within each slice and the firm effects within each slice and year prior to estimating the ATT for each cohort (see Equation (7)); $\bar{\alpha}$ represents the average worker effect within each slice and $\bar{\psi}_t$ represents the average firm effect within each slice and year. Event time 0 is the year of permanent residency. Standard errors are clustered at the individual level. 95% confidence intervals are shown.
*Source:* Authors' calculations using the CEEDD.

Figure A.11: Baseline versus Alternate Definitions of Job and Industry Transitions

(a) Probability of Job-to-Job Transition

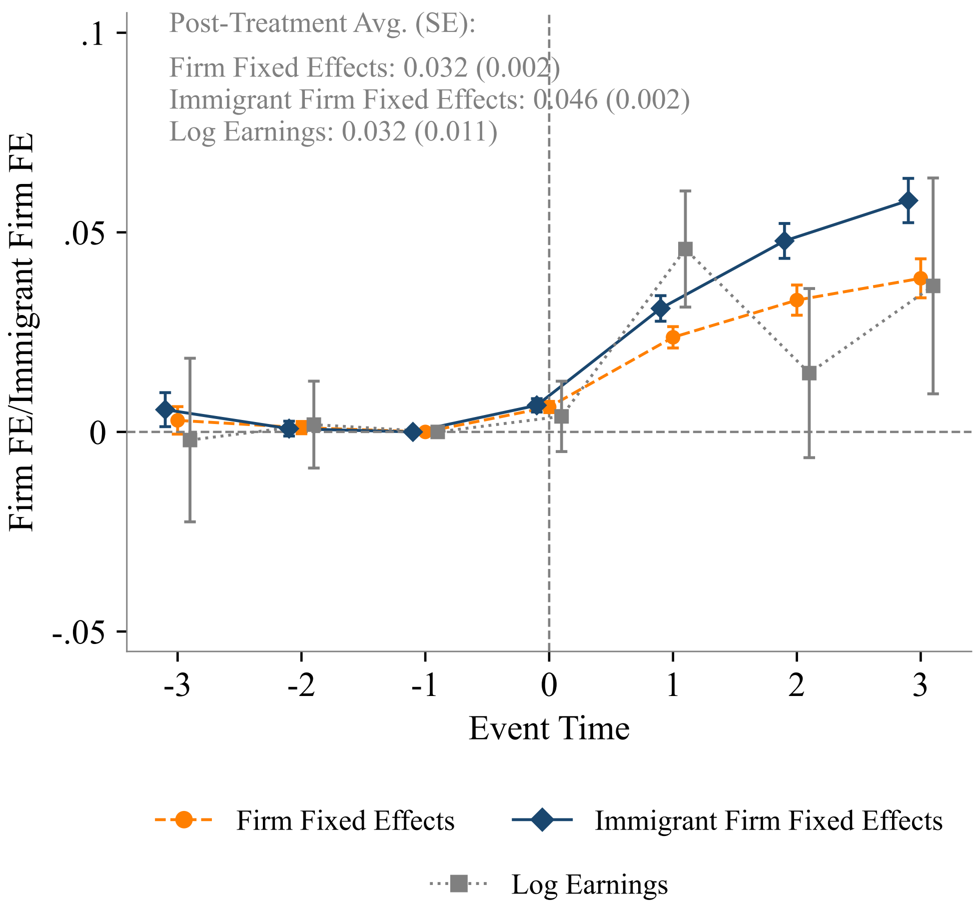



(b) Probability of Industry Change



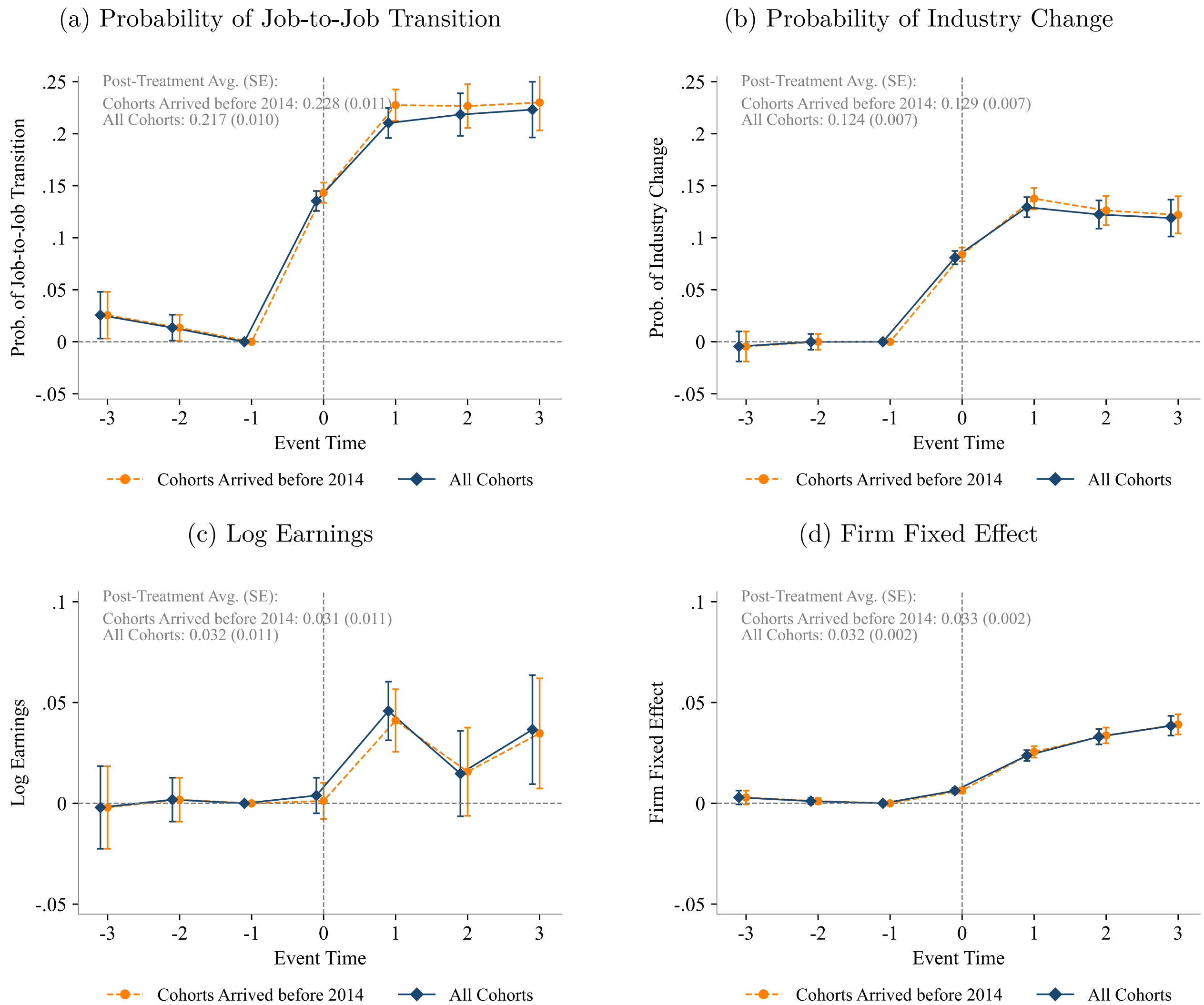

*Notes:* This figure compares the event study estimates for different measures of job-to-job transitions. The baseline measure of job-to-job transition occurs when an employment spell with one primary employer ends, and a new employment spell with a different primary employer begins; an employment spell is defined as a consecutive series of years where an individual receives strictly positive earnings from the same employer. The baseline industry transition is calculated as a change in industry in the same year as a baseline job-to-job transition. The alternative measure of job-to-job transition is defined by a change in the primary employer ID from one year to the next. The alternative industry transition is defined by a change in industry in the same year as an alternative job-to-job transition. See section 3.2 for more details. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.12: Immigrant Firm Fixed Effect




*Notes:* The figure compares the event study estimates for the firm fixed effects from an AKM model estimated with the full population (see Appendix C) to event study estimates for the *immigrant* firm fixed effects estimated by restricting the sample to permanent residents before estimating AKM. Event time 0 is the year of permanent residency. The orange line represents the firm fixed effects, the navy line represents the *immigrant* firm fixed effects, and the gray line represents the log earnings. All firm fixed effects (whether estimated with the full population or the subpopulation of permanent residents) are for the worker's primary employer. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

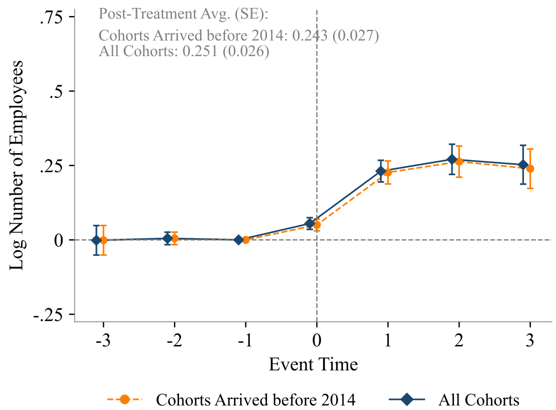
Figure A.13: Main Labor Market Outcomes Excluding the 2014 Cohort



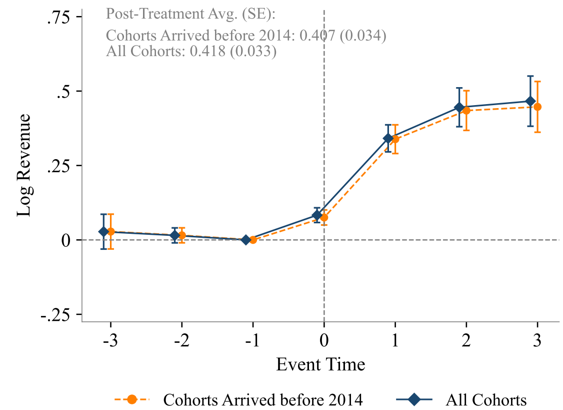

*Notes:* This figure shows event study estimates for the main labor market outcomes after excluding the last cohort in our analysis sample which arrived in 2014. Orange lines represent the event study estimates after the 2014 cohort is excluded; navy lines represent the main estimates with all cohorts. Panel (a) shows job-to-job transition probability. Panel (b) shows industry transition probability. Panel (c) shows log earnings. Panel (d) shows firm fixed effects of the worker's primary employer. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.14: Firm Characteristics Excluding the 2014 Cohort

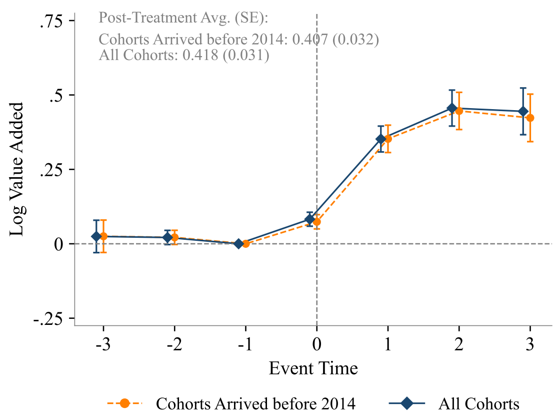
(a) Log Number of Employees



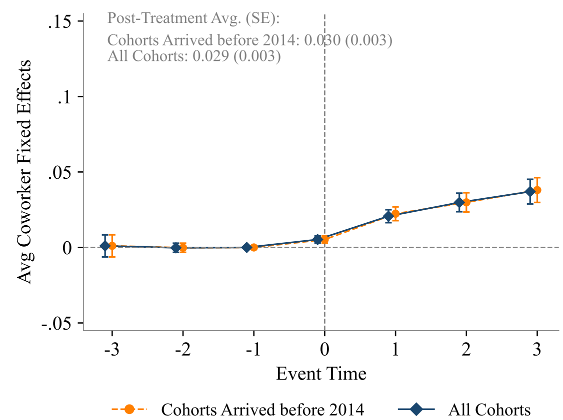

(b) Log Revenue



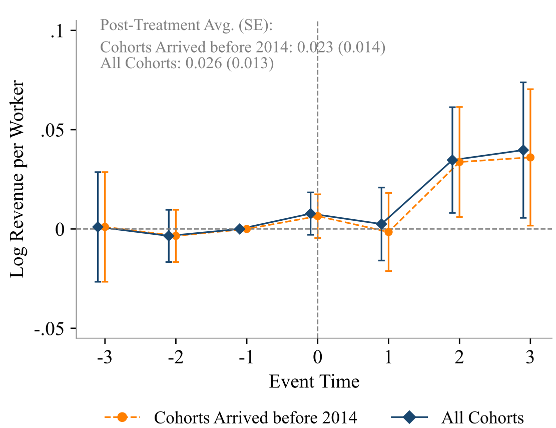

(c) Log Value Added



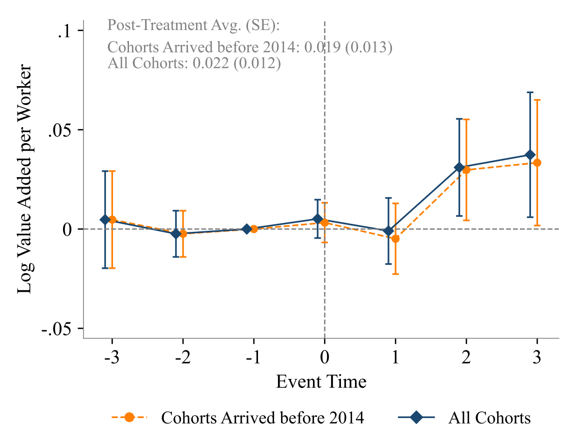

(d) Average Coworker Fixed Effects




(e) Log Revenue per Worker



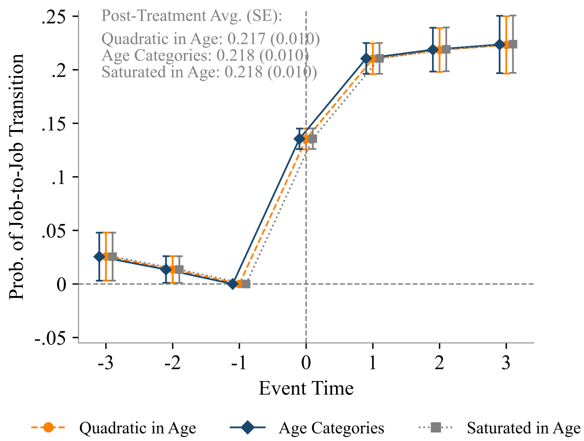

(f) Log Value Added per Worker



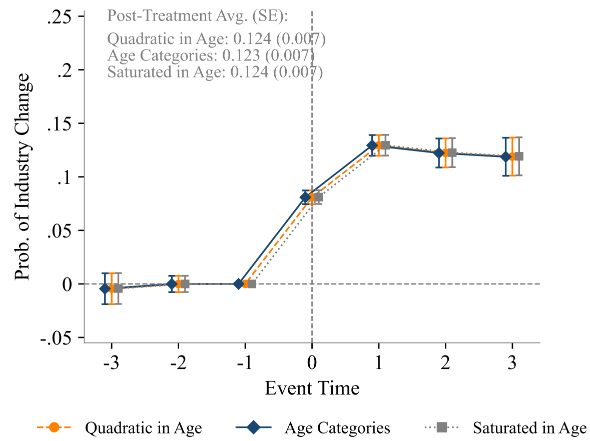

*Notes:* This figure shows event study estimates for firm characteristics of each worker's primary employer after excluding the last cohort in our analysis sample which arrived in 2014. Orange lines represent the event study estimates after the 2014 cohort is excluded; navy lines represent the main estimates with all cohorts. Panel (a) shows log number of employees. Panel (b) shows log firm revenue. Panel (c) shows log value added, where value added is calculated as total revenue minus total expenses plus total payroll. Panel (d) shows the average worker fixed effects of coworkers (leave-one-out mean). Panel (e) shows log revenue per worker. Panel (f) shows log value added per worker. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.15: Age Control Comparison: Main Labor Market Outcomes

