Immigrants and the Dynamics of High-Wage Jobs: Evidence from the Canadian Labour Force Survey*

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Abstract

We exploit recently-introduced immigrant identifiers in the Canadian Labour Force Survey (LFS) and the longitudinal dimension of these data to compare the labor force and job dynamics of Canada's native-born and immigrant populations. We are particularly interested in the role of job, as opposed to worker, heterogeneity in driving immigrant wage disparities and in how the paths into and out of jobs of varying quality compares between immigrants and the native-born. Our main finding is that the disparity in immigrant job quality, which does not appear to diminish with years since arrival, reflects a combination of relatively low transitions into high-wage jobs and high transitions out of these jobs. The former result appears about equally due to difficulties obtaining high-wage jobs directly out of unemployment and in using low-wage jobs as stepping-stones. We find little or no evidence, however, that immigrant jobseekers face barriers to low-wage jobs. We interpret these findings as emphasizing the empirical importance of the quintessential immigrant anecdote of a low-quality "survival job" becoming a "dead-end job."

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1 Introduction

The deteriorating labor market performance of new immigrants to Canada, which occurred between the early 1970s up to at least the mid-1990s, is now well documented in the literature (see Baker and Benjamin 1994 for early evidence and Aydemir and Skuterud 2005 for more recent evidence). Concerns over how best to reverse this trend have over the past decade spawned a substantial literature informing the nature of the obstacles facing Canada's newest immigrants (see Picot and Sweetman 2005 for a review). Overwhelmingly, these studies have sought to identify sources of variation in worker productivity between immigrants and the Canadian-born with similar years of schooling and work experience. Aydemir and Skuterud (2005) and Green and Worswick (2010), for example, identify differential returns to foreign and host-country work experience; Sweetman (2004) examines differences in school quality; Ferrer, Green and Riddell (2006) examine literacy skills; and Ferrer and Riddell (2008) compare returns to education between immigrants and natives.

It is now widely recognized among economists that much of the wage dispersion observed in real-world labor markets exists independently of heterogeneity in worker productivity. Using matched employer-employee data, Abowd, Creecy, and Kramarz (2002) report that variation in how firms pay identical workers amounts to roughly 20% to 30% of overall wage dispersion. An important question is to what extent these types of wage differentials underlie the labor market challenges of Canadian immigrants. One possibility is that employers discriminate against immigrants on the basis of something other than their productivity. The disparity in callback rates for Chinese and South-Asian minorities identified in the recent audit study by Oreopoulos (2009) provides some evidence of this, though it is difficult to know to what extent differences in callback rates translate into wage differentials (Heckman 1998). The possibility that employers systematically undervalue equivalent foreign educational credentials (Bauder 2003) is also consistent with this type of variation, though it is not obvious why such behaviour would persist in competitive labor markets. A third possibility, which has come to dominate the theoretical economics literature seeking to explain wage dispersion across employers, is that immigrant wage disparities reflect heterogeneity in the productivity of firms, combined with frictions in the information workers have about which firms are hiring and the wages they are offering (Mortensen 2005). Suggestive of the role of firm heterogeneity in driving immigrant wage disparities, Aydemir and Skuterud (2008) find that the concentration of recent immigrant men from non-traditional source regions (Asia, Africa, and Eastern Europe) in low-wage firms within Canada's major urban centres can account for roughly three-quarters of the 19% average wage gap facing this group.

The role of the job search process in driving immigrant wage disparities has received remarkably little attention in the Canadian literature. The reason for this gap reflects, at least in part, the scarcity of longitudinal data identifying the transitions of immigrants into and out of jobs of varying quality. A recent exception is Goel and Lang (2009) who use data from the Longitudinal Survey of Immigrants to Canada (LSIC) to study the initial job search durations of a representative sample of the 2002 immigrant arrival cohort.[1] An important shortcoming of these data, however, is that they contain no observations on native-born workers. As a result, it is difficult to know to what extent their findings reflect challenges common to all new labor market entrants. Further, they only tell us about unemployed job search. But evidence suggests that job search while employed produces higher job offer arrival rates (Blau and Robins 1990). This may be particularly true for transitions into high-wage jobs and for immigrants who, in the absence of host-country work experience, may lack the social networks needed to access high-wage jobs. Or alternatively, perhaps low-wage jobs are stepping stones for natives, but for immigrants they are "survival jobs" that become "dead-end jobs" as considerable anecdotal evidence suggests.[2] What is needed is a broader, more complete, picture that not only informs how the paths into high-wage jobs may be very different for immigrants and natives, but also to what extent immigrants may have greater difficulties retaining these jobs.

Beginning in January 2006, the regular monthly Canadian Labour Force Survey (LFS) began, for the first time, to identify the country of birth of all respondents, and for those born abroad, the year in which permanent residency was obtained. Besides its potential to provide more timely information on the labor market conditions of immigrants in Canada – Statistics Canada's stated justification for the data – we believe that the greatest value of immigrant identifiers in the LFS lies in the longitudinal dimension of these data and the possibility of comparing transitions of immigrants and the native-born between labor force states and jobs of varying quality. One can therefore examine whether the under-representation of immigrants in high-wage jobs identified in Aydemir and Skuterud (2008) primarily reflects disparities in access to or retention of high-wage jobs.

[1] Aydemir (2003) and Aydemir (2009) look at relative employment and labor force participation rates using cross-sectional data. But these studies are unable to tell us anything about the process of acquiring high-wage jobs and how that process might be different for immigrants.

[2] Canadian media reports of doctors and engineers being compelled to drive taxis in response to foreign credential issues has become a cliché in popular discussions of Canadian immigration. See for example "The crying shame of the taxi-driving surgeon, *Toronto Star*, March 2, 2009, pg. GT02; and "Credentials and access," *The Globe and Mail*, December 19, 2006, Pg.A22.

Pooling LFS files between January 2006 and December 2008, we identify 375,289 (404,733) and 42,004 (48,924) month-to-month observations on native-born and immigrant men (women) respectively, satisfying our sample restriction criteria. In order to identify heterogeneity in job quality, we begin by running a wage regression, using only the native-born sample, on a rich set of observable worker and job characteristics, including union status; firm and establishment size; and the interaction of a job-skill variable with four-digit industry codes. We then distinguish high- and low-wage jobs in the entire sample by using the estimates from this wage regression to determine whether an individual's job characteristics imply job quality above or below the median value in the native-born population. Predicted high-wage job rates between immigrants and natives are then analysed assuming transitions are determined by a stationary first-order Markov process between five discrete states: (i) high-wage jobs; (ii) low-wage jobs; (iii) self-employment; (iv) unemployment; and (v) nonparticipation. To our knowledge this paper is the first to take an exclusively dynamic approach to examining the well-documented labor market challenges facing Canada's immigrant population.

Our main finding is that the immigrant gap in the incidence of being employed in a high-wage job, when compared to similarly aged and educated native-born workers, is driven by a combination of lower transitions into and higher transitions out of high-wage jobs, with the former difference being relatively more important for immigrant men and the latter for women. With respect to flows out of high-wage jobs, we find the differences are driven by higher immigrant flows into low-wage and self-employment, and not unemployment. The disparity in immigrant flows into high-wage jobs, on the other hand, appears driven by lower transitions from both unemployment and low-wage jobs, with the latter difference, but not the former, tending to grow with an immigrant's years since migration. We find little or no evidence, however, that immigrant jobseekers have any greater difficulties than their native-born counterparts in obtaining low-wage jobs. In fact for recently-arrived immigrant men, transition rates from unemployment to low-wage jobs are if anything slightly higher than for natives. Lastly, our results suggest that the moderate assimilation we see in the wage rates of Canadian immigrants, which we identify and has been documented elsewhere, primarily reflects improvements in the individual productivity of immigrants rather than a process of shopping for better jobs. Overall our results give an impression of immigrant job and labor force dynamics that are remarkably consistent with the popular perception of immigrants getting stuck in low-quality "survival jobs" that were intended to serve only as stepping stones to better jobs.

The remainder of the paper is organized as follows. In the following section we discuss the existing literature on search models of wage dispersion and their application to immigrant wage differentials. In Section 3 we present the data and our empirical strategies for defining high-wage jobs and for relating the relative job transition behavior of immigrants to their under-representation in high-wage jobs. The fourth section discusses the results and Section 5 concludes.

2 Existing Literature

The key mechanism underlying search models of wage dispersion is that job matches do not occur instantaneously or costlessly because job seekers, whether employed or unemployed, do not have full information about the jobs available. Mortensen (2005) argues that the search theoretic approach to wage dispersion is at least as important as the alternatives, including compensating differentials and efficiency wages, in driving wage dispersion across equally productive workers. Although it is theoretically possible to generate an equilibrium with a non-degenerate wage distribution in the absence of any worker or firm heterogeneity, whether on productivity dimensions or otherwise (Burdett and Judd 1983), it is well known that such models do a poor job of replicating real-world wage distributions. More important from our perspective, without any form of worker heterogeneity there is nothing in the model to distinguish immigrants from natives and thereby explain immigrant wage disparities.