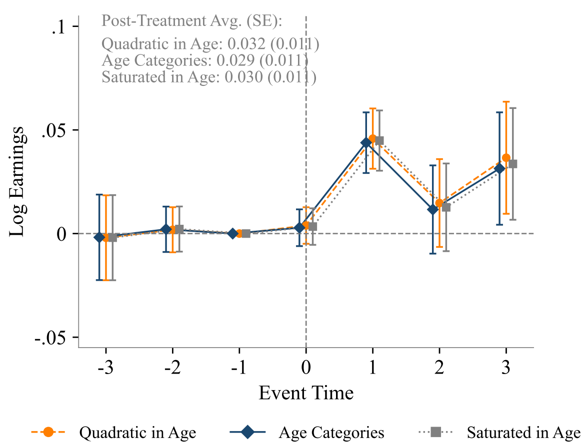
(a) Prob. of Job-to-Job Transition



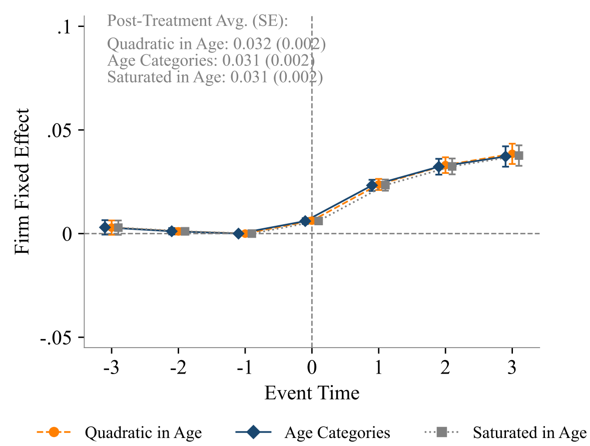

(b) Prob. of Industry Change




(c) Log Earnings

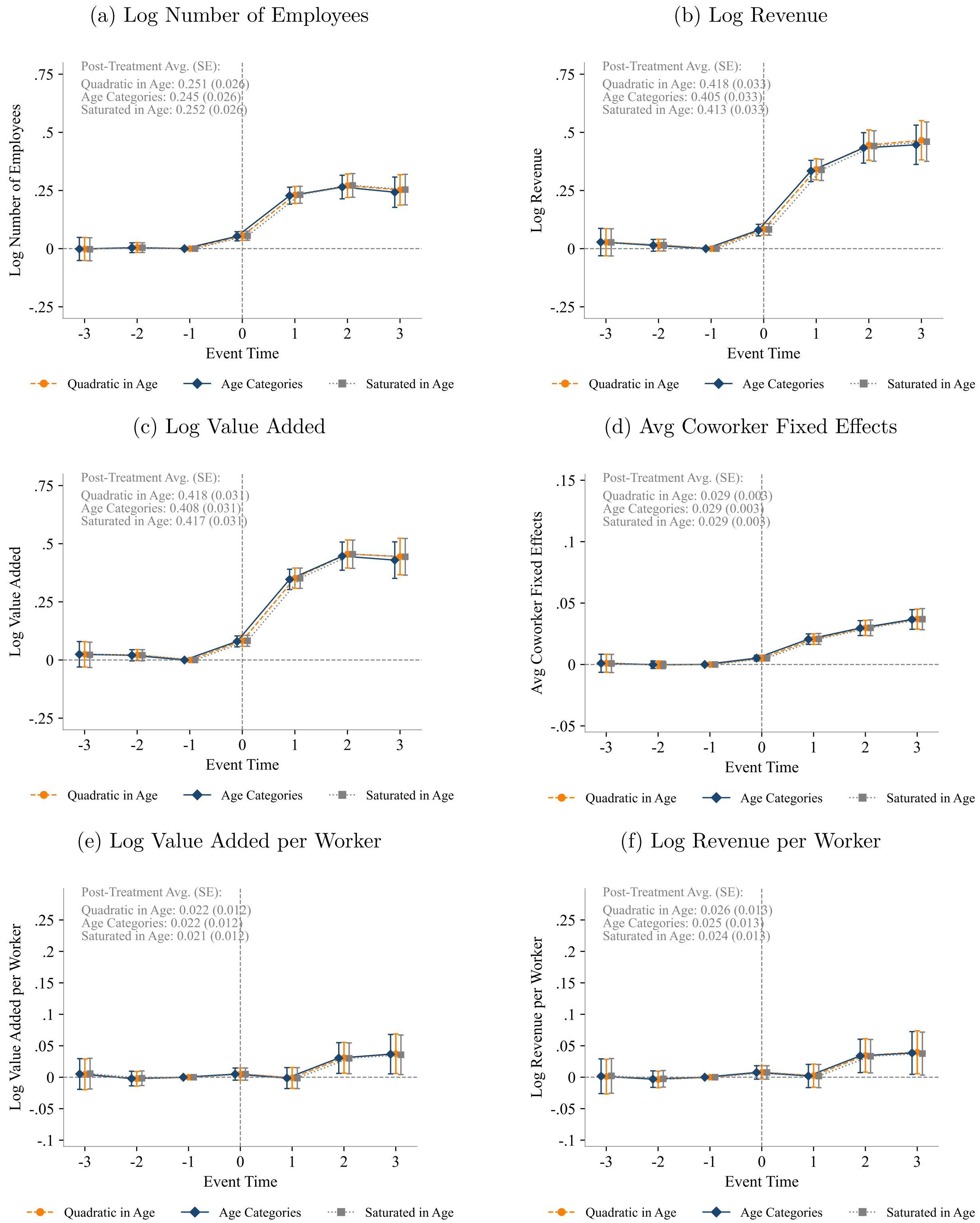



(d) Firm Fixed Effect




*Notes:* This figure compares event study estimates for the main labor market outcomes with different age controls. The orange line represents estimates using the baseline quadratic polynomial in age, the navy line represents estimates using the fixed effects for age categories (25–34, 35–44, 45–54, and 55+), and the gray line represents estimates using fixed effects for each age. Panel (a) shows probability of job-to-job transition. Panel (b) shows industry transition probability. Panel (c) shows log earnings. Panel (d) shows firm fixed effects of the individual's primary employer. Event time 0 is the year of permanent residency. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

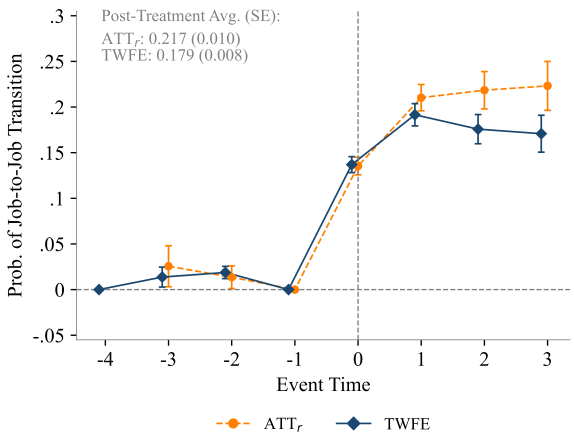
Figure A.16: Age Control Comparison: Firm Characteristics



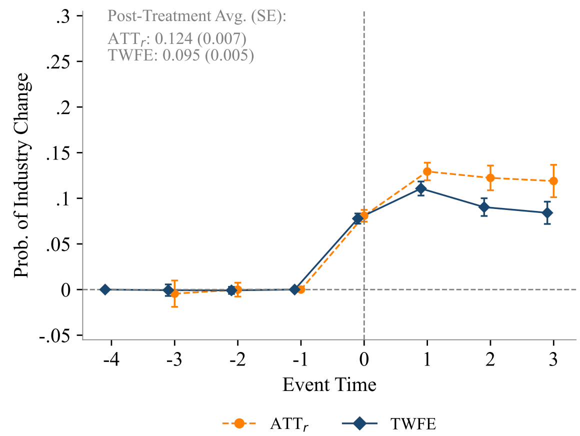

*Notes:* This figure compares event study estimates for firm characteristics obtained by estimating the event study model with different age controls. The orange line represents estimates using the baseline quadratic polynomial in age, the navy line represents estimates using the fixed effects for age categories (25–34, 35–44, 45–54, and 55+), and the gray line represents estimates using fixed effects for each age. Panel (a) shows log number of employees. Panel (b) shows log revenue. Panel (c) shows log value added. Panel (d) shows average coworker fixed effects. Panel (e) shows the log value added per worker. Panel (f) shows the log revenue per worker. Event time 0 is the year of permanent residency. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.17: TWFE: Main Labor Market Outcomes

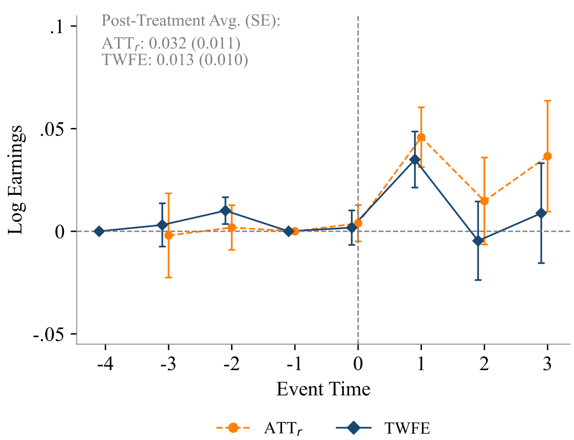
(a) Prob. of Job-to-Job Transition



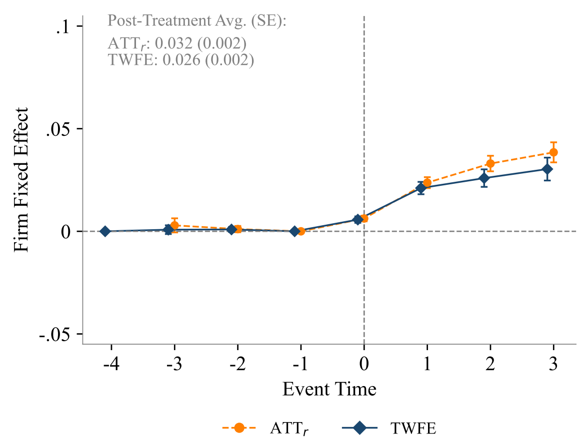

(b) Prob. of Industry Change




(c) Log Earnings



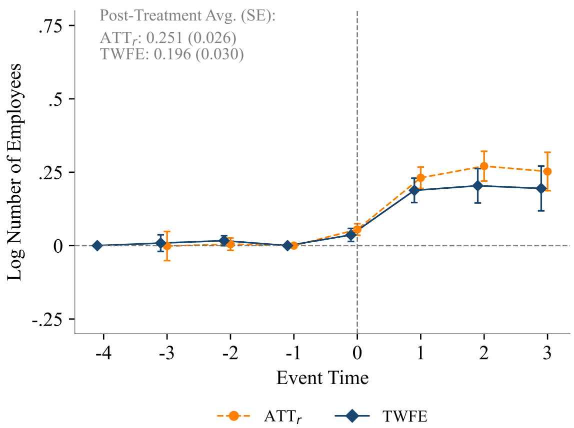

(d) Firm Fixed Effect



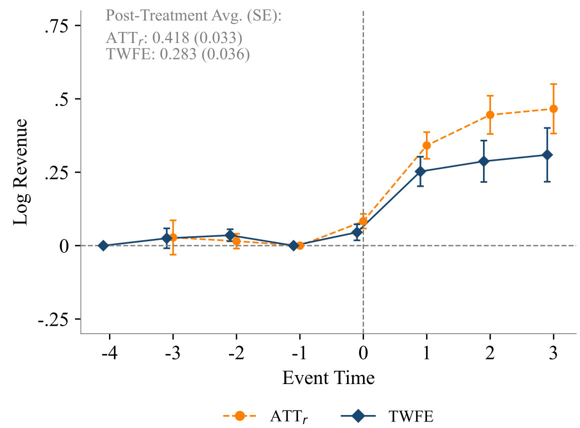

*Notes:* This figure compares event study estimates for the main labor market outcomes between the CCDID estimates and a two-way fixed effects (TWFE) model with -1 and -4 as reference periods (see Section 6.6). Orange lines represent CCDID estimates and navy lines represent estimates from TWFE. Panel (a) shows probability of job-to-job transition. Panel (b) shows industry transition probability. Panel (c) shows log earnings. Panel (d) shows firm fixed effects of the individual's primary employer. Event time 0 is the year of permanent residency. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.18: TWFE: Firm Characteristics

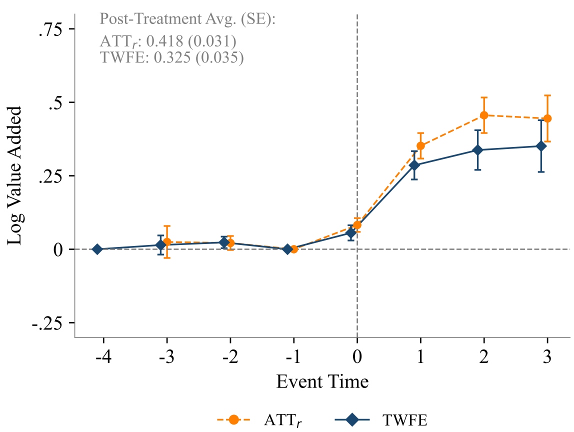
(a) Log Number of Employees



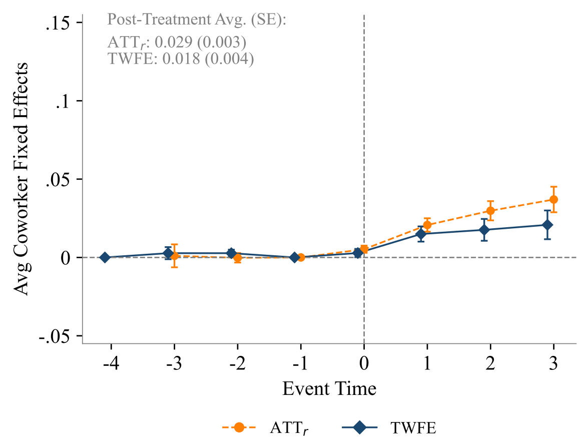

(b) Log Revenue



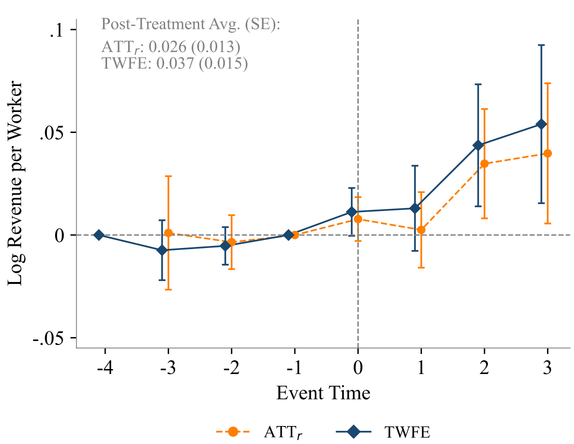

(c) Log Value Added



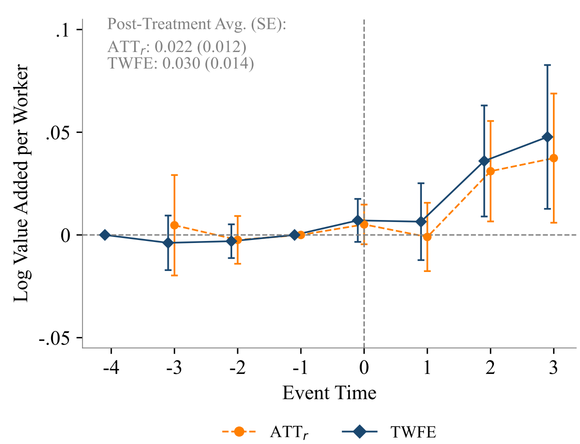

(d) Avg Coworker Fixed Effects




(e) Log Revenue per Worker



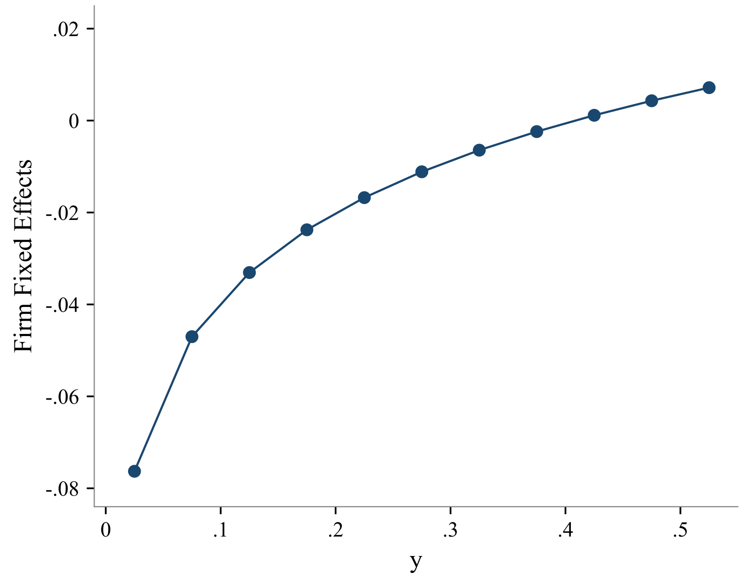

(f) Log Value Added per Worker



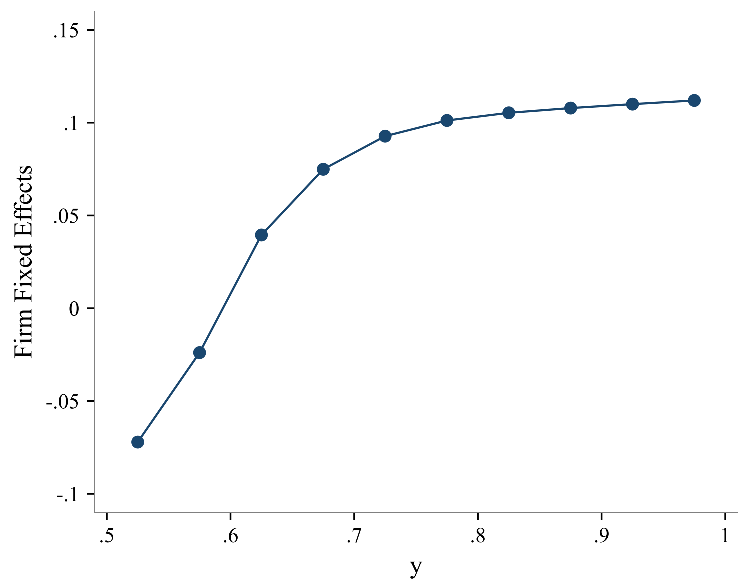

*Notes:* This figure compares event study estimates for firm characteristics between the CCDID estimates and a two-way fixed effects (TFWE) model with -1 and -4 as reference periods (see Section 6.6). Orange lines represent CCDID estimates and navy lines represent estimates from TWFE. Panel (a) shows log number of employees. Panel (b) shows log revenue. Panel (c) shows log value added. Panel (d) shows average coworker fixed effects (AKM estimates; see Appendix C). Panel (e) shows log revenue per worker. Panel (f) shows log value added per worker. Event time 0 is the year of permanent residency. Standard errors are clustered at the individual level. 95% confidence intervals are shown. *Source:* Authors' calculations using the CEEDD.

Figure A.19: Monotonic Relationship between AKM Firm Effects and True Firm Type

(a) AKM Firm Effects versus True Firm Type, TFW market

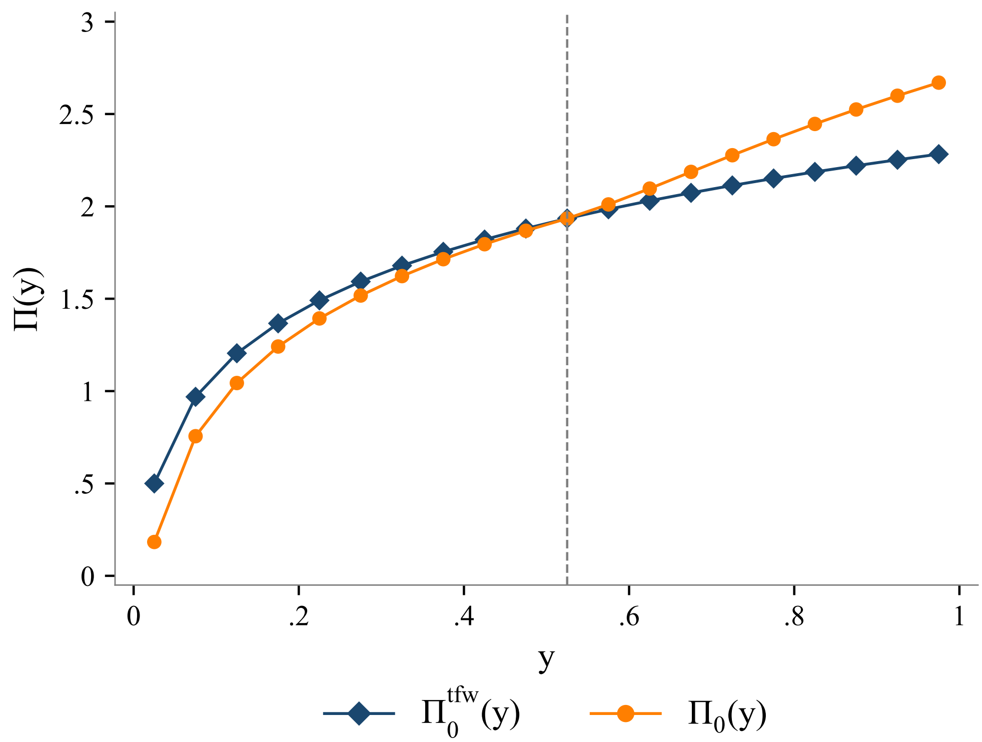



(b) AKM Firm Effects versus True Firm Type, domestic market




*Notes:* This figure reports the show the monotonic relationship between the true firm type, $y$, and the average estimated AKM firm fixed effect within each firm type in the TFW market (Panel A) and the domestic market (Panel B). See Section 8 for more details.

Figure A.20: Simulated $\Pi_0(y)$ and $\Pi_0^{\text{tfw}}(y)$ Functions




*Notes:* This figure plots the simulated $\Pi_0(y)$ and $\Pi_0^{\text{tfw}}(y)$ functions. The $\Pi_0(y)$ increases more steeply and intersects at a single point which is the equilibrium value of y $y^*$ where the firms at that productivity level are indifferent between choosing a vacancy in the TFW segment or the domestic market segment. We numerically solve for the share of $y = y^*$ firms so that $\Pi_0(y^*) = \Pi_0^{\text{tfw}}(y^*)$ and we find that 6.7 percent of the $y = y^*$ firms choose the TFW market (and the remainder choose the domestic market). We re-calculate this share in response to a counterfactual policy change when we re-solve the new equilibrium in both labor market segments. See Section 8 for more details.

# J Appendix Tables

Table A.1: Percentage of Temporary Foreign Workers (TFWs) in each Occupation (2-, 3-, and 4-digit NOC)

| **Occupation Name** | **% TFWs** |
|---|---|
| **(a) 2-digit NOC** | |
| 67 — Service support and other service occupations, n.e.c. | 5.85% |
| 63 — Service supervisors and specialized service occupations | 5.47% |
| 51 — Professional occupations in art and culture | 5.03% |
| 72 — Industrial, electrical and construction trades | 4.66% |
| 52 — Technical occupations in art, culture, recreation and sport | 4.63% |
| 22 — Technical occupations in natural and applied sciences | 2.77% |
| 21 — Professional occupations in natural and applied sciences | 2.47% |
| 75 — Transport and heavy equipment operation and related maintenance occupations | 1.91% |
| 94 — Processing and manufacturing machine operators and related production workers | 1.36% |
| 96 — Labourers in processing, manufacturing and utilities | 1.33% |
| 73 — Maintenance and equipment operation trades | 1.28% |
| 65 — Service representatives and other customer and personal services occupations | 1.14% |
| 76 — Trades helpers, construction labourers and related occupations | 0.70% |
| 66 — Sales support occupations | 0.62% |
| 06 — Middle management occupations in retail and wholesale trade and customer services | 0.57% |
| 11 — Professional occupations in business and finance | 0.54% |
| 62 — Retail sales supervisors and specialized sales occupations | 0.50% |
| 01 — Specialized middle management operations | 0.49% |
| 12 — Administrative and financial supervisors and administrative occupations | 0.43% |
| 86 — Harvesting, landscaping and natural resources labourers | 0.41% |
| **Other Occupations** | **57.83%** |

*Note:* This table presents the top occupations in the Temporary Foreign Worker Program (TFWP) from 2004 to 2016, using 2-, 3-, and 4-digit National Occupation Classification (NOC) codes. Data restricts to workers with a Labour Market Opinion (LMO) or Labour Market Impact Assessment (LMIA) and excludes live-in caregivers and workers in the agriculture, public, education, and health sectors. *Source:* Immigration, Refugees and Citizenship Canada (2017b).

*(continued)*

| Occupation Name | % TFWs |
|---|---|
| **(b) 3-digit NOC** | |
| 513 — Creative and performing artists | 4.83% |
| 671 — Food counter attendants, kitchen helpers and related support | 4.08% |
| 632 — Chefs and cooks | 3.30% |
| 631 — Service supervisors | 1.65% |
| 523 — Announcers and other performers, n.e.c. | 1.44% |
| 673 — Other service support and related occupations, n.e.c. | 1.41% |
| 751 — Transport & heavy equipment operation and related | 1.37% |
| 961 — Labourers in processing, manufacturing and utilities | 1.33% |
| 525 — Athletes, coaches, referees and related occupations | 1.23% |
| 217 — Computer and information systems professionals | 1.19% |
| 522 — Photographers, graphic arts technicians, motion pictures & broadcasting techs | 1.18% |
| 946 — Other machine operators in processing/manufacturing | 1.13% |
| 723 — Machinists and related occupations | 1.07% |
| 224 — Technical occupations in electronics and electrical engineering | 0.87% |
| 728 — Masonry and plastering trades | 0.87% |
| 727 — Other construction trades | 0.78% |
| 524 — Artisans and craftspersons | 0.77% |
| 729 — Other installers, repairers and servicers | 0.70% |
| 761 — Trades helpers and labourers | 0.68% |
| 223 — Technical occupations in civil, mechanical and industrial engineering | 0.65% |
| **Other Occupations** | **69.47%** |

*Note:* This table presents the top occupations in the Temporary Foreign Worker Program (TFWP) from 2004 to 2016, using 2-, 3-, and 4-digit National Occupation Classification (NOC) codes. Data restricts to workers with a Labour Market Opinion (LMO) or Labour Market Impact Assessment (LMIA) and excludes live-in caregivers and workers in the agriculture, public, education, and health sectors. *Source:* Immigration, Refugees and Citizenship Canada (2017b).

*(continued)*

| Occupation Name | % TFWs |
|---|---|
| **(c) 4-digit NOC** | |
| 6711 — Food counter attendants, kitchen helpers and related support occupations | 4.08% |
| 6322 — Cooks | 2.88% |
| 5133 — Musicians and singers | 2.11% |
| 6311 — Food service supervisors | 1.39% |
| 5135 — Actors and comedians | 1.32% |
| 7511 — Transport truck drivers | 1.21% |
| 6731 — Light duty cleaners | 1.15% |
| 5131 — Producers, directors, choreographers and related occupations | 1.06% |
| 5254 — Program leaders and instructors in recreation, sport and fitness | 1.02% |
| 5232 — Other performers, n.e.c. | 0.90% |
| 9617 — Labourers in food, beverage and associated products processing | 0.75% |
| 7271 — Carpenters | 0.64% |
| 7611 — Construction trades helpers and labourers | 0.61% |
| 6513 — Food and beverage servers | 0.59% |
| 5241 — Graphic designers and illustrators | 0.58% |
| 9463 — Fish and seafood plant workers | 0.56% |
| 2174 — Computer programmers and interactive media developers | 0.56% |
| 9462 — Industrial butchers and meat cutters, poultry preparers and related workers | 0.54% |
| 5231 — Announcers and other broadcasters | 0.53% |
| 5226 — Other technical and coordinating occupations in motion pictures, broadcasting and the performing arts | 0.50% |
| **Other Occupations** | **77.03%** |

*Note:* This table presents the top occupations in the Temporary Foreign Worker Program (TFWP) from 2004 to 2016, using 2-, 3-, and 4-digit National Occupation Classification (NOC) codes. Data restricts to workers with a Labour Market Opinion (LMO) or Labour Market Impact Assessment (LMIA) and excludes live-in caregivers and workers in the agriculture, public, education, and health sectors. *Source:* Immigration, Refugees and Citizenship Canada (2017b).