To date, the main source of ex-ante worker heterogeneity to have received attention in the immigrant job search literature lies in immigrants' use of job search methods, and in particular in their access to social networks. Goel and Lang (2009) present a theoretical model in which the main effect of search networks is to raise the offer arrival rate, which in turn leads to lower wage outcomes, but shorter unemployment durations, for those who rely on these networks. Using Canadian longitudinal data on a single arrival cohort (described above) combined with Census data, they find network strength is associated with a higher probability of being employed six months after arrival, but also with a lower wage, particularly for recent immigrants, corroborating their theoretical predictions. Using a similar longitudinal data source from Australia, Mahuteau and Junankar (2008) also find that the beneficial effect of networks is in reducing initial unemployment durations of new arrivals, rather than in raising the quality (wages) of jobs obtained. Frijters, Shields and Price (2005) compare the relative search methods of unemployed immigrants and natives, and their relative effectiveness, exploiting the longitudinal dimension of the U.K. Quarterly Labour Force Survey (QLFS). Their results indicate substantially lower job-finding rates among immigrant men than among UK-born men, but find that the difference has virtually nothing to do with immigrants' choices of job search methods. Using an earnings frontier empirical methodology and U.S. Census data, Daneshvary *et al.* (1992) find little gap at entry in male immigrants' utilization of job search information (relative to natives) and complete assimilation within 12 years of arrival.[3]

Unlike these papers, we do not exclusively consider unemployment durations, but rather document relative immigrant transition rates between jobs and labor force states. In this regard, our paper is closest to the recent paper by Hansen and Loftstrom (2009), who analyze the relative transition rates of Swedish immigrants into and out of social assistance, unemployment, and employment, using the same dynamic multinomial logit model that we employ, but are also able to control for endogenous initial conditions and unobserved heterogeneity.[4] Their results indicate a significant amount of state dependence in social assistance use, particularly among refugees, pointing to the existence of a "welfare trap" in Sweden. Given that Canadian policy concerns have been dominated by the relatively poor wage outcomes of recent immigrants, as opposed to their welfare take-up rates, we focus instead on identifying the relative immigrant transitions and paths into and out of high-wage jobs.

Though the existing literature has almost exclusively focused on search methods, another possible search theoretic mechanism for driving wage heterogeneity independently of worker productivity are differences in reservation wages arising from heterogeneity in non-labor income or preferences for leisure time (see Albrecht and Axell (1984) for the baseline model with reservation wage heterogeneity). Immigrants, for example, may face different costs of search due to wealth constraints, which forces them to accept low-wage dead-end survival jobs. Or perhaps due to persistent cultural differences their preferences for leisure are weaker or stronger. Though we do not attempt to identify any of these alternative possibilities directly, the theoretical potential for immigrant wage disparities to be independent of ex-ante worker productivity is an important consideration that we think has not received enough attention in the immigration literature. In this paper we try to shed some light on which mechanisms may be of greatest relevance in understanding the well-documented labor market challenges of Canadian immigrants in the hope of informing more focused future analyses.

[3] We are also aware of three studies using a purely cross-sectional approach to examining the relative unemployment risks of immigrants. Chiswick, Cohen and Zach (1997) use U.S. data; McDonald and Worswick (1997) examine Canadian data; and Arai and Vilhelmsson (2004) examine Swedish data.

[4] Their administrative data tracks individuals over a 6-year period and contains essentially no sample attrition. They are, therefore, better able to separately disentangle the unobserved heterogeneity determining initial conditions and subsequent labor market transitions than we are with at best only 6-month panels.

3 Methodology

3.1 Data

The Canadian Labour Force Survey (LFS) is a monthly nationally-representative survey of 53,500 households, involving nearly 100,000 individuals aged 15 years and over. The LFS data have three distinctive features enabling our analysis. First, though the survey's raison d'être is to provide cross-sectional snapshots in time, in order to save on data collection costs all respondents are (potentially) re-sampled for six consecutive months. By matching individuals across consecutive months, one can obtain large samples of observations tracking respondents as they transition between jobs and labor force states and make statistically meaningful comparisons of these transition between subgroups of the population.[5] Second, beginning in January 2006 the LFS began to identify the country of birth of all respondents, and for those born abroad their year of immigration. This allows us to distinguish between native-born individuals and immigrants, as well as to consider whether immigrants' job and labor force dynamics tend to assimilate to those of natives with time since migration. Lastly, in the first month surveyed an hourly wage rate is identified for all paid employees, as well as a rich set of job characteristic information, enabling us to empirically distinguish jobs of high and low quality.

3.2 Identifying high- and low-wage jobs

We begin by pooling the January 2006 to December 2008 LFS files and extracting the sample of individuals aged 25-54, in order to limit transitions involving school and retirement. Using the provided labor force activity and class of worker codes we can straightforwardly distinguish four discrete states: (i) paid-employment; (ii) self-employment; (iii) unemployment; and non-participation. But as discussed above, our primary objective is in documenting relative immigrant transitions in and out of jobs of varying quality, as well as the origin and destination states of these transitions. Using the wage data we therefore also distinguish individuals in paid-employment by whether or not they are employed in a relatively high- or low-wage job.

To distinguish high- and low-wage jobs we begin by estimating a log wage regression conditioning on individual worker and job characteristics. Since wage rates are only identified

[5]Matching is done using an individual identifier provided in the master files of the LFS. The identifier amounts to a concatenation of dwelling, household and individual-within-household identifiers. Since the LFS samples households, not individuals, false-positive matches are possible. We follow Madrian and Lefgren (1999) in using sex and age characteristics to limit the number of false-positives.

for all paid employees in the first month in which respondents are surveyed, we restrict the estimation to paid employees in the first month of their sample rotation so that there are no repeated observations on individuals. In addition, in order to avoid complications arising from differences in wage returns across immigrants and natives, due to lower lower returns to foreign sources of schooling and work experience for example, we also exclude all immigrants. This leaves us with a sample size of 179,597 employees. The specification we estimate is given by:

$$\log(w_i) = \alpha + x_i\beta + z_i\theta + g_i\lambda + \gamma_1 t_i + \gamma_2 t_i^2 + \varepsilon_i \tag{3.1}$$

where w_i is the real hourly wage rate (adjusted for inflation using a provincial CPI) of worker i; x_i is a vector of individual worker characteristics; z_i is a vector of job characteristics; g_i is a set of geography characteristics; t_i is a time trend taking on 36 (12 months $\times$ 3 years) possible values; and ε_i is an iid error term. Worker characteristics include controls for age (and its square); highest level of educational attainment (8 categories); and married dummy. Job characteristics include controls for union membership; temporary (as opposed to permanent) job contract; whether paid on an hourly basis (as opposed to a salary); part-time (< 30) weekly hours; whether paid tips or commissions; an interaction of firm and establishment size (10 categories); and most significantly the interaction of a job-skill variable (5 categories) with four-digit industry, for which we identify 1,447 non-empty combinations in the sample.[6] Lastly, the geography controls include 10 province dummies (the territories are excluded from the LFS sampling frame) and a series of dummies indicating the degree of urbanization of the area of residence (5 categories). Since age and schooling returns are likely to vary substantially across gender, but the job characteristic effects are intended to capture heterogeneity that is independent of worker heterogeneity, all the variables in (3.1) except the job characteristic effects z_i are interacted with gender dummies. The results from this estimation are presented in Table A1.[7]

Having identified the 1,462-element job characteristic parameter vector θ in equation (3.1), we then predict "job quality" at the individual level for all paid employees in our entire sample using $z_i\hat{\theta}$, that is for both natives and immigrants and the repeated observations on

[6]The skill level of jobs variable is based on a concordance created by Human Resources and Skills Development Canada (HRSDC) using the 4-digit National Occupational Classification (NOCS-2006). The five categories are: (O) management occupations; (A) occupations usually requiring a university education; (B) occupations usually requiring a college education or apprenticeship training; (C) occupations usually requiring secondary school and/or occupation-specific training; and (D) occupation requiring no formal schooling. The concordance table is available here: http://www5.hrsdc.gc.ca/noc/English/NOC/2006/html/Matrix.html.

[7]Rather than estimate the 1,447 skill-industry fixed effects directly, we first partial out these effects identifying the remaining parameters and then use the residual from this partial regression to back them out. In Stata this routine is referred to as an "absorbed" regression.

individuals in which wage rates, but not job characteristics, are known to be measured with error.[8] Throughout the analysis we limit the immigrant sample to the foreign-born whose age at immigration was 15 or higher. Since it is possible that the skill-industry cell of observations not used in the estimation of (3.1) are empty in the estimating sample, the skill-industry fixed effects are not identified for some observations and so we are forced to drop them. Fortunately this affects less than 0.06% of the observations. A potentially more serious limitation of our approach to measuring job quality is that the identified variation across job characteristics is confounded by unobserved worker heterogeneity. Our view is that this would be a more significant problem if we were to estimate (3.1) including immigrants in the sample. This is true because we know that job characteristics z_i are correlated with immigrant status and lower human capital returns β for immigrants imply higher wage residuals ε_i. But when we restrict the estimation to native-born workers we think the interpretation of the identified variation as heterogeneity in jobs, as opposed to workers, is a reasonable approximation. Certainly there is a precedent in the literature for interpreting industry wage differentials as "premiums." (Krueger and Summers 1988, Kugler 2003). There is also good evidence that estimated returns to unionization largely reflect rents (Kuhn 1998).