Table A.2: Federal Skilled Worker Program (FSWP) Selection Factors (2010)

| **Factor** | **Maximum Points** | **Details** |
|---|---|---|
| Education | 25 | Points awarded based on level of education (degree/diploma etc.). |
| Language Skills | 24 | Total points for proficiency in English and/or French (first + second language). |
| Work Experience | 21 | Skilled work experience in past 10 years (up to 21 pts for 4+ years). |
| Age | 10 | Maximum 10 points for ages 21–49; fewer points outside that range. |
| Arranged Employment | 10 | Points for valid job offer in Canada. |
| Adaptability | 10 | Points for arranged employment (5 pts), one year full-time authorized work in Canada (5 pts), and other factors |
| Pass mark threshold | 67 | Minimum number of points required to be eligible under FSWP. |

*Notes:* This table shows the selection grid for the Federal Skilled Worker Program in 2010. Applicants need at least 67/100 points to be eligible. *Source:* Citizenship and Immigration Canada (2010)

Table A.3: Summary of Maximum Points by Category for the Quebec Skilled Worker Program (2013–2014)

| **Category** | **Maximum Points** |
|---|---|
| Education | 26 |
| Work Experience | 8 |
| Age | 16 |
| Language Proficiency | 22 |
| Stay & Family in Québec | 8 |
| Spouse/Partner Characteristics | 17 |
| Valid Job Offer | 14 |
| Children | 8 |
| Financial Self-Sufficiency | *Eliminatory*[*] |

[*] "Eliminatory" means that this requirement must be satisfied in order for the application to be considered; no points are awarded for it, but failure to meet it results in ineligibility.

Source: Ministère de l'Immigration, de la Diversité et de l'Inclusion (Québec), 2014

Table A.4: Provincial Nominee Program Timeline by Province/Territory

| Province/Territory | Date of First Signed PNP Agreement | Start of PNP |
|---|---|---|
| Newfoundland and Labrador | September 1, 1999 | 1999 |
| New Brunswick | February 22, 1999 | 1999 |
| Manitoba | October 22, 1996 | 1999 |
| Prince Edward Island | March 29, 2001 | 2001 |
| Saskatchewan | March 16, 1998 | 2001 |
| British Columbia | April 19, 1998 | 2001 |
| Alberta | March, 2002 | 2002 |
| Yukon | April, 2001 | 2002 |
| Nova Scotia | August 27, 2002 | 2003 |
| Ontario | November 21, 2005 | 2007 |
| Northwest Territories | August, 2009 | 2009 |

This table shows the date at which provinces and territories opted into the Provincial Nominee Program (PNP). *Source:* Citizenship and Immigration Canada, 2011.

Table A.5: Examples of PNP Streams for TFWs

| Province | Program Name | Brief Description |
|---|---|---|
| ***— Streams Requiring a Job Offer —*** | | |
| Ontario | Employer Job Offer: Foreign Worker Stream | For skilled foreign workers (NOC TEER 0, 1, 2, or 3) who have a valid job offer from an Ontario employer (Government of Ontario, 2025a). |
| British Columbia | Skills Immigration - Skilled Worker | Targets skilled workers (NOC TEER 0, 1, 2, or 3) with a job offer from a B.C. employer and several years of related work experience (Government of British Columbia, 2025b). |
| British Columbia | Skills Immigration - Entry Level and Semi-Skilled | For workers in tourism/hospitality or food processing with a job offer and who have been working for their B.C. employer (Government of British Columbia, 2025a). |
| Alberta | Alberta Opportunity Stream | For temporary foreign workers already working full-time in Alberta in an eligible occupation. Requires a valid work permit and a job offer from their current Alberta employer (Government of Alberta, 2025b). |
| Saskatchewan | Skilled Worker with Existing Work Permit | For skilled workers who have been working in Saskatchewan for at least six months on a valid work permit and have a permanent, full-time job offer from their employer (Government of Saskatchewan, 2025b). |
| Manitoba | Skilled Worker in Manitoba Stream | For qualified temporary foreign workers and international student graduates who are currently working in Manitoba and have been offered a permanent, full-time job (Government of Manitoba, 2025b). |
| Nova Scotia | Skilled Worker Stream | The applicant must have a full-time, permanent job offer from a Nova Scotia employer (Nova Scotia Office of Immigration, 2025c). |
| New Brunswick | Skilled Worker Stream - New Brunswick Experience | For individuals who have received a full-time, permanent job offer from a New Brunswick employer. The applicant must have been living in New Brunswick and working full-time for at least six months for the same eligible employer who is supporting the application (Government of New Brunswick, 2025). |

Table A.5 – continued from previous page

| Province | Program Name | Brief Description |
|---|---|---|
| Prince Edward | Skilled Worker in PEI Stream | Requires a full-time, non-seasonal job offer from a PEI employer in a TEER 0, 1, 2, or 3 occupation, and applicants must have at least two years of full-time work experience in the past five years (Government of Prince Edward Island, 2025). |
| Newfoundland | Skilled Worker Category | For individuals with a guaranteed job offer from an eligible Newfoundland and Labrador employer (Government of Newfoundland and Labrador, 2025). |
| — ***Human Capital Streams*** — | | |
| Ontario | OINP Human Capital Priorities Stream | (Express Entry-aligned) For candidates who have applied to the FSWP or CEC and are in the EE pool. Applicants must have specific skills or work experience (Government of Ontario, 2025b). |
| Saskatchewan | SINP International Skilled Worker: Occupation In-Demand | (Not Express Entry) Uses a points grid. Invites candidates with at least one year of work experience in an occupation on Saskatchewan's in-demand list. Canadian experience adds points (Government of Saskatchewan, 2025a). |
| Alberta | Alberta Express Entry Stream | (Express Entry-aligned) For candidates whose primary occupation is in-demand in Alberta and who have applied to the FSWP, CEC, or FSTP and are in the EE pool (Government of Alberta, 2025a). |
| Nova Scotia | Labour Market Priorities Stream | (Express Entry-aligned) selects candidates in the federal Express Entry system who meet provincial labor market needs to apply for nomination (Nova Scotia Office of Immigration, 2025a). |
| Nova Scotia | Occupations In Demand Stream | (Not Express Entry) Targets specific TEER category 3, 4 or 5 occupations of the National Occupational Classification that are in high labor market demand in Nova Scotia (Nova Scotia Office of Immigration, 2025b) |

Table A.5 – continued from previous page

| Province | Program Name | Brief Description |
|---|---|---|
| Manitoba | Skilled Worker Overseas Stream (Manitoba Experience Pathway) | (Not Express Entry) Uses a points grid to assess applicants based on language proficiency, age, work experience, education, and adaptability. Requires the applicant to have an established connection to Manitoba, such as 6+ months of previous work experience in the province (Government of Manitoba, 2025a). |

Table A.6: Pathways to Permanent Residency, Overall and by Skill Group

| | **Get PR (Never = 0)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **All** | | | **High skill** | | | **Low skill** | | |
| | All | $3 \leq$T2PR$\leq 5$ | Analysis | All | $3 \leq$T2PR$\leq 5$ | Analysis | All | $3 \leq$T2PR$\leq 5$ | Analysis |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **Sample Composition** | | | | | | | | | |
| $3 \leq$Time-to-PR $\leq 5$ | 0.53 | 1.00 | 1.00 | 0.51 | 1.00 | 1.00 | 0.56 | 1.00 | 1.00 |
| Analysis sample | 0.22 | 0.42 | 1.00 | 0.21 | 0.41 | 1.00 | 0.24 | 0.44 | 1.00 |
| **Pathway** | | | | | | | | | |
| PNP | 0.52 | 0.54 | 0.57 | 0.46 | 0.46 | 0.42 | 0.61 | 0.66 | 0.78 |
| Family class | 0.11 | 0.11 | 0.07 | – | – | – | 0.26 | 0.24 | 0.15 |
| Skilled programs | 0.36 | 0.35 | 0.36 | 0.52 | 0.52 | 0.56 | 0.09 | 0.08 | 0.07 |
| Other | 0.01 | 0.01 | 0.00 | – | – | – | 0.04 | 0.02 | 0.01 |

*Notes:* This Table presents summary statistics for the sample of Temporary Foreign Workers (TFWs) defined in Section 3, restricting the sample to TFWs that eventually get PR. The statistics are reported for TFWs' pathways to PR, as described in Section 2. Column (1) includes TFWs who eventually receive PR. Column (2) restricts to TFWs who take 3–5 years to receive PR. Column (3) further limits to the main sample that is described in Section 3.3. Columns (4), (5), and (6) include the full sample, sample of TFWs who take 3–5 years to receive PR, and main analysis sample, respectively, while also restricting to TFWs who are high-skilled. Columns (7), (8), and (9) include the full sample, sample of TFWs who take 3–5 years to receive PR, and main analysis sample, respectively, while also restricting to TFWs who are low-skilled. The classification into low and high skilled workers uses the intended occupation in the IMDB recorded at the time of PR. "PNP" refers to the Provincial Nominee Program. The Skilled Programs include the Federal Skilled Workers Program (FSWP), Canadian Experience Class (CEC), Federal Skilled Trades Program (FSTP), and the Quebec Skilled Workers Program (QSWP). Separate statistics for the Family Class and Other are excluded from Columns (4), (5), and (6) because they did not pass Statistics Canada's rule for vetting disclosure (due to small sample sizes); these suppressed categories jointly account for the residual share. *Source:* Authors' calculations using the CEEDD (Demographic variables and information on PR pathways are obtained from the IMDB).

Table A.7: Sample Restrictions

| **Restriction Step** | **Observations** | **Unique Individuals** |
|---|---|---|
| First permit LMO (excluding SAWP and LCP) | — | 234,000 |
| In T1PMF or T4ROE (primary jobs only) with positive earnings | 1,265,000 | 220,000 |
| Removed individuals with earnings before first LMO | 1,252,000 | 218,000 |
| Individuals who eventually get PR | 975,000 | 112,000 |
| Non-missing intended occupation | 965,000 | 111,000 |
| Non-missing primary employer firm fixed effect | 726,000 | 95,000 |
| Time to PR $\geq 3$ and Time to PR $\leq 5$ (years) | 392,000 | 51,000 |
| Drop initial year | 340,000 | 51,000 |
| $-5 \leq$ Event Time $\leq 5$ | 302,000 | 51,000 |
| Balanced panel on time to PR for Event Time $\leq 2$ | 191,000 | 25,000 |

*Notes:* This table details the sequential application of sample restrictions, showing the remaining number of observations and unique individuals at each step. Observations and unique individuals are rounded to comply with Statistics Canada guidelines for intermediate output. Precise numbers are available upon publication. "PR" refers to Permanent Residency. "LMO" refers to Labour Market Opinion (see Section 3). SAWP refers to the Seasonal Agricultural Workers Program, and LCP refers to the Live-in Caregiver Program. Event Time is defined as "Year of PR − Year". Information on the date of PR and intended occupation comes from the Longitudinal Immigration Database (IMDB), and earnings variables come from the T4 database. *Source:* Authors' calculations using the CEEDD.

Table A.8: Initial Characteristics of Primary Employers

| | Get PR (Never = 0) | | | Never Get PR = 1 |
|---|---|---|---|---|
| | All | $3 \leq$ T2PR $\leq 5$ | Analysis Sample | All |
| | (1) | (2) | (3) | (4) |
| **Sample Composition** | | | | |
| $3 \leq$Time-to-PR $\leq 5$ | 0.53 | 1.00 | 1.00 | – |
| Analysis sample | 0.22 | 0.42 | 1.00 | 0.00 |
| **Firm Characteristics** | | | | |
| Mean log value added | 15.47 | 15.36 | 15.64 | 15.50 |
| Mean log revenue | 16.36 | 16.25 | 16.64 | 16.48 |
| Mean log firm size (employees) | 4.86 | 4.80 | 4.93 | 4.65 |

*Notes:* This Table presents summary statistics for the sample of TFWs defined in Section 3. The statistics are reported for the primary employer in the first year as a TFW. Column (1) includes TFWs who eventually receive PR. Column (2) restricts to TFWs who take 3–5 years to receive PR. Column (3) further limits to the main sample that is described in Section 3.3. Column (4) represents workers who never obtain PR, defined as those for whom no year of PR is recorded in the IMDB. The classification into low and high skilled workers uses the intended occupation in the IMDB recorded at the time of PR. Value added is calculated as Total Revenue minus Total Expenses plus Total Payroll. All monetary variables are reported in 2012 Canadian dollars. *Source:* Authors' calculations using the CEEDD (Demographic variables are obtained from the IMDB and firm characteristics are obtained from the NALMF).

Table A.9: Summary Statistics by Immigration Status in the 2016 Canadian Census, Full-time Aged 16-64 Workers Only

| | Native-born | Ever PR | TFWs |
|---|---|---|---|
| **Demographics** | | | |
| Female | 0.357 | 0.388 | 0.352 |
| Age 18–24 years | 0.081 | 0.024 | 0.097 |
| Age 25–34 years | 0.241 | 0.196 | 0.560 |
| Age 35–44 years | 0.228 | 0.269 | 0.220 |
| Age 45–54 years | 0.254 | 0.310 | 0.101 |
| Age 55–64 years | 0.196 | 0.201 | 0.022 |
| Bachelor's degree or higher | 0.185 | 0.387 | 0.532 |
| Household size | 2.878 | 3.553 | 2.955 |
| Married/common law | 0.643 | 0.764 | 0.590 |
| **Employment and Income** | | | |
| Log Earnings (2012 dollars) | 10.63 | 10.52 | 10.20 |
| **Industry Breakdown** | | | |
| Professional, scientific & technical services | 0.092 | 0.118 | 0.161 |
| Wholesale trade | 0.063 | 0.057 | 0.039 |
| Manufacturing | 0.151 | 0.181 | 0.103 |
| Accommodation and food services | 0.057 | 0.089 | 0.173 |
| Transportation and warehousing | 0.071 | 0.072 | 0.043 |
| Retail trade | 0.138 | 0.114 | 0.113 |
| Construction | 0.124 | 0.067 | 0.065 |
| Finance, insurance and management | 0.067 | 0.086 | 0.063 |
| Admin, support, waste mgmt services | 0.050 | 0.057 | 0.056 |
| Industry missing | 0.021 | 0.043 | 0.041 |
| Other | 0.166 | 0.117 | 0.142 |
| **N** | 166,704 | 54,758 | 2,599 |

*Notes:* This table presents summary statistics for the working-age population (18-64 years) by immigration status in the 2016 Canadian Census (Public Use Microdata File). The analysis sample excludes those working in agriculture, health, education, and public sectors; we also exclude those categorized as care providers based on NOC 2016 categorization; we also exclude those who were students during the nine-month period between September 2015 and May 10, 2016. "Temporary residents" include temporary foreign workers (TFWs) and refugee claimants. All values except earnings, household size and sample size are proportions. "Earnings" refers to gross wages and salaries before deductions for such items as income taxes, pension plan contributions and employment insurance premiums during the reference period (conditional on positive earnings). Industry breakdown shows the proportion of workers in each sector identified by NAICS codes. "Industry missing" includes individuals with industry coded as 'not available' or 'not applicable'. The "Other" category includes agriculture, forestry, fishing; mining, quarrying; utilities; information and cultural industries; real estate and rental and leasing; arts, entertainment and recreation; and other services except public admin. *Source:* Authors' calculations using the 2016 Canadian Census (Public Use Microdata File).

Table A.10: Estimated Response Type Shares by Initial Firm Type and Event Time

| Event time | $p_{LL}$ | $p_{HL}$ | $p_{LH}$ | $p_{HH}$ |
|---|---|---|---|---|
| **Panel A. Initial employment at type L** | | | | |
| 1 | 0.829 | 0 | 0.121 | 0.050 |
| 2 | 0.775 | 0 | 0.151 | 0.074 |
| **Panel B. Initial employment at type H** | | | | |
| 1 | 0.073 | 0 | -0.030 | 0.957 |
| 2 | 0.093 | 0 | -0.006 | 0.913 |

*Notes:* $p_{d_0 d_1}$ denotes the estimated share of treated workers with response type $(D_t(0), D_t(1)) = (d_0, d_1)$. Here, $D_t(0)$ and $D_t(1)$ represent the primary employer's potential firm types when the worker does not have PR and when they do, respectively (see Appendix D). Firms are classified as below or above the median based on their estimated AKM pay premium; "L" refers to below median and "H" refers to above median. The results are presented separately for workers initially employed at below-median firms (panel A) or above-median firms (panel B). Response type shares are weighted averages across cohort-by-event-time cells, with weights proportional to the number of treated workers per cell. $p_{HL} = 0$ is imposed by the strong monotonicity assumption, which rules out PR causing workers to move from high-paying to low-paying firms. The aggregate point estimate of $p_{LH}$ is slightly negative for the above-median group ($-0.030$ at event time 1, $-0.006$ at event time 2), which is inconsistent with strong monotonicity and likely reflects sampling variability in individual cells. The estimation constrains $\gamma_t^H$ to $[0, 1]$ when computing bounds. *Source:* Authors' calculations using the CEEDD.

Table A.11: Counterfactual Analysis Increasing Expected Cost of TFW Vacancy ($\beta = 0.3$)

| | Decentralized equilibrium (DE) with segmented labor markets | Scenario: Increase expected cost for TFW vacancy | % change relative to DE |
|---|---|---|---|
| **Panel A: Market-level outcomes** | | | |
| *TFW market segment:* | | | |
| Output (market production) | 1.151 | 1.118 | -2.88% |
| Wage bill | 0.667 | 0.627 | -5.95% |
| Firm profits | 0.371 | 0.371 | -0.08% |
| Corr$(x, y)$ | 0.000 | 0.000 | |
| Market tightness ($V^{\text{tfw}}/U^{\text{tfw}}$) | 3.114 | 2.250 | -27.73% |
| *Domestic workers market segment:* | | | |
| Output (market production) | 1.521 | 1.523 | 0.10% |
| Wage bill | 0.976 | 0.978 | 0.21% |
| Firm profits | 0.438 | 0.436 | -0.50% |
| Corr$(x, y)$ | 0.139 | 0.139 | |
| Market tightness ($V/U$) | 3.572 | 3.626 | 1.51% |
| *Combined totals:* | | | |
| Output (market production) | 2.672 | 2.640 | -1.19% |
| Wage bill | 1.643 | 1.605 | -2.29% |
| Firm profits | 0.809 | 0.806 | -0.31% |
| **Panel B: Average wages** | | | |
| Average wages, TFWs | | | |
| TFWs, all | 0.799 | 0.773 | -3.23% |
| TFWs, below-median wages | 0.356 | 0.345 | -3.06% |
| TFWs, above-median wages | 1.242 | 1.201 | -3.28% |
| Average wages, domestic workers | | | |
| Domestic workers, all | 1.179 | 1.180 | 0.14% |
| Domestic workers, below-median wages | 0.559 | 0.561 | 0.27% |
| Domestic workers, above-median wages | 1.798 | 1.800 | 0.12% |
| Average wages, all workers | 0.988 | 0.979 | -0.93% |
| **Panel C: Social welfare** | | | |
| Social welfare in TFW market segment | 1.084 | 1.053 | -2.84% |
| Social welfare in domestic workers market segment | 1.509 | 1.508 | -0.04% |
| Total social welfare | 2.593 | 2.561 | -1.21% |

*Notes:* This table presents results from our counterfactual scenario where we increase the expected cost of a temporary foreign worker (TFW) application by 20%, which reduces the probability of application acceptance in our calibrated model. We set $\beta = 0.3$ and impose free entry. The first column of results presents values from the decentralized equilibrium at baseline; the second column reports the new equilibrium after the counterfactual policy change, and the third column reports the percent change between the two scenarios. The wage bill is the total wages paid to all of the workers in each market segment. The Corr$(x, y)$ is the $h(x, y)$-weighted correlation between worker ability and firm productivity in each market segment. Social welfare is calculated as the sum of the total wages paid (wage bill), firm profits, and the total value of home production.

Table A.12: Counterfactual Analysis Increasing Expected Cost of TFW Vacancy ($\beta = 0.5$)

| | Decentralized equilibrium (DE) with segmented labor markets | Scenario: Increase expected cost for TFW vacancy | % change relative to DE |
|---|---|---|---|
| **Panel A: Market-level outcomes** | | | |
| *TFW market segment:* | | | |
| Output (market production) | 1.066 | 1.024 | -3.94% |
| Wage bill | 0.720 | 0.680 | -5.57% |
| Firm profits | 0.279 | 0.272 | -2.44% |
| Corr$(x, y)$ | 0.000 | 0.000 | |
| Market tightness ($V^{\text{tfw}}/U^{\text{tfw}}$) | 1.198 | 0.876 | -26.91% |
| *Domestic workers market segment:* | | | |
| Output (market production) | 1.460 | 1.462 | 0.14% |
| Wage bill | 1.067 | 1.071 | 0.37% |
| Firm profits | 0.335 | 0.332 | -0.97% |
| Corr$(x, y)$ | 0.131 | 0.131 | |
| Market tightness ($V/U$) | 1.566 | 1.606 | 2.53% |
| *Combined market:* | | | |
| Output (market production) | 2.526 | 2.486 | -1.58% |
| Wage bill | 1.787 | 1.751 | -2.03% |
| Firm profits | 0.614 | 0.604 | -1.64% |
| **Panel B: Average wages** | | | |
| Average wages, TFWs | | | |
| TFWs, all | 0.950 | 0.934 | -1.65% |
| TFWs, below-median wages | 0.424 | 0.419 | -1.29% |
| TFWs, above-median wages | 1.476 | 1.450 | -1.75% |
| Average wages, domestic workers | | | |
| Domestic workers, all | 1.354 | 1.358 | 0.24% |
| Domestic workers, below-median wages | 0.647 | 0.650 | 0.46% |
| Domestic workers, above-median wages | 2.062 | 2.065 | 0.17% |
| Average wages, all workers | 1.156 | 1.154 | -0.14% |
| **Panel C: Social welfare** | | | |
| Social welfare in TFW market segment | 1.058 | 1.020 | -3.54% |
| Social welfare in domestic workers market segment | 1.510 | 1.510 | 0.02% |
| Total social welfare | 2.568 | 2.531 | -1.44% |

*Notes:* This table presents results from our counterfactual scenario where we increase the expected cost of a temporary foreign worker (TFW) application by 20%, which reduces the probability of application acceptance in our calibrated model. We set $\beta = 0.5$ and impose free entry. The first column of results presents values from the decentralized equilibrium at baseline; the second column reports the new equilibrium after the counterfactual policy change, and the third column reports the percent change between the two scenarios. The wage bill is the total wages paid to all of the workers in each market segment. The Corr$(x, y)$ is the $h(x, y)$-weighted correlation between worker ability and firm productivity in each market segment. Social welfare is calculated as the sum of the total wages paid (wage bill), firm profits, and the total value of home production.

Table A.13: Counterfactual Analysis Increasing Expected Cost of TFW Vacancy ($\beta = 0.7$)

| | Decentralized equilibrium (DE) with segmented labor markets | Scenario: Increase expected cost for TFW vacancy | % change relative to DE |
|---|---|---|---|
| **Panel A: Market-level outcomes** | | | |
| *TFW market segment:* | | | |
| Output (market production) | 0.928 | 0.877 | -5.49% |
| Wage bill | 0.733 | 0.687 | -6.23% |
| Firm profits | 0.157 | 0.150 | -4.33% |
| $\text{Corr}(x, y)$ | 0.000 | 0.000 | |
| Market tightness ($V^{\text{tfw}}/U^{\text{tfw}}$) | 0.509 | 0.368 | -27.63% |
| *Domestic workers market segment:* | | | |
| Output (market production) | 1.367 | 1.372 | 0.33% |
| Wage bill | 1.137 | 1.144 | 0.61% |
| Firm profits | 0.198 | 0.196 | -1.31% |
| $\text{Corr}(x, y)$ | 0.099 | 0.099 | |
| Market tightness ($V/U$) | 0.706 | 0.721 | 2.13% |
| *Combined market:* | | | |
| Output (market production) | 2.295 | 2.248 | -2.02% |
| Wage bill | 1.870 | 1.831 | -2.08% |
| Firm profits | 0.355 | 0.346 | -2.64% |
| **Panel B: Average wages** | | | |
| Average wages, TFWs | | | |
| TFWs, all | 1.093 | 1.084 | -0.82% |
| TFWs, below-median wages | 0.489 | 0.486 | -0.62% |
| TFWs, above-median wages | 1.697 | 1.682 | -0.92% |
| Average wages, domestic workers | | | |
| Domestic workers, all | 1.533 | 1.537 | 0.21% |
| Domestic workers, below-median wages | 0.728 | 0.731 | 0.34% |
| Domestic workers, above-median wages | 2.338 | 2.342 | 0.17% |
| Average wages, all workers | 1.324 | 1.328 | 0.32% |
| **Panel C: Social welfare** | | | |
| Social welfare in TFW market segment | 0.963 | 0.920 | -4.51% |
| Social welfare in domestic workers market segment | 1.472 | 1.474 | 0.19% |
| Total social welfare | 2.435 | 2.394 | -1.67% |

*Notes:* This table presents results from our counterfactual scenario where we increase the expected cost of a temporary foreign worker (TFW) application by 20%, which reduces the probability of application acceptance in our calibrated model. We set $\beta = 0.7$ and impose free entry. The first column of results presents values from the decentralized equilibrium at baseline; the second column reports the new equilibrium after the counterfactual policy change, and the third column reports the percent change between the two scenarios. The wage bill is the total wages paid to all of the workers in each market segment. The $\text{Corr}(x, y)$ is the $h(x, y)$-weighted correlation between worker ability and firm productivity in each market segment. Social welfare is calculated as the sum of the total wages paid (wage bill), firm profits, and the total value of home production.

Table A.14: Express Entry Invitation Rounds — 2016 (Rounds 24–57)

| Round | Date | CRS Cutoff |
|---|---|---|
| 24 | Jan. 6, 2016 | 461 |
| 25 | Jan. 13, 2016 | 453 |
| 26 | Jan. 28, 2016 | 457 |
| 27 | Feb. 10, 2016 | 459 |
| 28 | Feb. 24, 2016 | 453 |
| 29 | Mar. 9, 2016 | 473 |
| 30 | Mar. 23, 2016 | 470 |
| 31 | Apr. 6, 2016 | 470 |
| 32 | Apr. 20, 2016 | 468 |
| 33 | May 6, 2016 | 534 |
| 34 | May 18, 2016 | 484 |
| 35 | June 1, 2016 | 483 |
| 36 | June 15, 2016 | 488 |
| 37 | June 29, 2016 | 482 |
| 38 | July 13, 2016 | 482 |
| 39 | July 27, 2016 | 488 |
| 40 | Aug. 10, 2016 | 490 |
| 41 | Aug. 24, 2016 | 538 |
| 42 | Sept. 7, 2016 | 491 |
| 43 | Sept. 21, 2016 | 483 |
| 44 | Oct. 12, 2016 | 484 |
| 45 | Oct. 19, 2016 | 475 |
| 46 | Nov. 2, 2016 | 472 |
| 47 | Nov. 16, 2016 | 470 |
| 48 | Nov. 30, 2016 | 786 |
| 49 | Dec. 16, 2016 | 497 |
| 50 | Dec. 22, 2016 | 475 |

"CRS" refers to the Comprehensive Ranking Score, determined by human capital factors (education, experience, age, language ability) and additional points for arranged employment or a provincial nomination.

Candidates with CRS scores above the cutoff in each round receive an invitation to apply (ITA) for permanent residence.

*Source:* Immigration, Refugees and Citizenship Canada (2017a)

Table A.15: Comprehensive Ranking System (CRS) Components and Maximum Points — 2015 Structure

| Component and Subcategory | Maximum Points |
|---|---|
| **A. Core / Human Capital Factors** | |
| Age (20–29 = maximum) | 110 (single) / 100 (with spouse) |
| Level of education | 150 / 140 |
| First official language proficiency (CLB 9+) | 160 / 150 |
| Canadian work experience | 80 / 70 |
| *Subtotal A: Core human capital factors* | **500 / 460** |
| **B. Spouse or Common-law Partner Factors** | |
| Spouse's level of education | 10 |
| Spouse's first official language proficiency | 20 |
| Spouse's Canadian work experience | 10 |
| *Subtotal B: Spouse factors* | **40** |
| **C. Skill Transferability Factors** | |
| Education + Language Proficiency | 50 |
| Education + Canadian Work Experience | 50 |
| Foreign Work Experience + Language Proficiency | 50 |
| Foreign Work Experience + Canadian Work Experience | 50 |
| Certificate of Qualification (trades) + Language Proficiency | 50 |
| *Subtotal C: Skill transferability (overall cap)* | **100** |
| **D. Additional Points** | |
| Provincial nomination | 600 |
| Valid job offer with a Labour Market Impact Assessment (LMIA) | 600 |
| *Subtotal D: Additional points (overall cap)* | **600** |
| **Total possible CRS score** | **1,200** |

*Notes:* Figures reflect the Comprehensive Ranking System (CRS) structure for Express Entry as introduced in 2015. Applicants are ranked out of 1,200 points, combining human-capital, skill-transferability, and additional factors. Category A is capped at 500 points, Category B is capped at 40 points, Category C is capped at 100 points, and Category D is capped at 600 points. *Source:* Immigration, Refugees and Citizenship Canada (2016c)

# K Sample Labour Market Opinion (LMO)

These appendices include sample PDF forms for the Labour Market Opinion (LMO) and Labour Market Impact Assessment (LMIA). The LMO was reformed and renamed to the LMIA in 2014.

The sample PDFs for the LMO were obtained from a historical archive of hrsdc.gc.ca on June 26, 2012, accessed via the Wayback Machine (https://web.archive.org/).

## K.1 Sample LMO for a low-skilled stream

Low-skilled LMO: https://users.nber.org/~notom/research/low_skilled_LMO.pdf

## K.2 Sample LMO for a high-skilled stream

High-skilled LMO: https://users.nber.org/~notom/research/high_skilled_LMO.pdf

### K.3 Sample LMIA

# LABOUR MARKET IMPACT ASSESSMENT APPLICATION HIGH-WAGE AND LOW-WAGE POSITIONS

**Employers should visit the Temporary Foreign Worker Program TFWP website at www.esdc.gc.ca/eng/jobs/foreign_workers/index.shtml, to verify that the Program is accepting applications for the specific occupation or sector for which they wish to hire the temporary foreign worker (TFW) and to determine if they are eligible to participate in the Program.**

## Personal Information Collection Statement

The information you provide on this form is collected by Employment and Social Development Canada (ESDC) under the authority of the *Immigration and Refugee Protection Act* (IRPA) and *Immigration and Refugee Protection Regulations* (IRPR), for the purpose of providing a Labour Market Impact Assessment (LMIA) in accordance with these statutes. Completion is voluntary; however, failure to complete this form will result in your LMIA application not being processed.