In Table 1 we compare mean values of wage rates and our measure of job quality $z_i\hat{\theta}$ between immigrants and natives, both unconditionally and conditional on personal characteristics x_i, geography w_i, and the quadratic time trend t_i (the unconditional rates are shown in the bottom row). For both men and women, it appears that somewhere between one-third and one-half of the disparity in immigrant wage rates can be accounted for by their inferior job quality. For example, for immigrant men the conditional job quality gap is about 0.14 log points, compared to an overall gap of 0.29 log points in wage rates. This is consistent with the findings of Aydemir and Skuterud (2008), who find that a significant portion of observed immigrant wage differentials can be attributed to the concentration of immigrants among low-wage workplaces.

In Figure 1 we plot Kernel density estimates of our job quality measure separately for immigrants and natives. Consistent with the larger unconditional disparity in job quality for immigrant women in Table 1, the density function for native-born women, but not native-born men, first-order stochastically dominates the immigrant function. That is $\Pr(z_i\hat{\theta} >$

[8]Interestingly, when we also use the repeated observations on paid employees to estimate (3.1) we find a clear pattern of monotonically increasing residual wages across subsequent sample rotations. That is the coefficients on a set of dummies indicating the month of the respondent's sample rotation are significant and monotonically increasing from the second through the sixth month. This is consistent with within-job wage growth, which the LFS fails to capture by only updating wages in re-interviews when job changes have occurred.

$a|\text{immigrant}) > \Pr(z_i\hat{\theta} > a|\text{native})$ for all a. Consequently, for women, but not men, it does not matter what threshold level of job quality we use to define high-wage jobs – at all values the high-wage job rate of native-born women will exceed that of immigrant women. Moreover, the lower we set the threshold, the larger the gap in rates will be. For men, on the other hand, if the threshold is set sufficiently high, the high-wage job rate of immigrants will exceed that of natives (at least unconditionally).

In choosing a threshold we assume that what matters to immigrants is whether the quality of their job, implied by their job characteristics, is better than the median value in the population of native-born workers of the same gender. We, therefore, define the high-wage job state as $\mathbf{1}(z_i\hat{\theta} \geq \text{median}(z_i\hat{\theta}|\text{gender}_i))$, where $\mathbf{1}$ is an indicator function. Paid employees not in a high-wage job are defined as being in a low-wage job. The median values used are illustrated in Figure 1 by the dashed vertical lines. They reveal disparities in high-wage job rates for both immigrant men and women, though the difference is larger for women, reflecting in particular the over-representation of immigrant men in exceptionally high quality jobs apparent in the upper tail of the male distribution (top panel of Figure 1).

In order to get some sense of what types of jobs may be driving the differences in Figure 1, in Table 2 we identify the skill-industry cells of the five most common high- and low-wage jobs separately for immigrants and natives. We think there are two particularly noteworthy results. First, for immigrant men the five most common high-wage jobs account for 9.3% of all immigrant jobs compared to 8.2% for native-born men. Moreover, the most common immigrant jobs – the top two of which are jobs requiring a university degree in computer systems design (NAICS 5415) and architectural and engineering services (NAICS 5413) – tend to be of higher quality than the most common native-born high-wage jobs – university-educated school teachers and non-university educated building equipment contractors and city workers. This difference becomes even more salient when we consider the 10 most common jobs (for the sake of brevity we only report the top five). The pattern, however, looks quite different for women. Here the most common high-wage jobs, for both natives and immigrants, are more likely to be in the public sector, but the top five account for a much lower proportion of immigrant than native jobs (top five account for 14.8% of all native jobs, but only 7.9% of immigrant jobs). Clearly this concentration of immigrant men, but not women, in high-wage jobs plays an important role in moderating the wage disparities of immigrant men, but not women.

The second striking feature of Table 2 is the relative concentration of immigrant men and women in a small number of low-wage jobs. For immigrant men, the five most common low-wage jobs - restaurant cooks, truckers, unskilled factory workers, and security guards – account for 6.8% of all immigrant jobs, compared to 4.5% for natives. Similarly, for immigrant women, the five most common low-wage jobs – unskilled jobs in nursing homes, daycares, banks, fast-food restaurants, and cleaning staff in building and dwellings – account for 10.1% of all jobs, compared to 7.5% for native women.

3.3 Dynamic model

Our empirical methodology for analysing wage dynamics closely follows the approach of Kuhn and Schuetze (2001) in their analysis of secular trends in Canadian self-employment rates. We begin by assuming that the dynamics of immigrants and natives between five job and labor market states – high-wage jobs (H); low-wage jobs (L); self-employment (S); unemployment (U); and nonparticipation (N) – can be approximated by a first-order Markov process. That is, the probability of being in any particular state in month $t+1$ (the destination state), which we call j, depends only on the state of the individual in month t (the origin state), which we write k. The entire stochastic system can therefore be described in a single 5x5 transition matrix $\mathbf{P}$ with elements p_{jk}. Moreover, the elements can be estimated unconditionally or by five separate multinomial logit (MNL) models, which in each case restrict the sample to individuals who are observed in the origin state j in month t and predict the probabilities of being in each of the five destination states k in period $t+1$, conditional on set of period t observable characteristics.

Since we ultimately want to compare the transitions of natives and immigrants and the difference in rates of being employed in a high-wage job, in all cases we include an immigrate dummy to allow for "unexplained" immigrant deviations in p_{jk} conditional on observables. Moreover, we assume that the stochastic Markov process, given by $\mathbf{P}$, is in a steady-state. That is, the proportion of workers in each state in any given month is time invariant. Since the recent U.S. financial crisis did not begin to spill over to the Canadian labor market in a significant way until 2009, this assumption appears reasonable over the 2006-2008 period our data cover.[9] We therefore assume that the Markov process $\mathbf{P}$ has an ergodic (or stationary) distribution q, which is given by the eigenvector of $\mathbf{P}$ associated with the unit eigenvalue, that is:

$$\mathbf{P}q = q. \tag{3.2}$$

[9] We have tried estimating all of our transition matrices dropping the data before August 2008 and the results are very similar. We would be surprised, however, if this were the case with the 2009, to which we did not have access when writing this paper.

The restriction that the elements q sum to one insures a unique solution. Judd (1998) shows that a direct way to solve for q is obtained by expressing equation (3.2) as the linear system $(\mathbf{P}-1)q = 0$, which after imposing $\sum q_i = 1$ amounts to:

$$q = \begin{pmatrix} p_{11}-1 & \cdots & p_{14} & 1 \\ \vdots & \ddots & \vdots & \vdots \\ p_{41} & \cdots & p_{44}-1 & 1 \\ p_{51} & \cdots & p_{54} & 1 \end{pmatrix}^{-1} \begin{pmatrix} 0 \\ \vdots \\ 0 \\ 1 \end{pmatrix}.$$

Defining the first state as a high-wage job, the first element of the vector q then tells us the proportion of the population in a high-wage job. Since we are primarily interested in relative immigrant access to good jobs, as opposed to differences in labor market attachment, we define the high-wage job rate as the proportion of the labor force $\sum(H + L + S + U)$ in a high-wage job.

In judging their own labor market performance, we believe that what matters to immigrants is how their access to high-wage jobs compares to similarly aged and educated native-born workers in their geographic vicinity. Our starting point is therefore to compare the transition matrices $\mathbf{P}$ of immigrants and natives conditional on the vector of individual characteristics x_i and geography g_i in equation (3.1). In order to gain insight into the nature of the immigrant disparities in access to high-wage jobs, we then produce two types of counterfactual immigrant high-wage job rates. First, to identify the relative importance of the individual elements of the transition matrix $\mathbf{P}$, we compute counterfactual high-wage job rates by replacing particular elements of the immigrant matrices with their corresponding native-born values.[10] The question of interest is to what extent the counterfactual immigrant high-wage rates approach the high-wage rates of natives and in particular, which transitions go the furthest in reducing the immigrant gaps.

Second, we add a set of covariates that, unlike the elements of x_i and g_i, are specific to an origin state. Hence, for individuals in either a high- or low-wage job in period t the MNL model that predicts their destination state includes (in addition to x_i, g_i and an immigrant dummy) the same union, temporary job, hourly-paid, and firm/establishment size variables used in (3.1), as well as controls for industry (21 categories); occupation (25 categories); voluntary/involuntary part-time work; and months of job tenure (quadratic). For individuals who are self-employed in period t, the MNL model adds controls for industry,

[10] Since the columns of $\mathbf{P}$ must sum to one, changing any particular element requires adjusting the remaining four. In doing so we follow Kuhn and Schuetze (2001) and adjust the remaining four transition probabilities so as to maintain their relative proportions. For example, if the elements of a particular column are $[0.2, 0.2, 0.2, 0.2, 0.2]$ and we replace the first element with 0.5, all the remaining elements become 0.125.

occupation, voluntary/involuntary part-time, and job tenure. For the unemployed, the model adds indicators for search methods used (7 possible methods); the number of methods used; indicators of whether the individual has a future job start or is on a temporary layoff; and the duration of unemployment (quadratic). Lastly non-participants, we condition on an indicator of whether the individual has ever worked; whether the individual is a discouraged worker; and the duration of joblessness (quadratic). The question of interest to us is to what extent this richer set of covariates can account for the unexplained gaps we observe in immigrant high-wage job rates when we only condition on age, education and geography. We are particularly interested in the effect of adding tenure, unemployment, and nonparticipation durations since it is likely that hazard rates out of all the states are duration dependent, and in the case of job tenure in particular, we know that immigrants' limited time in Canada necessarily implies lower average job tenure.

3.4 Limitations of the LFS

Two potentially serious limitations of the LFS data in studying labor market or job dynamics are (i) non-random sample attrition; and (ii) reporting error due to high reliance on household proxy responses (on average 55% of all responses). Similar to the Current Population Survey (CPS) monthly sample attrition rates are typically about 3% in our sample and tend to decrease slightly between months two and six. Of greater concern is that the rates tend to be slightly higher for immigrants. So, for example, the attrition rate between the first and the second month of the rotation is 5.5% for immigrant men compared to 3.4% for native-born men. An important part of this difference, perhaps all of it, likely reflects more international migration among immigrants, which any longitudinal data source will fail to capture (and we probably do not want to capture). To gauge the potential effects of attrition, we began by using the approach of Manski (1989) to put nonparametric bounds on the transition rates in $\mathbf{P}$. In most cases, though not all, the attrition rates are high enough that the native and immigrant bounds overlap nullifying unambiguous rankings.

The effect of proxy response on reporting errors in the Canadian LFS data, and similar surveys in many other countries, is known, though arguably not well recognized by analysts using these data (a notable exception is Poterba and Summers 1995). Lemaitre (1988) examines data from a quality assurance program of the Canadian LFS, which reinterviews approximately 2% of the original sample in the week following the survey week. These data offer two key insights. First, inconsistent reporting between the original interview and reinterview is only slightly higher for multicategorical variables than binary variables, but significantly higher for quasicontinuous variables, such as hours of work. This provides further support for our approach of focusing on transitions in job characteristics, as opposed to changes in wage rates. Second, inconsistencies are substantially higher when only one response is nonproxy than when either both responses are nonproxy or both are by the same proxy respondent (typically the spouse). As further evidence of this, we find implausibly large transition rates between high- and low-wage jobs (typically twice as high), when all transitions are used than when we limit the sample to observations in which the respondent in months t and $t+1$ are the same person, whether proxy or nonproxy. To limit this bias, we therefore exclude all observations in which the household respondent in month t and $t+1$ is not the same individual, which also has the effect of removing all attrition in the sample, since in these cases there is no respondent in $t+1$.

The important question is whether this restriction, which excludes 42% (40%) of the original male (female) sample, compromises the external validity of our results. In other words, are job and labor market dynamics substantively different in the attrition sample or where the household survey respondent changes across months. Unfortunately, there is no straightforward way to know this since the destination states of dropped observations are either unobserved or not trusted. Table 2 of the Appendix reports means in observable characteristics (in period t) across three disjoint samples: (i) observations with a common respondent in period t and $t+1$; (ii) observations with a different respondent in period t and $t+1$; and (iii) observations that attrite in period $t+1$. Stars in the "different respondent" and "attrition" samples indicate whether the means are statistically different than in the "same respondent" sample. In almost all cases the attrition sample appears to be the outlier. They are younger, lower paid, less educated, more urban, and more likely to be foreign born. The differences between the two matched samples, however, appear quite modest (though usually statistically significant reflecting the large samples). The most salient difference is that individuals in our "same respondent" sample are less likely to be married, presumably reflecting the fact that the likelihood of a different adult respondent answering the telephone goes up as the number of adults in the household increases. Otherwise, the samples look similar. Though informative, similarity on observables does not, however, rule out important unobservable differences. One could imagine that factors driving attrition, or geographic mobility more specifically, are particularly likely to be latent in nature.

In order to gauge to what extent the high-wage job rates based on the transitions of our preferred "same-respondent" sample may be unrepresentative, we need a benchmark. Taking the pooled sample of all individuals in the first month of their sample rotation, we can estimate a cross-sectional high-wage job rate that is not only nationally-representative and free of any attrition bias, but also, to our knowledge, not biased in any particular direction as a result of systematic proxy reporting error. We can therefore compare our high-wage job rates based exclusively on the transition data (and the ergodic distributional assumption) to the cross-sectional rates to determine whether or not our approach produces reasonably representative estimates of high-wage job rates in the population. Since the cross-sectional estimates are restricted to first interviews, whereas the dynamic estimates are based entirely on transitions, they are based on entirely independent sources of data. Besides sampling error, which should be minimal given our sample sizes, and the validity of the steady-state assumption, any differences in these estimates should reflect the consequences of sample attrition and spurious job transitions arising from reporting errors.

The results from this comparison, reported in Table 3, reveal remarkably similar high-wage job rates, as well as low-wage job, unemployment, self-employment, and nonparticipation rates, using the cross-sectional and longitudinal data. This suggests not only that the stationarity assumption is a reasonable approximation over our sample period, but also that attrition and our "same-respondent" sample restriction do not tend to bias the estimates in any particular direction. Although the differences between the rates are somewhat larger for immigrant men, which we might expect given the higher rates of sample attrition in this group, they are still modest (in all cases less than 3 percentage points). We, therefore, think that our approach of using these ergodic rates, and their underlying job and labor market transitions, to shed some light on the the nature of the challenges Canadian immigrants face in accessing high-wage jobs is worthwhile.

4 Results

As described above, we begin by comparing predicted monthly transition rates between immigrants and natives from five MNL models holding characteristics (age, education, marital status, and geography) constant at the native-born mean values, but setting the immigrant dummy equal to 0 for natives and 1 for immigrants. These rates are presented in Table 4 in 5x5 matrices separately for men and women. The most striking differences are in transitions into high-wage jobs directly from unemployment. For men, the native rate is twice the magnitude of the immigrant rate (5.3% compared to 2.6%), while for women it is four times as large (4.6% compared to only 1.0% for immigrant women). Assuming a first-order Markov process, the hazard rate out of unemployment is necessarily constant and expected unemployment durations are simply $1/(1 - [U_t, U_{t+1}])$, where $[U_t, U_{t+1}]$ is the likelihood of remaining in the unemployed state. Despite difficulties accessing high-wage jobs directly from unemployment, the estimates imply only slightly higher (and statistically insignificant) average unemployment durations for immigrant men – 2.92 months compared to 2.73 for natives – and virtually identical durations for women – 2.54 compared to 2.53 months. The reason is not only that immigrant jobseekers are much more likely to leave the labor force in any given month (this appears particularly true for women where more than one-fifth of jobseekers are expected to be nonparticipants in the following month compared to one-in-seven native-born jobseekers), but also that they appear to have no comparable difficulties accessing low-wage jobs. In fact, among men the immigrant-native difference in transition rates from unemployment to low-wage jobs is statistically insignificant.

Having obtained a low-wage job, is there any evidence that immigrants are better able to use these jobs as stepping stones to high-wage jobs? The estimates in Table 4 suggest not. Among both men and women, the low- to high-wage job transition rate is significantly lower for immigrants than natives. Among men the rate is 1.4% for natives compared to 1.1% for immigrants, while among women it is 1.2% compared to 0.8%. Although the magnitude of these differences appear small (relative to the unemployment transitions), they are based on substantially larger stocks, so that they imply large differences in levels of worker flows. An important question is to what extent the lower immigrant low- to high-wage transition rates reflect a disparity in job search effectiveness, in job offer arrival rates for example, as opposed to lower job search activity. Unfortunately, in the absence of information on the search activities of employed workers in the LFS data, we are unable to provide direct evidence on this. However, given what we know about immigrant job dissatisfaction, in particular about greater skill mismatch in immigrants' jobs (Galarneau and Morissette 2004), it seems more likely to us it reflects search effectiveness. Our finding, therefore, appears to provide some empirical support for the popular perception of immigrants getting stuck in low-quality "survival" jobs.

Differences in the flows out of high-wage jobs between immigrants and natives appear similarly small in magnitude, but again are based on much larger stocks. The higher outflows for immigrants suggest significantly shorter immigrant durations in high-wage jobs. For men, this appears driven by a combination of higher transitions into both low-wage jobs, self-employment and unemployment, whereas for women there is also evidence of greater transitions into nonparticipation. Unfortunately, the LFS data tell us nothings about the nature of the transitions into low-wage jobs and self-employment, since reasons for job separations are only identified in subsequent months when the destination state is unemployment. Regardless, the results in Table 4 suggest that the under-representation of immigrants in high-wage jobs reflects not only difficulties in obtaining these jobs, but also differences in retention.

Below the transition matrices in Table 4 we compute the high-wage job rates implied by these transitions and the ergodic distributional assumption in equation (3.2). In comparison to the unconditional rates in Table 4, the immigrant-native gaps when we condition on age, education, marital status and geography are substantially larger. For men the gap in the incidence of being employed in a high-wage job increases from 4.2 (0.374-0.332) to 16.3 (0.380-0.217) percentage points when we assign immigrants native characteristics. For women the increase is even larger – 22.3 (0.401-0.178) compared to 10.3 (0.380-0.217) percentage points. In what follows we examine which individual transition rates p_{jk} are driving these large gaps and whether a richer set of covariates can explain them away.