The information you provide may be shared with Citizenship and Immigration Canada (CIC) for the administration and enforcement of the IRPA and IRPR as permitted by the *Department of Employment and Social Development Act* (DESD Act), and may be accessed by the Canada Border Services Agency (CBSA) for the purpose of issuing work permits at Ports of Entry. ESDC may also provide information to CBSA in order for that agency to investigate and enforce the IRPA and IRPR in relation to an LMIA.

The information may also be shared with provincial/territorial governments for the purpose of administration and enforcement of provincial/territorial legislation, including employment standards and occupational health and safety legislation, as permitted by the DESD Act. The information may also be used by ESDC for inspections, policy analysis, research and evaluation in relation to the entry and hiring of TFWs to Canada or the IRPA.

The information you provide is administered under Part 4 of the DESD Act and the *Privacy Act*. You have the right to access and request correction of your personal information, which is described in Personal Information Bank PPU 440 and PPU 171 of Info Source. Instructions for making formal requests are outlined in the Info Source publication available online at infosource.gc.ca.

**A person, who contravenes a provision set out under sections 126 or 127 of the *Immigration and Refugee Protection Act* (misrepresentation), could be liable to a fine or to imprisonment, or to both. Also, providing inaccurate information, in the context of this application, may lead to an administrative penalty such as being ineligible to access the Program for a period of two years.**

## BUSINESS INFORMATION

1. Employer ID Number (if applicable):

2. Canada Revenue Agency Business Number (first 9 digits are mandatory for Canadian businesses):

3. Business Legal Name:

4. Business Operating Name:

5. Business Mailing Address:

6.City:

7. Province/State:

8. Country:

9. Postal Code:

10. Business Telephone Number:

11. Business Address (if different than mailing address):

12. City:

13. Province/State

14. Country::

15. Postal Code:

16. Type of business (select all that apply):

☐ incorporated/limited ☐ partnership ☐ sole proprietor ☐ other, specify ____________

17. Is the business a franchise?

☐ No ☐ Yes

If yes, is the corporate head office aware of this application for temporary foreign workers (TFW)?

☐ Yes ☐ No

Provide the name of the corporation:

18. Website Address:

19. Date Business Started: (YYYY-MM-DD)

20. Describe the principal business activity:

| 21. Primary Contact Name: First / Middle / Last | 22. Job Title: |
|---|---|

| 23. Contact Phone Number: Ext. | 24. Fax Number: | 25. E-mail: |
|---|---|---|

26. Preferred Official Language of Correspondence:

English French

## THIRD-PARTY, RECRUITER OR EMPLOYMENT AGENCY INFORMATION

1. Are you using the services of a third-party, recruiter or employment agency for the purpose of hiring a TFW?

☐ No ☐ Yes If yes, complete the boxes on the right

**Note:**
**In some provinces/territories it is mandatory to be registered in order to recruit TFWs on behalf of an employer. For more information visit:**
http://www.esdc.gc.ca/eng/jobs/foreign_workers/high_low_wage/index.shtml

2. Name of third-party, recruiter or employment agency:

3. Registration, license or certificate number:

4. Are you appointing a third-party to represent you in completing this application form or to provide advice in an immigration process?

☐ No ☐ Yes If yes, complete **Schedule A - Third-party representative**

5. Name of third-party representative:

6. A number of provinces/territories prohibit the charging of recruitment fees to TFWs for the purpose of securing a job offer. Have you the employer or any other third-party in connection to this job offer received payment from the TFWs to secure this offer of employment?

☐ Yes ☐ No

## BUSINESS DETAILS

1. Number of employees currently employed nationally under this Canada Revenue Agency Business number (e.g. 5 franchises are covered by the business number and there are a total of 100 employees):

2. Total number of employees currently employed at the work location specified on this form:

3. Total number of Canadian/permanent resident employees at the work location specified on this form:

4. Total number of employees (including Canadians/permanent residents and TFWs) working in this occupation at this work location.

5. Total number of TFWs (as the result of receiving a positive LMIA) at the work location specified on this form:

6. Did you employ a TFW (as the result of receiving a positive LMIA) in the last two years, prior to December 31, 2013?

☐ Yes ☐ No

If YES – did you provide all TFWs employed by you in the last two years with wages, working conditions and employment in an occupation that were substantially the same as those that were described in the offer(s) of employment (and confirmed in the LMIA letter(s) and annexe(s))?

☐ Yes ☐ No

7. Have you applied for and received a positive LMIA on or after December 31, 2013, and employed a TFW in that position?

☐ Yes ☐ No

If YES – did you provide all TFWs employed by you, on LMIAs received on or after December 31, 2013, with employment in the same occupation as described in the offer(s) of employment (and confirmed in the LMIA letter(s) and annexe(s)) and with substantially the same wages and working conditions - but not less favourable than- those set out in that offer(s) of employment (and confirmed in the LMIA letter(s) and annexe(s))?

☐ Yes ☐ No

**Note:**
Employers should be aware that with recent changes to the Immigration and Refugee Protection Regulations, the look back period has changed from 2 to 6 years. However, this change is not retroactive and, therefore will not be fully implemented until January 2020.

8. Have you had an LMIA revoked within the previous 2 years from the date you submitted this application?

☐ No ☐ Yes

If yes, was the LMIA revoked because you had provided false, misleading or inaccurate information in the context of a request for an opinion.

☐ No ☐ Yes If yes, please provide the following details regarding this revocation:

Date (YYYY-MM-DD): ____________ System File Number: ____________

If the public policy considerations that justified the revocation are no longer relevant, please provide a detailed explanation:

9. Were any employees laid off in the past 12 months?

☐ No

☐ Yes If yes, how many Canadians/permanent residents? ________ How many TFWs? __________

Reason(s) for layoff(s) and occupations affected:

10. Does your business receive support through Employment and Social Development Canada's Work-Sharing program?

☐ No

☐ Yes If yes, provide details:

## JOB OFFER INFORMATION

If you are requesting an LMIA to fill multiple jobs for the identical position/occupation, provide the job offer information only once.
However, if there are multiple jobs for different positions/occupations, use a separate application form for each unique position/occupation.

1. Are you applying for an LMIA to hire a TFW in a Caregiver position? ☐ No ☐ Yes

If yes, employers hiring:

- an In-home Caregiver must complete this form and **Schedule G - In-Home Caregiving Occupations.**
- a Caregiver to work in a Health Institution must complete this form.

2. Job Title:

3. Number of TFWs requested for this job offer (same wage, job description, location, etc.):

4. Expected employment duration:

________ Days ________ weeks ______ months ______ years

Employment duration rational:

5. Expected employment start date (YYYY– MM –DD):

6. Provide exact location where the TFW will be working (number and street address):

7. City:

8. Province:

9. Postal Code:

10. Describe the main duties of the job:

11. Minimum education requirements of the job:

☐ Doctorate/PhD ☐ Doctor of Medicine ☐ Master's degree

☐ Bachelor's degree ☐ College level diploma/certificate ☐ Apprenticeship diploma/certificate

☐ Trade diploma/certificate ☐ Secondary school ☐ Vocational school diploma/certificate

☐ No formal education requirement

Additional Information:

12. Minimum experience/skills requirements of the job: (include years of experience and/or occupational designations such as CA, CMA, CGA, R.N.,P.Eng.)

13. Indicate the language requirement stated in the offer of employment:

☐ The offer of employment does not require the ability to communicate in any specific language.

☐ The offer of employment requires the ability to communicate orally in:

☐ English ☐ French ☐ English <u>or</u> French ☐ English <u>and</u> French

☐ The offer of employment requires the ability to communicate in writing in:

☐ English ☐ French ☐ English <u>or</u> French ☐ English <u>and</u> French

☐ The offer of employment requires the ability to communicate in a language other than English or French.

If this option is selected, identify the specific language needed and clearly describe why this is a bona fide employment requirement for performing the duties associated with the employment. If insufficient space, attach a separate signed and dated sheet.

14. Wage in Canadian dollars and number of work hours. **Note**: Employers must provide the calculation of an hourly rate.

$ per hour ______________ $ per year ______________

Overtime rate of $ __________ starts after __________ hours of work per week.

| Number of hours per day | Total number of hours per week | Total number of hours per month |
|---|---|---|
| ____________ | ____________ | ____________ |

15. What is the wage range for these employees currently working in this occupation at this work location ?

Low-wage: $ ______________ /hour High-wage: $ ______________ /hour **OR** ☐ there are no employees currently working in this occupation at this work location

**Note:**
The wage range should be from the last 2 pay periods that have occurred within the 6 weeks prior to submitting the application.

16. Vacation (if applicable) Days: _______ (# of business days per year) OR Remuneration: _________ (% of gross salary)

17. Is the job offer for full-time employment (at least 30 hours of work per week) throughout the duration of employment covered by the LMIA ?

☐ Yes ☐ No If no, explain.

18. Is this employment seasonal? ☐ Yes ☐ No

19. Benefits:

☐ Disability insurance ☐ Dental insurance ☐ Pension ☐ Extended medical insurance (e.g. prescription drugs, paramedical services, medical services and equipment)

20. Other benefits (specify):

21. Are there any federal/provincial/territorial certification, licensing or registration requirements for this job?

☐ No

☐ Yes If yes, what is the name of the certifying/licensing/registering body?

______________________________________________

Will the TFW have all required certification, licensing, or registration prior to entering and starting work in Canada?

☐ No If no, indicate the anticipated period of time to acquire all of the required qualifications after starting work

_______ Days: _______weeks _________ months

☐ Yes If yes, the TFW must have proof that he/she already has all the required qualifications.

**Note:**
Securing the necessary documents to practice in Canada is the employer's and the worker's responsibility. CIC must be satisfied that the skilled workers are capable of performing the employment being offered to them. CIC will check to ensure the skilled workers hold the required certification, or license to practice in a regulated occupation in Canada. If the applicant is not certified or licensed, CIC will assess whether the applicant is likely to qualify for licensing/certification when in Canada.

22. Is the position part of a union?

☐ No ☐ Yes If yes, what is the name of the union and the local?

Has the union been consulted about the hiring of a TFW?

☐ No If no, explain.

☐ Yes If yes, what is the position of the union? Provide details and attach documentation, if available.

23. Have you attempted to recruit Canadians/permanent residents for this job?

☐ No If no, explain.

☐ Yes If yes, you must provide proof of recruitment (e.g. copy of advertisements and information to support where, when and for how long the position was advertised).

In addition, if you advertised on the Job Bank (or the provincial/territorial equivalent), provide the order number: ____________________

24. What are the potential benefits to the Canadian labour market for offering this job to a TFW(s)?

☐ Filling a labour shortage ☐ Development or transfer of skills and knowledge for the benefit of Canadians/permanent residents

☐ Other ☐ Direct job creation or job retention of Canadians/permanent residents

Provide Details:

25. Provide a rationale for the job offer you are making to the TFW(s) and describe how this will meet your employment needs:

26. Do you plan to hire or train Canadians/permanent residents for the position(s) for which you are requesting an LMIA ?

☐ No If no, explain.

☐ Yes If yes, provide a brief description of the training plan.

27. Will you provide the temporary foreign worker with suitable and affordable accommodation ?

☐ No, but I will assist by doing the following: ____________________

☐ Yes If yes, please indicate the rent : CAD$ ____________ ☐ per week or ☐ per month

and describe the type of accommodation:

☐ Not applicable

## SUMMARY OF RESULTS TO MEET MINIMUM RECRUITMENT AND ADVERTISEMENT REQUIREMENT

You must provide a brief summary of the results of the activities you conducted to meet the minimum recruitment and advertisement requirements to apply for an opinion.

| | |
|---|---|
| 1. Number of applications/resumes received from Canadians/permanent residents: | 2. Number of Canadian/permanent resident applicants interviewed: |
| 3. Number of Canadians/permanent residents offered the position: | 4. Number of Canadians/permanent residents hired: |

| | |
|---|---|
| 5. Number of job offers declined by Canadian/permanent resident applicants: | 6. Number of Canadian/permanent resident applicants who were not qualified for the job: |

7. For each unsuitable Canadian/permanent resident applicant, provide an explanation as to why the candidate did not meet the requirements of the position, if necessary, attach a separate sheet. However, do not provide the names of the candidates (e.g. applicant #1 – has not completed the apprenticeship program and therefore cannot work as a journeyperson, applicant #2 – (unable to communicate in English to the level required for service in a fast paced environment).

## TRANSITION TO A CANADIAN WORKFORCE

**There are 2 possible paths for employers to transition to a Canadian workforce. The path that an employer must follow is determined by the wage being offered to the TFW for the position, in relation to the provincial/territorial median hourly wage, based on Statistics Canada's Labour Force Survey (2014).**

**Exemptions:**

The requirement to transition to a Canadian workforce is not applicable to employers who are hiring TFWs for:

- on-farm primary agricultural positions, specifically
  - farm managers/supervisors and specialized livestock workers (NOC 8251, 8252, 8253, 8254 and 8256); and
  - general farm workers, nursery and greenhouse workers and harvesting labourers (NOC 8431, 8432 and 8611).
- caregiver positions in a:
  - private household (NOC 3152, 3233, 3413, 6471 and 6474); and
  - health care facility (NOC 3152, 3233, 3413 and 6471).
- positions where they are submitting an application to exclusively support a TFW's permanent residence under an Express Entry program (the TFW will not be applying for a work permit).

**Employers hiring TFWs in these positions, go to the IMPACTS ON THE CANADIAN LABOUR MARKET section**

**The provincial/territorial median hourly wages are as follows:**

| | | | |
|---|---|---|---|
| Alberta | $25.00 | Nunavut | $29.00 |
| British Columbia | $22.00 | Ontario | $21.15 |
| Manitoba | $19.50 | Prince Edward Island | $17.49 |
| New Brunswick | $18.00 | Quebec | $20.00 |
| Newfoundland and Labrador | $21.12 | Saskatchewan | $22.00 |
| Northwest Territories | $30.00 | Yukon | $27.50 |
| Nova Scotia | $18.85 | | |

Is the wage you are offering for the position at or above the provincial/territorial median hourly wage in the province/territory where the job is located?

☐ No — If no, complete the following Section A – Cap for Low-wage Positions

☐ Yes — If yes, skip to Section B – Transition Plans for High-wage Positions

## Section A - Cap for the Low-wage Positions

Employers hiring TFWs and offering a wage that is below the provincial/territorial median hourly wage will be subject to a maximum 10% cap on the proportion of these low-wage TFWs. The cap will be phased in over the next 2 years to provide employers who use the program with time to transition to a Canadian workforce.

Employers that have a low-wage TFW workforce will be subject to an established cap, which is the lesser of their current percentage of TFWs in low-wage positions, or

- 30% as of June 20, 2014
- 20% as of July 1, 2015; and
- 10% as of July 1, 2016.

**Exemptions to the Cap Requirement:**

There is one exemption to the low-wage cap requirement. Employers should check the box if the following is applicable to their business:

☐ The business has fewer than 10 employees nationally, including the position to be staffed with TFWs;

☐ Positions are truly temporary where the position:

- is part of a highly mobile workforce that regularly crosses inter-jurisdictional boundaries (e.g. provincial, territorial and/or international) as part of the business' ongoing operations; or
- will not be filled after the worker leaves; or
- is for 120 days or less.