In Table 5, we present counterfactual immigrant high-wage job rates obtained by replacing individual elements of the immigrant transition matrices with the corresponding values from the native-born matrices. In parentheses we indicate what percentage of the conditional gap is closed as a result (negative values in parentheses imply that the gap widens). In addition, we report the counterfactual rates when all the entry or exit flow elements are replaced. For example, the high-wage job rates reported in the row "Entry to: high wage job" are obtained by replacing all the off-diagonal elements of the first row of the immigrant transition matrices, whereas the rates labeled "Exit from: high-wage job" are obtained by replacing all the off-diagonal elements in the first column of the immigrant transition matrix.[11]

The main result from Table 5 is that the under-representation of immigrants in high-wage jobs reflects a combination of relatively low flows into high-wage jobs and high flows out of these jobs. For women, the challenge appears to have more to do with accessing high-wage jobs, particularly from low-wage jobs and unemployment. Together these two transitions can account for nearly half of the overall gap in high-wage jobs for immigrant women (23.8%+20.4%). For men transitions out of high-wage jobs, particularly into low-wage jobs and self-employment, play a larger role. In fact, two-thirds (68.5%) of the gap for immigrant men is closed when we assign them the high-wage job exit rates of native-born men. We think that this result probably does more to challenge conventional wisdom than the finding of low flows into high-wage jobs. Unfortunately, as noted above, the data do

[11] As usual we must maintain the condition that the columns sum to one. In the case of exits, this simply means replacing the entire column. In the case of entries, the values of the remaining four elements of each column are changed so as to maintain their relative proportionality.

not allow us to say much about the nature of the transitions out of high-wage jobs. The exceptionally high transitions from high-wage jobs to self-employment for immigrant men are, however, consistent with cross-sectional analyses of Canadian Census data identifying a tendency for immigrant self-employment rates to diverge relative to natives with years since migration (Frenette 2004; Schuetze 2010).

Lastly, in Table 6 we add a richer covariate set to the MNL models predicting transitions and consider to what extent assigning immigrants the mean native values of these covariates can eliminate the high-wage job gaps they face. Since predicting the full 5x5 transition matrix involves five separate MNL models (one for each origin state), we can assign the natives values across all five origin states simultaneously (the results are reported in the column labeled "All") or we can limit it to a single origin state, so that only a single column of the immigrant transition matrix is changed (these results are reported in the remaining five columns). The first row of Table 6 reports immigrant high-wage rates when no native values are assigned and the immigrant dummy is 1, which are essentially predicted unconditional immigrant rates. These rates are 34.9% for men and 25.5% for women. The final row of Table 6 reports the results when all native values are assigned and the immigrant dummy is 0, which are essentially predicted unconditional rates for natives. These rates are 39.1% for men and 39.5% for women.

The immigrant gaps in these unconditional rates in Table 6 are substantially smaller than the conditional rates in Table 4, particularly for men. The results in the second through fifth rows of Table 6 reveal that the age, education, marital status, and geography of immigrants all contribute to moderating the immigrant disparity in high-wage jobs, but their higher education levels are by far the most important. This is particularly true for immigrant men, whose high-wage job rate decreases from 34.9% to 25.9% when they are assigned natives' mean education levels. The MNL estimates (not reported for the sake of brevity) reveal that the reason is that post-secondary schooling, particularly university degrees, substantially reduce transition rates from high- to low-wage jobs. The question is to what extent the job characteristics of immigrants, including industry and occupation, or duration dependence in hazard rates into and out of high-wage jobs can account for the fact that in comparing similarly-educated immigrants and natives, immigrants are so much less likely to be employed in a high-wage job.

The results in Table 6 reveal that we are by and large unable to explain the shortfalls in high-wage job rates of immigrant women. In no case does the counterfactual rate exceed the unconditional rate of 25.5% by more than 1.1 percentage points. Even when we simultaneously assign immigrant women the industry mix, tenure levels, job search methods, and incidence of having a future start or being on layoff, of native-born women – all the covariates that imply greater high-wage job rates for immigrant women in Table 6 – we still predict a high-wage job rate of only 27.9%, far below the native rate of 39.5%. For men, on the other hand, whose unconditional gap is substantially smaller to begin with, assigning native values of covariates does in some cases, especially job tenure and the search methods of the unemployed, bring the immigrant high-wage job rate very close to that of native-born men (in the case of both tenure and search methods, 36.5% for immigrants compared to 39.1% for natives). We think that the search methods result is particularly noteworthy as it reflects relatively high immigrant use of passive search methods, specifically "checked with friends or relatives"; "looked at job ads"; and "answered job ads"; all of which are associated with significantly lower transitions of jobseekers directly into high-wage jobs. If we simultaneously assign immigrant men native values of all the covariates that imply a shortfall in their high-wage job rates – union status; temporary job status; industry mix; tenure; search methods; and duration of unemployment – but allow them to keep their own values for all the remaining covariates, most notably their higher education levels, we predict a high-wage job rate of 40.1%, which is slightly higher than the native-born rate of 39.1%. In some sense then, we are able to account for the complete gap in the high-wage job rate of immigrant men. But, of course, we are still unable to explain why in comparing similarly aged and educated immigrants and natives with common job characteristics and durations in their current jobs and in unemployment and joblessness, immigrant men still face a disadvantage in high-wage jobs, and in particular in transition rates from high- to low-wage jobs.

Arguably, the under-representation of immigrants in high-wage jobs is of less concern if the rates tend to converge to those of natives with an immigrant's years since migration, than if the gaps are persistent over immigrants' careers. We, therefore, complete our analysis by considering how the relative transition matrices of immigrants, and their implied "ergodic" high-wage job rates, vary with age and an immigrant's years since migration. To do this we re-estimate the MNL models that condition on age, education, marital status, and geography (Table 4), but add quadratic "age at migration" and "years since migration" controls. All of the predicted rates shown in the bottom two panels of Figure 2 are obtained at the mean values of the native or immigrant covariates, except the age at migration variable, which is held constant in the immigrant profile at age 24. The results indicate that although job quality does tend to rise for both immigrant and native workers over time, there is little (for men) or no (for women) narrowing of the immigrant gap in the years following migration.

This is perhaps surprising given evidence elsewhere of immigrant assimilation (although modest) in overall wage rates (e.g., Baker and Benjamin 1994). A shortcoming of our data is that we are unable to simultaneously control for cohort (i.e, year of migration) effects, which could contaminate the estimated assimilation effects (Borjas 1985). However, the Canadian evidence suggests deteriorating immigrant "quality" across arrival cohorts, which if anything should produce an upward bias in returns to years since migration. In addition, when we estimate the same assimilation model using the overall wage rate data in the LFS, we do find evidence of assimilation in overall wage rates (we present the results in the top two panels of Figure 2). We are therefore doubtful that unobserved heterogeneity across cohorts is driving our results. Rather we interpret our results as evidence that the limited wage assimilation of Canadian immigrants is primarily driven by improvements in individual productivity, rather than in job quality.

Although there is no evidence of assimilation in the overall high-wage job rates, there may be assimilation in particular transition rates. In Figures 3A (men) and 3B (women) we plot the age profiles for each of the 25 transitions in the usual 5x5 matrices. Perhaps most interesting are the unemployment transitions, which for men show virtually identical immigrant and native transition rates into low-wage jobs at arrival in Canada, but substantially lower transitions into high-wage jobs. However, high-wage transition rates subsequently increase for immigrants while they tend to decline slightly for natives. And low-wage transition rates from unemployment decrease for both immigrants and natives, but considerably more quickly for immigrants. The convergence evident in the decreasing high- to low-wage job transition rates for both immigrant men and women, similarly serves to reduce the immigrant disparity in high-wage jobs. For men, in fact, the higher immigrant high- to low-wage job transition rate upon entry has almost entirely disappeared twenty years after arrival.

More generally, there is much greater evidence of assimilation in transition rates across the 25 possible transitions, than there is of diverging rates. This is particularly evident in the relative flows of immigrant women out of the labor force, which tend to be much higher at entry, but tend to decline to the rates of natives very quickly. Why then do the high-wage job rates of immigrants not converge? The answer lies in both the low- to high-wage transitions (L_tH_{t+1}) and the high-wage to self-employment transitions (H_tS_{t+1}). For both immigrant men and women these rates tend to diverge with years since migration and serve to increase the gaps in immigrant high-wage job rates. The welfare implications of increasing self-employment transitions are, however, unclear. And it is similarly not obvious why the likelihood of making successful transition from low- to high-wage jobs tends to decline more quickly with age for immigrants than natives. The patterns of the low- to high-wage transition profiles for both immigrant men and women – that is, relatively high rates of successful transitions soon after arrival which subsequently fall off very quickly – are, however, entirely consistent with the popular perception of immigrants getting stuck in low-quality jobs.

5 Conclusion

We exploit recently-introduced immigrant identifiers in the Canadian Labour Force Survey (LFS) to examine the relative job and labor force dynamics of Canadian immigrants. We are, in particular, interested in the role of job, as opposed to worker, heterogeneity in driving the well-documented earnings disparities of Canada's foreign-born population.

Our findings suggest that up to one-half of the shortfall in the average wage of immigrants, when compared to similarly aged and educated native-born workers, can be accounted for by the inferior quality of their jobs. Moreover, the data provide no evidence that this gap in job quality closes with time since migration. This suggests to us that the modest assimilation we see in the wage rates of Canadian immigrants, in both our data and elsewhere, primarily reflects individual productivity gains, such as improvements in language skills or accreditation of foreign educational credentials, as opposed to a process of job shopping. It also suggests to us that policy initiatives that influence the quality of immigrant jobs may have the greatest potential to improve the integration of immigrants into Canadian labor markets.