**Note:**
The position should be no more than 120 days in length, however, this could be extended on a case-by-case basis if an employer can demonstrate that their peak season, project or event operates beyond 120 days.

Employers, who are exempt from the Cap requirement, go to the **IMPACTS ON THE CANADIAN LABOUR MARKET section.**

Employers, who are NOT exempt from the Cap requirement must complete **Schedule E - Cap for Low-wage Positions.**

## Section B - Transition Plan for High-wage Positions

The Transition Plan is a mandatory requirement for all employers applying to hire TFWs, and are offering a wage that is at or above the provincial/territorial median hourly wage.

**Rationale For Possible Exemption:**

To be considered for an exemption from having to provide a Transition Plan, the employer must complete this section and provide a justification on how they meet the criteria indicated in the following question. Exemptions will be considered on a case by case basis.

Employers who are NOT exempt from the Transition Plan requirement must complete **Schedule C - Employer Transition Plan**.

1.What are the requirements of the position? Select all of the exemption criteria that apply to the position specified on this LMIA.

☐ The position has a limited duration which means – the job is time-limited and will no longer exist after the TFW leaves.

The employment duration is:

☐ 1 to 120 days;

☐ more than 120 days to a maximum of 2 years (e.g. non-recurring project-based positions)

☐ The position is exempt under the Quebec Facilitated Process
**(Note**: Under the Facilitated Process, a Transition Plan is only required on the second LMIA application for the same occupation.)

2. Provide details:

## IMPACTS ON THE CANADIAN LABOUR MARKET

The questions in this section are to be completed by all employers. The response to these questions will assist the Program to determine the impact the employment of temporary foreign workers will have on the Canadian labour market.

For the purpose of the Program:

**Offshoring** - is the relocation by a company of a business process from Canada to another country. This would include an operational process, such as manufacturing, or supporting processes (e.g. accounting or IT services). More recently, offshoring has been associated with technical and administrative services supporting domestic and global operations from outside Canada.

**Outsourcing** - is the contracting out of a Canadian business process to a foreign or Canadian third party organization resulting in the entry of Temporary Foreign Workers into Canada.

1. Will the entry of these TFWs lead to job losses, now or in the foreseeable future, for Canadians/permanent residents as a result of lay-offs, outsourcing, offshoring or other factors related to utilizing TFWs?

☐ No

☐ Yes If yes, provide a summary of the impact of hiring these TFWs, on your workforce (e.g. lay-offs, relocations) and the Canadian workforce more generally

2. Is this job offer related to an activity, contract or a subcontract that will facilitate outsourcing or offshoring?

☐ No If no, go to the next section

☐ Yes If yes, you must:
- complete the following questions (a to c) and
- have each employer with whom you have a contractual arrangement to provide services, complete a separate **Schedule B – Impacts on the Canadian Labour Market.**

a.) Provide a summary of the contractual arrangement between the employer of record and the company receiving services including (but not limited to) information on: the purpose and scope of the project, the project timelines, the expertise required, and the number of Canadians and permanent residents working on the project.

b.) Provide details on how Canadians/permanent residents with whom you have a contractual arrangement for services will be positively and/or negatively affected by this arrangement? (e.g. lay-offs, relocation, displacement, promotions, restructuring, transfer of skills and/or knowledge).

c.) As part of this contractual arrangement, have you hired any foreign nationals through any work permit-exempt or Labour Market Impact Assessment-exempt processing stream?

☐ No

☐ Yes If yes, complete the following two questions (i) and (ii.)

c-i) Provide details on efforts in the past two years to hire and/or train Canadians/permanent residents for positions where a foreign national has entered under a work permit-exemption or Labour Market Impact Assessment-exemption.

c-ii) Provide a summary of the impact of hiring these foreign nationals on Canadians/permanent resident workers within the company receiving services under this contractual arrangement (e.g. lay-offs, relocation).

## FILM AND ENTERTAINMENT REQUEST ONLY

| 1. Name of the production: | 2. Total number of people involved in the production: |
|---|---|

3. Type of Production:

4. A copy of the contract between the employer and the foreign entertainer must be included with this application form, except for film and TV requests.

Is the contract included with application? Yes No If no, please explain:

## TEMPORARY FOREIGN WORKER INFORMATION

**If you are hiring more than one TFW, use separate sheets to identify each worker coming to work for you in Canada.**
**If the TFW information is not available, leave this section blank.**

**Note:**
After the positive LMIA letter and annexes have been issued, six months will be allocated to the:

- employer to provide ESDC/Service Canada with the names of the TFWs; and
- TFWs to submit an application for a work permit to Citizenship and Immigration Canada.

| | |
|---|---|
| 1. Surname (family name) as shown on the passport: | 2. Given name(s) as shown on the passport: |
| 3. Gender: ☐ Male ☐ Female | 4. Date of Birth (YYYY–MM–DD): |
| 5. Location of residence outside Canada: City: Country: | 6. Citizenship(s): |

7. If the TFW is currently in Canada, please indicate his/her location (city and province) and immigration status:

City: ____________________ Province: ____________________

Status: Temporary Foreign Worker (Foreign Live-in Caregiver) Temporary Foreign Worker Visitor Student Refugee Claimant

## DECLARATION OF EMPLOYER

I am an unincorporated employer, sole proprietor or partnership. ☐ Yes ☐ No

If you answered "YES" to the above:

| | |
|---|---|
| I understand that some provinces and territories operate, pursuant to agreements with the federal Department of Citizenship and Immigration, Provincial Nominee Programs. I hereby consent to ESDC providing the personal information contained in this request for a Labour Market Impact Assessment to the provincial/territorial government(s) of the province(s) or territory(ies) where I carry on business to be used by the province(s) or territory(ies) for the administration of their Provincial Nominee Programs. | ☐ Yes<br>☐ No |

**Employers must check each box to declare that they comply (or will comply) with the statements below :**

☐ I certify that I am an employer who does not, on a regular basis, offer strip tease, erotic dance, escort services or erotic massages. I understand that any LMIA application from an employer, who offers these services on a regular basis, will not be processed.

☐ I certify that I am actively engaged in the business in respect of which the offer of employment is made and understand that I must remain so during the period of employment for which the work permit is issued to the TFW(s).

☐ I certify that the offer is consistent with my reasonable employment needs

☐ I certify that I am reasonably able to fulfill the terms of the employment offer

☐ I certify that I am compliant with, and will comply with the federal/provincial/territorial laws that regulate employment and the recruitment of employees, in the province/territory in which it is intended that the TFWs work and, if applicable, with the terms and conditions of any collective agreement.

☐ I certify that all recruitment done, or that may be done on my behalf, by a third-party was, and will be, in compliance with federal/provincial/territorial laws governing recruitment. I acknowledge and understand that I will be held accountable for the actions of any third-party recruiting TFWs on my behalf.

☐ I certify that I am aware of the published recruitment and advertising requirements of the Temporary Foreign Worker Program. I am, and will continue to be, compliant with these requirements and I can provide proof upon request.

☐ I certify that the employment of a foreign worker will not adversely affect the settlement of any labour dispute in progress or the employment of any person involved in the dispute, should there be an ongoing or pending labour dispute at my business. I will inform Service Canada in the case one should develop.

☐ I will comply with the prevailing wage requirements and I agree to review and adjust, when applicable, the TFWs wages, at least annually, to ensure he/she continues to receive the prevailing wage for the occupation and region where he/she is employed.

☐ I certify that I will make reasonable efforts to provide a workplace that is free of abuse which includes physical, sexual, psychological or financial abuse.

☐ I certify that I will provide theTFWs with employment in the same occupation as that set out in the TFWs offer of employment and with wages and working conditions that are substantially the same as — but not less favourable than — those set out in the LMIA letter and annex A.

☐ I agree that I will not recover any costs, directly or indirectly, associated with seeking an LMIA from any TFW(s).

☐ I acknowledge and understand that for a period of six years from the first day of employment of theTFW(s), I may be subject to an inspection and I will retain any documents that relate to the LMIA application and the terms and conditions of the LMIA letter and annexes.

☐ If required, I will give all reasonable assistance to the officer conducting the inspection. I will attend interviews and on-site inspections, answer questions, provide information and documentation that relate to the conditions I have agreed to, pertaining to the LMIA letter and annexes.

☐ I understand that should an on-site inspection be required for verification of compliance with the conditions stated on the LMIA letter and annexes, the inspections may take place at any premises or location where the TFW(s) perform(s) work and any premises or place that the employer has provided to the TFW(s) as accommodations. In the case of private dwellings, employer consent or a warrant will be required.

☐ I will provide Service Canada with the names of the TFW(s) I intend to employ within six months from the date on the LMIA letter.

☐ I declare that the employment of the TFW(s) is likely to have a positive or neutral effect on the Canadian labour market and will not lead to job loss or reduction in work hours for any Canadian or permanent resident during the period of employment for which the work permit is issued.

☐ I agree to pay the total fee indicated in the Labour Market Impact Assessment Application - Processing Fee Payment section , either by credit card or certified cheque/money order. I also acknowledge that if I do not submit my payment, my LMIA application will not be processed. This attestation and the requirement to pay the processing fee are NOT applicable to employers who meet the definition of on-farm primary agriculture and are hiring TFWs in the following NOC codes 8251, 8252, 8253, 8254, 8256, 8431, 8432 and 8611.

**Employers hiring TFWs in low-wage positions must check the following boxes to declare that they comply (or will comply) with the statements below.**

☐ I have signed and enclosed a copy of the employment contract related to the job offer referred to in this LMIA application. I certify that this offer of employment meets all Program requirements. The terms and conditions in the offer, including the wages, working conditions, job duties and any benefits are (or will be adjusted to be) the same as those that will be described in the LMIA letter and annexes.

☐ I will retain a copy of the contract, related to the offer of employment, signed by all parties. I understand and agree that ESDC may request a copy during an employer compliance review or an inspection.

☐ I will pay all transportation costs for the TFW(s) to travel from their country of residence to the location of work in Canada and for the return transportation to their country of residence. If the TFW is already in Canada, I will pay all transportation costs from their residence in Canada to the location of work in Canada, and for the return transportation to their country of residence. I will not recover, directly or indirectly, any of these costs from any TFW(s).

☐ I will arrange and pay for private health insurance for the TFW(s), which is similar to provincial/territorial health care coverage, until he/she is eligible for provincial/territorial health care insurance coverage (where applicable) and will not recover these costs from the TFW.

☐ I am in good standing with the applicable workers' compensation program and I will register the TFW(s) under the appropriate provincial/territorial workers' compensation/workplace safety insurance plans, where available, or purchase, on-the-job injury or illness insurance that provides the TFW(s) with protection similar to the one offered by the applicable provincial/territorial law. I will not recover these costs from the TFW.

**Important :**

**Employers must immediately inform Service Canada of any changes related to the foreign worker's terms and conditions of employment as described in the positive LMIA letter and annex. If Service Canada accepts the employer's changes to the original LMIA, the employers' file will be updated accordingly.**

**In accordance with the provisions of the Immigration and Refugee Protection Regulations, ESDC may conduct an inspection to verify the employer's compliance with the conditions set out in the positive LMIA letter and annexes. As a result, this inspection could include a review of the employer's file and if Service Canada does not have a copy of the changes, the employer will be held accountable for the information that is on file.**

## SIGNATURE OF EMPLOYER

**The individual signing this form must have authority for either the hiring or financial decisions of the organization (e.g. owner, franchisee, general manager, or senior executive – such as VP Human Resources). For In-home Caregiver positions, employers must be a parent, legal guardian, be the recipient of care or have a valid power of attorney, etc.**

**I have read and I understand the Personal Information Collection Statement found at the beginning of this application. I declare that the information provided in this Labour Market Impact Assessment is true, accurate and complete.**

| | |
|---|---|
| Signature of Employer | Printed Name of Employer |
| Title of Employer | Date (YYYY-MM-DD) |

**A person, who contravenes a provision set out under sections 126 or 127 of the Immigration and Refugee Protection Act (misrepresentation), could be liable to a fine or to imprisonment, or to both. Also, providing inaccurate information, in the context of this application, may lead to an administrative penalty such as being ineligible to access the Program for a period of two years.**

## DOCUMENTATION REQUIRED

New employers hiring a TFW must always submit one document which supports their active engagement in the business. Returning applicants to the Program are not required to re-submit any documentation. However, ESDC/Service Canada may request employers submit additional documents when they are applying for a new LMIA. Employers, who provide documents that are not requested, may find that this slows down the processing of their application.

If a required document is not attached, please explain:

Proof of recruitment (e.g. copy of advertisement and information to support where, when and for how long the position was advertised)

Business registration or legal incorporation documents (if first LMIA application) Does not apply to employers of In-home Caregivers.

Municipal/provincial/territorial business license (where applicable and if first LMIA application) Does not apply to employers of In-home Caregivers.

Canada Revenue Agency:

- T2 Schedule 100 Balance Sheet Information (for corporations only – 2 most recent returns filed)
- T2 Schedule 125 Income Statement Information (for corporations only – 2 most recent returns filed)

Only required if this is the employer's first LMIA application. Does not apply to film and entertainment or employers of In-home caregivers.

Attestation by a lawyer, notary public or chartered accountant confirming that the business exists and the main activity of the business. (for sole proprietorship/ partnership)

Letter from a legal business confirming the existence of a contract for a good and/or service with the employer applying for an LMIA. Does not apply to employers of In-home Caregivers.

Provincial/territorial workplace safety and insurance (e.g. workers compensation board) clearance letter/certificate if applicable. Does not apply to businesses which currently do not have at least one employee.

Commercial lease agreement (where applicable and if first LMIA) Does not apply to employers of In-home Caregivers.

Film and Entertainment – copy of employment contract (except film and TV)

**Provincial documentation requirements (for the provinces noted below):**

**ALBERTA** - Employment Agency Business Licence (*Alberta's Fair Trading Act*) if applicable
**BRITISH COLUMBIA** - Employment Agency License (*British Columbia's Employment Standards Act*) if applicable
**MANITOBA** - Certificate of Registration (*Manitoba's Worker Recruitment and Protection Act*)
**NOVA SCOTIA** - Employer Registration Certificate *(Labour Standards Code)*
**SASKATCHEWAN** – Employer Registration Certificate (The Foreign Worker Recruitment and Immigration Services Act) (no documentation required, however employers must be registered).

**Note:**
In some cases the province may not provide a physical document but rather post the names of registered/certified employers on a website.

**Send Application and all Supporting Documentation:**

Employers must sign, and send the completed application and all required documentation to the Service Canada Centre responsible for processing applications in their area. A list of LMIA Processing centres is available on the ESDC website:
www.esdc.gc.ca/eng/jobs/foreign_workers/scc.shtml

Employers hiring In-home caregivers must send the completed application and all required documentation to the Service Canada Centre, in Ontario, responsible for processing In-home caregiver applications: www.esdc.gc.ca/eng/jobs/foreign_workers/scc.shtml#lcp

All employers requiring assistance can contact:
1-800-367-5693 (toll-free) from within Canada and the United States
506-546-7569 from outside Canada and the United States

**Note:**
A complete application means that employers have:

- filled out all of the fields in all of the necessary forms;
- included all of the required documentation;
- signed the forms where required; and
- submitted the fee payment with the application, if applicable

If an application is submitted and it is not complete, Service Canada staff will inform the employer that the application will not be processed. Incomplete applications and supporting documents submitted with the application will not be retained or returned to the employer. As a result, employers are advised to submit copies, not original documents.

## Appendix References


Abowd, J. M., Kramarz, F., & Margolis, D. N. (1999). High wage workers and high wage firms. *Econometrica*, *67*(2), 251–333.

Balla-Elliott, D., & Norwich, I. (2025). Cohort-chained DiD: Long-run effects with limited pre-treatment data. *Working Paper*. https://pdfs.isaacnorwich.com/CCDID.pdf

BC Chamber of Commerce. (2016). When business needs a champ: 2016-2017 policy and positions manual. https://www.kelownachamber.org/files/2016%20Policy%20Manual%20-%20Final.pdf

Borusyak, K., Jaravel, X., & Spiess, J. (2024). Revisiting Event Study Designs: Robust and Efficient Estimation. *Review of Economic Studies*, *91*, 3253–3285.

Card, D., Cardoso, A. R., Heining, J., & Kline, P. (2018). Firms and labor market inequality: Evidence and some theory. *Journal of Labor Economics*, *36*(S1), S13–S70.

Citizenship and Immigration Canada. (2010). Evaluation of the federal skilled worker program. *Evaluation Report Ci4-54/2010E-PDF*.

Citizenship and Immigration Canada. (2011). Evaluation of the Provincial Nominee Program. *Evaluation Report Ci4-75/2011E-PDF*.

Dostie, B., Li, J., Card, D., & Parent, D. (2023). Employer policies and the immigrant–native earnings gap. *Journal of Econometrics*, *233*(2), 544–567.

Employment and Social Development Canada. (2015). Overhauling the temporary foreign worker program: Putting Canadians first. *Government of Canada Publication Em4-1/2015E-PDF*.

Employment and Social Development Canada. (2021). Evaluation of the temporary foreign worker program. *Evaluation Report Em20-149/2021E-PDF*.

Government of Alberta. (2025a). *Alberta express entry stream* [Part of the Alberta Advantage Immigration Program (AAIP)]. Retrieved November 3, 2025, from https://www.alberta.ca/aaip-alberta-express-entry-stream-eligibility

Government of Alberta. (2025b). *Alberta opportunity stream* [Part of the Alberta Advantage Immigration Program]. Retrieved November 3, 2025, from https://www.alberta.ca/aaip-alberta-opportunity-stream-eligibility

Government of British Columbia. (2025a). *Skills immigration – entry level and semi-skilled* [Part of the WelcomeBC PNP information portal]. Retrieved November 3, 2025, from https://www.welcomebc.ca/immigrate-to-b-c/for-workers

Government of British Columbia. (2025b). *Skills immigration – skilled worker* [Part of the WelcomeBC PNP information portal]. Retrieved November 3, 2025, from https://www.welcomebc.ca/immigrate-to-b-c/for-workers

Government of Canada. (2025a). Hire a skilled worker to support their permanent residency: Overview. https://www.canada.ca/en/employment-social-development/services/foreign-workers/permanent.html

Government of Canada. (2025b). *Program requirements for low-wage positions* (tech. rep.). https://www.canada.ca/en/employment-social-development/services/foreign-workers/median-wage/low/requirements.html

Government of Manitoba. (2025a). *Eligibility - skilled worker overseas* [Part of the Manitoba Provincial Nominee Program (MPNP)]. Retrieved November 3, 2025, from https://immigratemanitoba.com/immigrate/skilled-worker/swo/eligibility/

Government of Manitoba. (2025b). *Skilled worker in manitoba stream* [Part of the Manitoba Provincial Nominee Program (MPNP)]. Retrieved November 3, 2025, from https://immigratemanitoba.com/immigrate/skilled-worker/swm/

Government of New Brunswick. (2025). *New brunswick skilled worker stream* [Part of the New Brunswick Provincial Nominee Program (NBPNP)]. Retrieved November 3, 2025, from https://www.welcomenb.ca/content/wel-bien/en/skilled-workers-with-employer-support.html

Government of Newfoundland and Labrador. (2025). *Skilled worker category* [Part of the Newfoundland and Labrador Provincial Nominee Program (NLPNP)]. Retrieved November 3, 2025, from https://www.gov.nl.ca/immigration/immigrating-to-newfoundland-and-labrador/provincial-nominee-program/skilled-worker-category/

Government of Ontario. (2025a). *Oinp employer job offer: Foreign worker stream*. Retrieved November 3, 2025, from https://www.ontario.ca/page/oinp-employer-job-offer-foreign-worker-stream

Government of Ontario. (2025b). *Ontario's express entry human capital priorities stream* [Part of the Ontario Immigrant Nominee Program (OINP)]. Retrieved November 3, 2025, from https://www.ontario.ca/page/ontarios-express-entry-human-capital-priorities-stream

Government of Prince Edward Island. (2025). *Skilled worker in pei stream* [Part of the PEI Provincial Nominee Program (PEI PNP)]. Retrieved November 3, 2025, from https://www.princeedwardisland.ca/en/information/office-immigration/skilled-worker-pei-stream

Government of Saskatchewan. (2025a). *International skilled worker: Occupations in-demand* [Part of the Saskatchewan Immigrant Nominee Program (SINP)]. Retrieved November 3, 2025, from https://www.saskatchewan.ca/residents/moving-to-saskatchewan/live-in-saskatchewan/by-immigrating/saskatchewan-immigrant-nominee-program/browse-sinp-programs/applicants-international-skilled-workers/international-skilled-worker-occupations-in-demand

Government of Saskatchewan. (2025b). *Saskatchewan experience category* [Part of the Saskatchewan Immigrant Nominee Program (SINP)]. Retrieved November 3, 2025, from https://www.saskatchewan.ca/residents/moving-to-saskatchewan/live-in-saskatchewan/by-immigrating/saskatchewan-immigrant-nominee-program/browse-sinp-programs/applicants-with-saskatchewan-experience/applicants-with-existing-work-permit

Immigration, Refugees and Citizenship Canada. (2015). Evaluation of the Canadian Experience Class. *Evaluation Report Ci4-147/2016E-PDF*.

Immigration, Refugees and Citizenship Canada. (2016a, November). *Express entry improvements: Fall 2016* [Accessed 24 October 2025]. Government of Canada. https://www.canada.ca/en/immigration-refugees-citizenship/news/2016/11/express-entry-improvements-fall-2016.html

Immigration, Refugees and Citizenship Canada. (2016b). *Express entry year-end report 2015* [Accessed 24 October 2025]. Government of Canada. https://www.canada.ca/en/immigration-refugees-citizenship/corporate/publications-manuals/express-entry-year-end-report-2015.html

Immigration, Refugees and Citizenship Canada. (2016c). Express entry: Early observations of year one [Accessed: 2025-10-25]. https://www.smu.ca/webfiles/ExpressentrypresentationIRCC.pdf

Immigration, Refugees and Citizenship Canada. (2017a). *Express entry year-end report 2016* [Accessed: 2025-10-25]. https://www.canada.ca/en/immigration-refugees-citizenship/services/reports-statistics/express-entry-year-end-2016.html

Immigration, Refugees and Citizenship Canada. (2017b). *Specialized research datasets: Temporary resident – ad hoc ircc (specialized datasets) - canada - temporary resident - temporary foreign worker program - intended occupation (noc 2011) - 2000 - 2016*. https://open.canada.ca/data/en/dataset/31ef4cab-d2b3-4dba-8e91-48fe64211ec5/resource/d24a3715-78b7-4a5d-a9f2-b9da0013adda

Immigration, Refugees and Citizenship Canada. (2025). *Federal skilled trades program: Who can apply*. Retrieved November 4, 2025, from https://www.canada.ca/en/immigration-refugees-citizenship/services/immigrate-canada/express-entry/who-can-apply/federal-skilled-trades.html

Kachulis, E., & Pérez-Leclerc, M. (2020). Temporary foreign workers in canada: Background paper [Section 3.2.4 (Global Talent Stream)]. Retrieved October 22, 2025, from https://lop.parl.ca/sites/PublicWebsite/default/en_CA/ResearchPublications/201936E

Kroft, K., Mourifié, I., & Vayalinkal, A. (2025). Horowitz-manski-lee bounds with multilayered sample selection [Working paper].

Kwon, S., & Roth, J. (2026). Testing mechanisms [Working paper].

Lee, D. S. (2009). Training, wages, and sample selection: Estimating sharp bounds on treatment effects. *The Review of Economic Studies*, *76*(3), 1071–1102. https://doi.org/10.1111/j.1467-937X.2009.00536.x

Li, J., Dostie, B., & Simard-Duplain, G. (2023). Firm pay policies and the gender earnings gap: The mediating role of marital and family status. *ILR Review*, *76*(1).

Lise, J., Meghir, C., & Robin, J.-M. (2016). Matching, sorting and wages. *Review of Economic Dynamics*, *19*, 63–87.

Ministère de l'Immigration, de la Diversité et de l'Inclusion (Québec). (2014). Note sur les procédures — modifications au règlement sur la pondération applicable à la sélection des ressortissants étrangers [Accessed October 2025]. https://collections.banq.qc.ca/ark:/52327/bs2429794

Moosapeta, A. (2022). *Why does Quebec have its own immigration policy?* Retrieved November 5, 2025, from https://www.cicnews.com/2022/12/why-does-quebec-have-its-own-immigration-policy-1230732.html

Nova Scotia Office of Immigration. (2025a). *Labour market priorities* [Part of the Nova Scotia Nominee Program (NSNP)]. Retrieved November 3, 2025, from https://novascotiaimmigration.com/move-here/labour-market-priorities/

Nova Scotia Office of Immigration. (2025b). *Occupations in demand* [Part of the Nova Scotia Nominee Program (NSNP)]. Retrieved November 3, 2025, from https://liveinnovascotia.com/nova-scotia-nominee-program#tab-1

Nova Scotia Office of Immigration. (2025c). *Skilled worker stream* [Part of the Nova Scotia Nominee Program (NSNP)]. Retrieved November 3, 2025, from https://novascotiaimmigration.com/move-here/skilled-worker/

O'Donnell, I., & Skuterud, M. (2022). The transformation of Canada's Temporary Foreign Worker Program. *Canadian Public Policy*, *48*(4), 518–532.

Rathnayake, G., Negi, A., Bartalotti, O., & Zhao, X. (2026). Difference-in-differences with sample selection. https://arxiv.org/abs/2411.09221

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, *225*(2), 175–199.

U.S. Citizenship and Immigration Services. (2023). I-140 receipts by class and country, fiscal year 2023 quarter 4 [Data Report]. https://www.uscis.gov/sites/default/files/document/data/i140_rec_by_class_country_fy2023_%20q4.pdf

U.S. Citizenship and Immigration Services. (2025a). E-3 specialty occupation workers from australia. https://www.uscis.gov/working-in-the-united-states/temporary-workers/e-3-specialty-occupation-workers-from-australia

U.S. Citizenship and Immigration Services. (2025b). Eb-5 immigrant investor program. https://www.uscis.gov/working-in-the-united-states/permanent-workers/eb-5-immigrant-investor-program

U.S. Citizenship and Immigration Services. (2025c). Employment-based immigration: First preference eb-1. https://www.uscis.gov/working-in-the-united-states/permanent-workers/employment-based-immigration-first-preference-eb-1

U.S. Citizenship and Immigration Services. (2025d). Employment-based immigration: Fourth preference eb-4. https://www.uscis.gov/working-in-the-united-states/permanent-workers/employment-based-immigration-fourth-preference-eb-4

U.S. Citizenship and Immigration Services. (2025e). Employment-based immigration: Second preference eb-2. https://www.uscis.gov/working-in-the-united-states/permanent-workers/employment-based-immigration-second-preference-eb-2

U.S. Citizenship and Immigration Services. (2025f). Employment-based immigration: Third preference eb-3. https://www.uscis.gov/working-in-the-united-states/permanent-workers/employment-based-immigration-third-preference-eb-3

U.S. Citizenship and Immigration Services. (2025g). Exchange visitors. https://www.uscis.gov/working-in-the-united-states/students-and-exchange-visitors/exchange-visitors

U.S. Citizenship and Immigration Services. (2025h). H-1b cap season. https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-1b-specialty-occupations/h-1b-cap-season

U.S. Citizenship and Immigration Services. (2025i). H-1b specialty occupations. https://www.uscis.gov/working-in-the-united-states/h-1b-specialty-occupations

U.S. Citizenship and Immigration Services. (2025j). H-2a temporary agricultural workers. https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-2a-temporary-agricultural-workers

U.S. Citizenship and Immigration Services. (2025k). H-2b temporary non-agricultural workers. https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-2b-temporary-non-agricultural-workers

U.S. Citizenship and Immigration Services. (2025l). I-140, immigrant petition for alien workers. https://www.uscis.gov/i-140

U.S. Citizenship and Immigration Services. (2025m). L-1a intracompany transferee executive or manager. https://www.uscis.gov/working-in-the-united-states/temporary-workers/l-1a-intracompany-transferee-executive-or-manager

U.S. Citizenship and Immigration Services. (2025n). P-1a athlete. https://www.uscis.gov/working-in-the-united-states/temporary-workers/p-1a-athlete

U.S. Citizenship and Immigration Services. (2025o). P-1b member of an internationally recognized entertainment group. https://www.uscis.gov/working-in-the-united-states/temporary-workers/p-1b-a-member-of-an-internationally-recognized-entertainment-group

U.S. Citizenship and Immigration Services. (2025p). Q cultural exchange. https://www.uscis.gov/working-in-the-united-states/temporary-workers/q-cultural-exchange

U.S. Citizenship and Immigration Services. (2025q). R-1 nonimmigrant religious workers. https://www.uscis.gov/working-in-the-united-states/temporary-workers/r-1-nonimmigrant-religious-workers

U.S. Citizenship and Immigration Services. (2025r). Tn usmca professionals. https://www.uscis.gov/working-in-the-united-states/temporary-workers/tn-usmca-professionals

U.S. Citizenship and Immigration Services. (2025s). Working in the united states: Permanent workers. https://www.uscis.gov/working-in-the-united-states/permanent-workers

U.S. Department of Labor. (2024). Perm selected statistics, fiscal year 2024 quarter 4 [Office of Foreign Labor Certification]. https://www.dol.gov/sites/dolgov/files/ETA/oflc/pdfs/PERM_Selected_Statistics_FY2024_Q4.pdf

U.S. Department of Labor. (2025a). E-3 requirements [Wage and Hour Division]. https://www.dol.gov/agencies/whd/fact-sheets/62y-e3-program-requirements

U.S. Department of Labor. (2025b). Foreign labor certification [Employment and Training Administration]. https://www.dol.gov/agencies/eta/foreign-labor/programs

U.S. Department of Labor. (2025c). Perm detail [Foreign Labor Certification]. https://foreignlaborcert.doleta.gov/perm_detail.cfm

U.S. Department of State. (2024). Table xvb, fy2024 annual report [Visa Statistics]. https://travel.state.gov/content/dam/visas/Statistics/AnnualReports/FY2024AnnualReport/Table%20XVB.pdf