What explains the under-representation of immigrants in low-wage jobs? Our main finding is that the gap appears to reflect, in roughly equal importance, relatively low transitions into high-wage jobs and high transitions out of these jobs. We suspect that the latter finding does more to challenge popular wisdom. Unfortunately, we are unable to say much about the nature or welfare implications of the relative outflows. Certainly the difference in transition rates from high- to low-wage appears to be more significant for immigrant men; primarily reflects transitions into low-wage jobs and self-employment; and is substantially moderated by the higher educational levels of immigrant men. However, in the absence of information on the reasons for job separation, the relative importance of involuntary displacement, as opposed to quits, in these transitions is unclear. Further analysis of immigrant job retention may be a fruitful area of future research.

With regard to the evidence on relative flows into high-wage jobs, we find that the differential rates are about equally due to difficulties obtaining high-wage jobs directly out of unemployment and in being able to successfully use low-wage jobs as stepping stones into high-wage jobs. The disparity in low- to high-wage job transitions appears particularly acute for immigrant women and does not tend to diminish, unlike transitions directly from unemployment, with years since migration. We do not, however, find any evidence of immigrant disparities in unemployment transitions into low-wage jobs. In fact, for recently-arrived immigrant men, unemployment to low-wage job transition rates are if anything slightly higher than those of similarly aged and educated native-born men. Our results are therefore entirely consistent with the notion of immigrants with low reservation wages, perhaps as a result of lower wealth or savings, getting stuck in low-quality "survival jobs." They also suggest to us that immigrant settlement policies directed exclusively at the unemployed (or underemployed) will ultimately fall short in their attempt to further the labor integration of Canada's newest immigrants.[12]

[12]As an example, the main employment service of the Ontario Ministry of Training, Colleges and Universities – Employment Ontario – explicitly limits eligibility (except in special cases) to their "assisted service" components – job search, job matching, placement and incentives – to individuals who are unemployed and not participating in full-time training or education. This program plays a particularly important role in providing employment services to the province's immigrant population through, for example, the Newcomer Employment Centres of the YMCA located in cities throughout the province.

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Table 1: Immigrant differentials in mean log wage and job quality

	Men		Women	
	Log wage	Job quality	Log wage	Job quality
Immigrant	-0.2915***	-0.1410***	-0.3013***	-0.1564***
	(0.0062)	(0.0036)	(0.0056)	(0.0037)
Age	0.0463***	0.0137***	0.0395***	0.0135***
	(0.0021)	(0.0012)	(0.0020)	(0.0013)
Age squared	-0.0460***	-0.0133***	-0.0388***	-0.0127***
	(0.0026)	(0.0016)	(0.0025)	(0.0016)
(Elementary school)				
High school incomplete	0.0337**	0.0295***	0.0364**	0.0161
	(0.0128)	(0.0071)	(0.0140)	(0.0089)
High school graduate	0.1392***	0.0845***	0.2069***	0.1211***
	(0.0124)	(0.0069)	(0.0129)	(0.0084)
Some post-secondary	0.1730***	0.1175***	0.2938***	0.1773***
	(0.0135)	(0.0077)	(0.0141)	(0.0092)
Trade or college credential	0.2718***	0.1793***	0.3832***	0.2426***
	(0.0121)	(0.0067)	(0.0127)	(0.0083)
University below Bachelor's	0.3640***	0.2620***	0.5479***	0.3558***
	(0.0164)	(0.0097)	(0.0155)	(0.0101)
Bachelor's degree	0.4759***	0.3391***	0.6611***	0.4377***
	(0.0129)	(0.0072)	(0.0131)	(0.0085)
Graduate degree	0.5937***	0.4094***	0.8108***	0.5159***
	(0.0145)	(0.0077)	(0.0143)	(0.0090)
Married	0.1197***	0.0670***	0.0423***	0.0194***
	(0.0040)	(0.0024)	(0.0037)	(0.0024)
Time trend	0.0012	0.0001	0.0010	-0.0003
	(0.0007)	(0.0004)	(0.0006)	(0.0004)
Time trend squared	0.0005	0.0002	0.0010	0.0013
	(0.0018)	(0.0010)	(0.0017)	(0.0011)
R-squared	0.2358	0.2299	0.2791	0.2625
Number of observations	97,709	97,709	101,490	101,490
(Unconditional differential)	-0.1351***	-0.0573***	-0.1916***	-0.1045***
	(0.0065)	(0.0038)	(0.0059)	(0.0038)

Note: Regressions also include province and four rural/urban indicators. Samples are restricted to paid employees observed in the first month of their 6-month sample rotation. Standard errors are reported in parentheses. * indicates significance at the 5% level.

Table 2: High- and low-wage jobs with largest native-born and immigrant employment shares

High-wage jobs					
Native-born men	(1)	(2)	Immigrant men	(1)	(2)
(A) Elementary and secondary schools	0.023	0.330	(A) Computer systems design and related	0.033	0.388
(B) Building equipment contractors	0.020	0.212	(A) Architectural and engineering services	0.021	0.346
(B) Local public administration	0.018	0.272	(A) Universities	0.018	0.248
(A) Computer systems design and related	0.012	0.384	(A) Depository credit intermediation	0.012	0.363
(B) Electric power generation and distribution	0.009	0.374	(B) Building equipment contractors	0.009	0.212
Native-born women	(1)	(2)	Immigrant women	(1)	(2)
(A) Elementary and secondary schools	0.065	0.313	(A) Hospitals	0.027	0.404
(A) Hospitals	0.043	0.412	(A) Elementary and secondary schools	0.019	0.288
(B) Hospitals	0.020	0.205	(A) Universities	0.012	0.223
(A) Federal public administration	0.010	0.437	(A) Computer systems design and related	0.011	0.397
(A) Individual family services	0.010	0.266	(A) Depository credit intermediation	0.010	0.355
Low-wage jobs					
Native-born men	(1)	(2)	Immigrant men	(1)	(2)
(C) General freight trucking	0.014	-0.136	(B) Full-service restaurants	0.020	-0.405
(B) Automotive repair and maintenance	0.010	-0.089	(C) General freight trucking	0.015	-0.150
(B) Residential building construction	0.008	-0.0001	(C) Motor vehicle parts manufacturing	0.014	-0.052
(B) Building equipment contractors	0.007	0.052	(C) Plastic product manufacturing	0.010	-0.133
(B) Building finishing contractors	0.006	-0.023	(D) Investigation and security services	0.009	-0.395
Native-born women	(1)	(2)	Immigrant women	(1)	(2)
(C) Nursing and residential care services	0.016	-0.129	(C) Nursing and residential care	0.026	-0.121
(B) Child daycare services	0.016	-0.158	(B) Child daycare services	0.023	-0.176
(C) Elementary and secondary schools	0.015	-0.098	(D) Limited-service eating places	0.018	-0.625
(C) Depository credit intermediation	0.015	-0.125	(C) Depository credit intermediation	0.018	-0.098
(C) Full-service restaurants	0.013	-0.365	(D) Services to buildings and dwellings	0.016	-0.347

Column (1): Share of total employment; Column (2): Mean job quality

Job-skill codes: (A) University educated; (B) College or apprenticeship; (C) Trained on-the-job; (D) Unskilled

Notes: High-wage (low-wage) jobs are defined as job quality greater (less) than gender-specific median job quality in the native-born population.

Table 3: Unconditional high-wage job rates based on longitudinal and cross-sectional data

	Longitudinal	Cross-sectional		Longituidnal	Cross-sectional	
	Ergodic	Full sample	Same respondent	Ergodic	Full sample	Same respondent
	Native-born men			Immigrant men		
High-wage job rate	0.374	0.384	0.387	0.332	0.303	0.306
Low-wage job rate	0.405	0.394	0.391	0.414	0.429	0.420
Self-employment rate	0.173	0.170	0.175	0.194	0.203	0.211
Unemployment rate	0.047	0.051	0.047	0.060	0.065	0.063
Nonparticipation rate	0.080	0.085	0.081	0.085	0.090	0.087
	Native-born women			Immigrant women		
High-wage job rate	0.432	0.422	0.425	0.288	0.280	0.284
Low-wage job rate	0.422	0.425	0.418	0.527	0.529	0.519
Self-employment rate	0.106	0.111	0.114	0.108	0.111	0.116
Unemployment rate	0.040	0.043	0.042	0.078	0.080	0.080
Nonparticipation rate	0.154	0.160	0.161	0.257	0.265	0.266

Note: The ergodic distribution rates are based on the unconditional transition probabilities (not shown). The cross-sectional rates are based on either: (i) the pooled sample of all observations from the January 2006 to December 2008 LFS files; or (ii) the subset of observations with a common survey respondent in periods *t* and *t+1*.

Table 4: Transition probabilities conditional on age, education, marital status and geography and implied high-wage job rate.

	Native-born					Immigrants				
Men										
	H_t	L_t	S_t	U_t	O_t	H_t	L_t	S_t	U_t	O_t
H_{t+1}	0.970	0.014	0.014	0.053	0.010	0.948*	0.011*	0.014	0.026*	0.005*
L_{t+1}	0.013	0.952	0.018	0.181	0.037	0.024*	0.939*	0.026*	0.156	0.051*
S_{t+1}	0.005	0.007	0.959	0.018	0.012	0.012*	0.008	0.947*	0.012*	0.013
U_{t+1}	0.007	0.016	0.003	0.634	0.077	0.010*	0.023*	0.004	0.658	0.107*
O_{t+1}	0.005	0.010	0.006	0.115	0.863	0.006	0.019*	0.008	0.148*	0.823*
High-wage job rate			0.380					0.217		
Women										
	Native-born					Immigrants				
	H_t	L_t	S_t	U_t	O_t	H_t	L_t	S_t	U_t	O_t
H_{t+1}	0.974	0.012	0.012	0.046	0.008	0.954*	0.008*	0.011	0.010*	0.003*
L_{t+1}	0.011	0.953	0.017	0.194	0.032	0.022*	0.945*	0.026*	0.153*	0.032
S_{t+1}	0.002	0.004	0.952	0.014	0.010	0.005*	0.004	0.928*	0.009	0.009
U_{t+1}	0.005	0.014	0.003	0.604	0.042	0.008*	0.017*	0.006*	0.606	0.062*
O_{t+1}	0.008	0.017	0.017	0.143	0.908	0.011*	0.027*	0.028*	0.222*	0.895*
High-wage job rate			0.401					0.178		

Notes: Native-born transition probabilities are predictions from five separate multinomial logit regressions (one for each origin state). All predictions are made at the native mean values of the covariates conditioning the sample on the origin state. The immigrant transition probabilities differ only by the “unexplained” immigrant effect (the coefficient on the immigrant dummy). * indicates if this difference is statistically significant at the 5% level.

Table 5: Counterfactual immigrant high-wage rates using native-born transition probabilities

	Men					Women				
	H_t	L_t	S_t	U_t	O_t	H_t	L_t	S_t	U_t	O_t
H_{t+1}	0.327	0.237	0.215	0.249	0.227	0.276	0.223	0.179	0.231	0.215
	(67.8)	(12.2)	(-0.8)	(19.6)	(6.4)	(44.2)	(20.4)	(0.5)	(23.8)	(16.8)
L_{t+1}	0.262	0.190	0.218	0.214	0.219	0.222	0.161	0.178	0.175	0.178
	(27.8)	(-16.5)	(0.6)	(-1.8)	(1.5)	(20.0)	(-7.6)	(0.5)	(-1.2)	(0.04)
S_{t+1}	0.240	0.217	0.206	0.216	0.217	0.184	0.178	0.169	0.178	0.178
	(14.5)	(-0.02)	(-6.9)	(-0.3)	(0.09)	(2.8)	(0.06)	(-3.9)	(0.01)	(-0.01)
U_{t+1}	0.227	0.214	0.217	0.218	0.217	0.187	0.177	0.178	0.178	0.181
	(6.5)	(-1.6)	(-0.06)	(0.8)	(0.2)	(3.9)	(-0.3)	(0.06)	(0.05)	(1.3)
O_{t+1}	0.219	0.213	0.216	0.217	0.217	0.190	0.174	0.178	0.177	0.178
	(1.4)	(-2.5)	(-0.1)	(0.3)	(0)	(5.5)	(-1.7)	(0.07)	(-0.5)	(0)

	Men		Women	
Entry to:				
High-wage job	0.274	(35.5)	0.302	(55.6)
Low-wage job	0.262	(28.0)	0.220	(19.1)
Self-employment	0.240	(14.3)	0.184	(2.9)
Unemployment	0.225	(5.0)	0.189	(5.0)
Non-participation	0.215	(-0.9)	0.185	(3.4)
Exit from:				
High-wage job	0.328	(68.5)	0.277	(44.4)
Low-wage job	0.230	(8.1)	0.220	(19.1)
Self-employment	0.215	(-0.9)	0.180	(1.1)
Unemployment	0.244	(16.6)	0.224	(20.9)
Non-participation	0.233	(10.2)	0.222	(19.9)

Notes: Numbers in parentheses indicate the percentage of the immigrant-native gap in conditional high-wage job rates (see Table 4) that is closed when immigrants are assigned the corresponding native-born transition probabilities.

Table 6: Counterfactual immigrant high-wage job rates using native-born characteristics.

	Men						Women					
	H_t	L_t	S_t	U_t	O_t	All	H_t	L_t	S_t	U_t	O_t	All
None	0.349	0.349	0.349	0.349	0.349	0.349	0.255	0.255	0.255	0.255	0.255	0.255
Age	0.348	0.349	0.350	0.349	0.349	0.345	0.253	0.257	0.257	0.255	0.256	0.250
Education	0.294	0.350	0.344	0.340	0.344	0.259	0.234	0.242	0.254	0.249	0.249	0.208
Married	0.341	0.331	0.349	0.347	0.348	0.336	0.255	0.257	0.256	0.255	0.255	0.255
Province	0.348	0.346	0.347	0.347	0.348	0.342	0.261	0.251	0.254	0.254	0.254	0.252
Urban/rural	0.351	0.341	0.341	0.349	0.348	0.334	0.247	0.246	0.253	0.255	0.255	0.234
Union	0.350	0.351				0.351	0.254	0.257				0.255
Temporary job	0.353	0.349				0.353	0.256	0.254				0.255
Hourly paid	0.348	0.349				0.348	0.254	0.255				0.254
Firm/establishment size	0.349	0.349				0.349	0.255	0.254				0.253
Industry	0.353	0.352	0.351			0.359	0.264	0.256	0.255			0.265
Occupation	0.335	0.349	0.345			0.332	0.246	0.266	0.258			0.259
Part-time (voluntary/inv.)	0.349	0.347	0.349			0.347	0.254	0.258	0.256			0.258
Tenure	0.368	0.346	0.349			0.365	0.267	0.254	0.255			0.266
Search methods				0.365		0.365				0.256		0.256
Number of methods				0.349		0.349				0.255		0.255
Future start or layoff				0.352		0.352				0.258		0.258
Duration of unemployment				0.350		0.350				0.256		0.256
Ever worked					0.349	0.349					0.259	0.259
Discouraged worker					0.349	0.349					0.255	0.255
Duration of joblessness					0.348	0.348					0.249	0.249
All native characteristics	0.301	0.321	0.336	0.341	0.343	0.248	0.234	0.243	0.254	0.250	0.245	0.205
All and immigrant dummy = 0	0.417	0.333	0.333	0.350	0.352	0.391	0.350	0.271	0.254	0.278	0.267	0.395

Notes: Counterfactual rates are in all cases obtained by predicting immigrant transition matrices using the native mean values of the covariates.

Figure 1: Kernel density estimates of the distribution of job quality

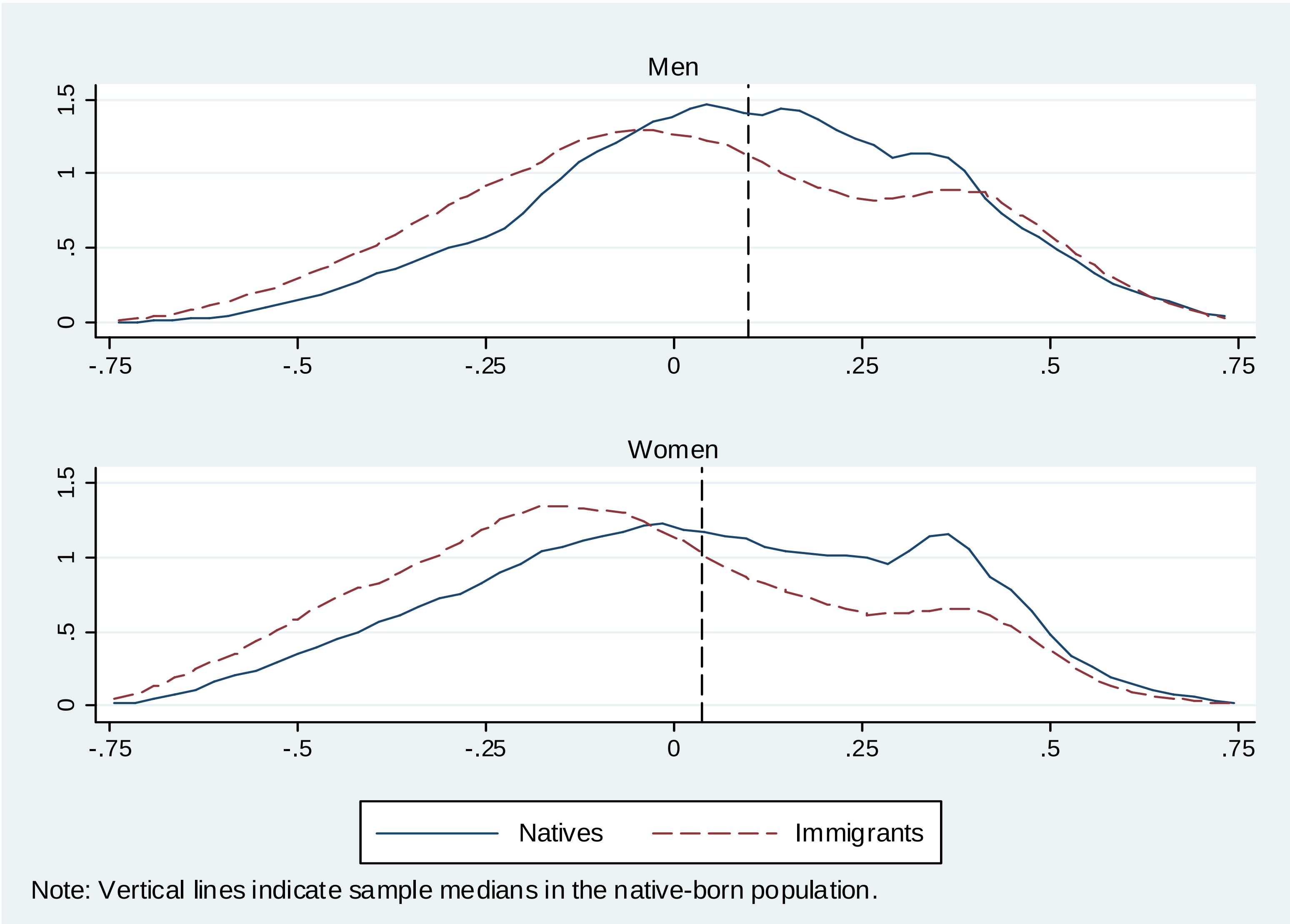
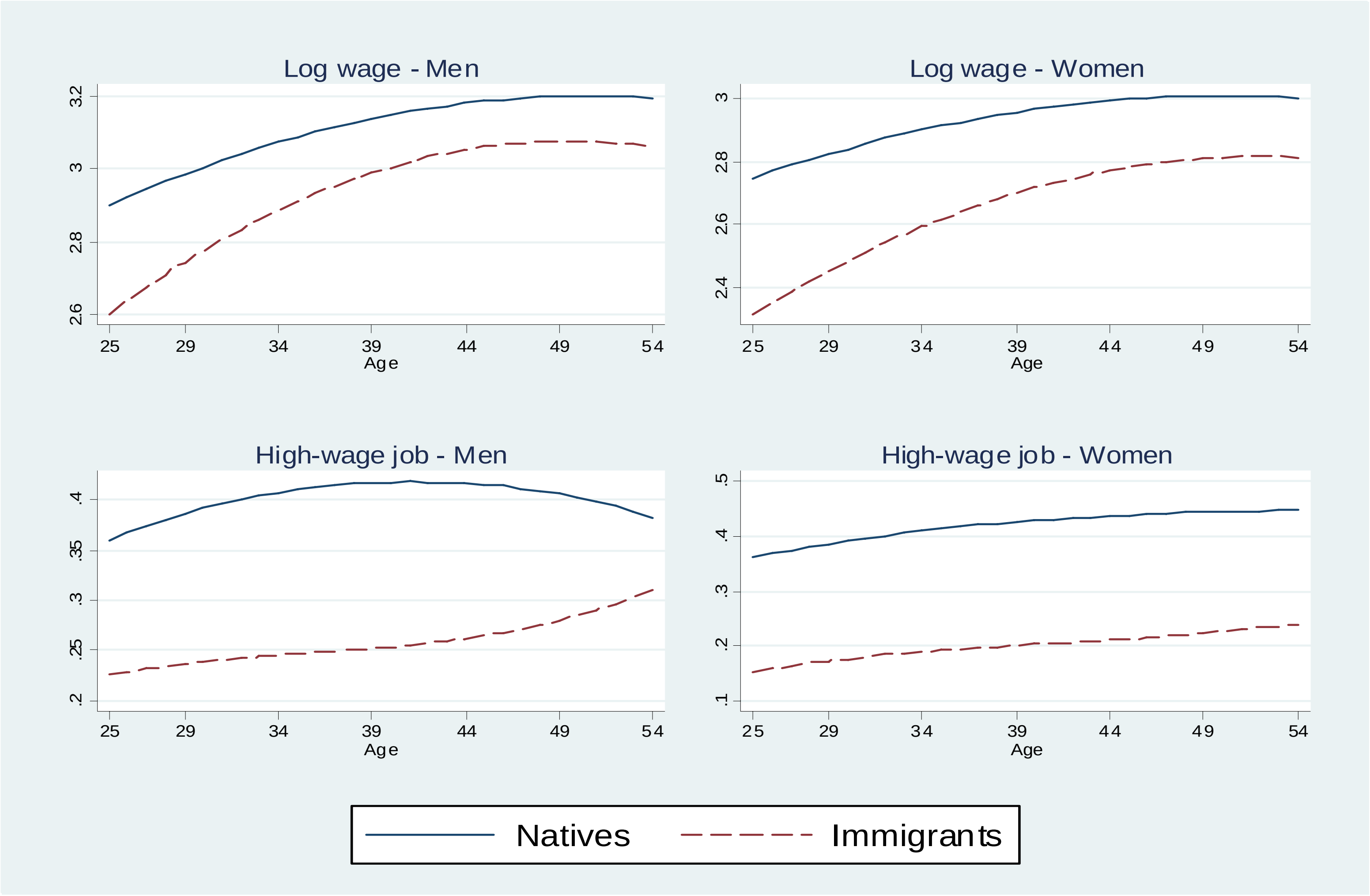


Figure 2: Predicted high-wage rates across age and years since migration.



Note: Predictions are from either an OLS regression (top two panels) or multinomial logit model (bottom two panels) that includes controls for age (quadratic); education; marital status; geography; a time trend (quadratic); an immigrant dummy; age at migration (quadratic); and years since migration (quadratic). The immigrant profiles are for an immigrant who arrived at age 24.

Figure 3A: Predicted transition probabilities across age and years since migration, men.

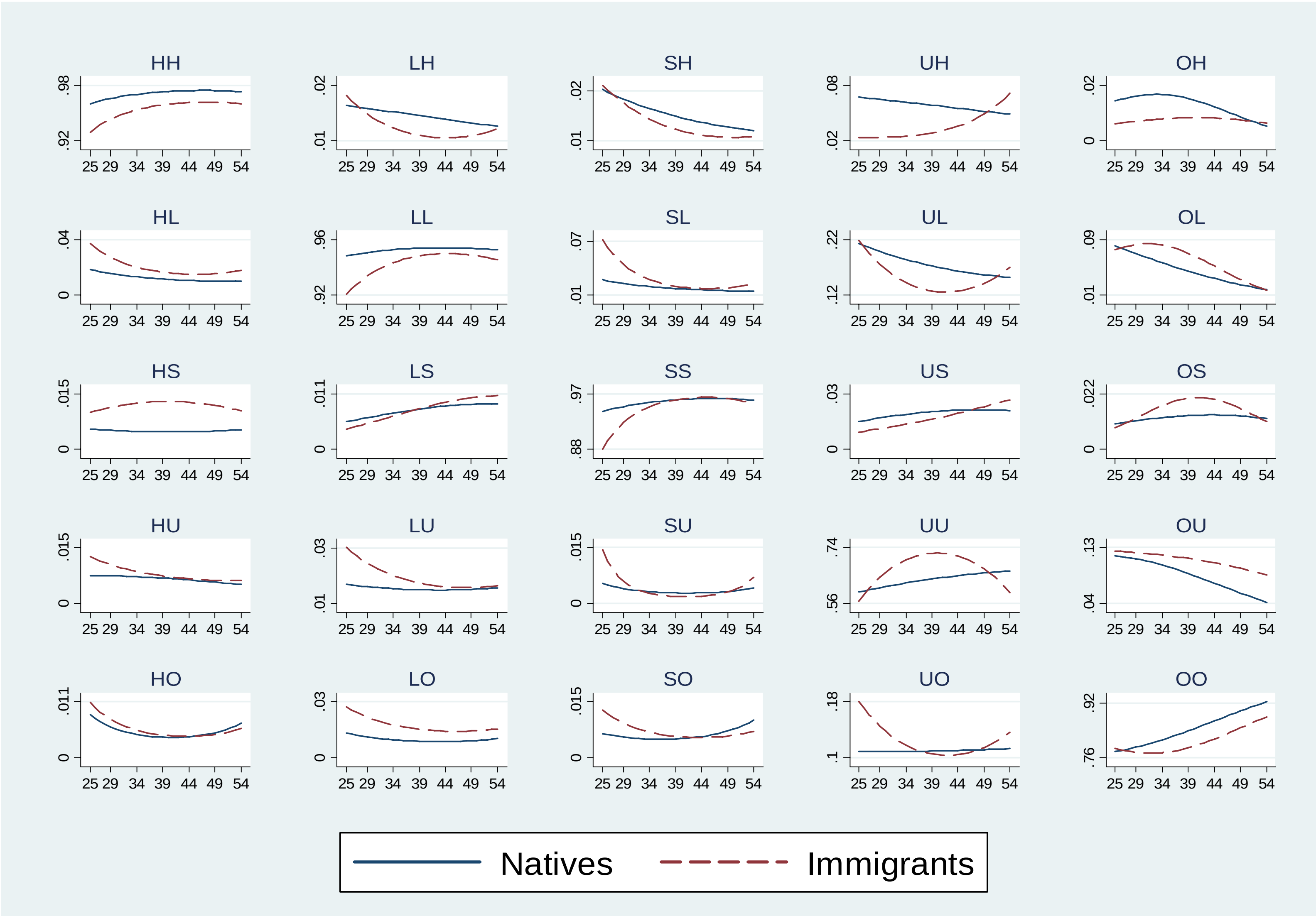


Figure 3B: Predicted transition probabilities across age and years since migration, women.

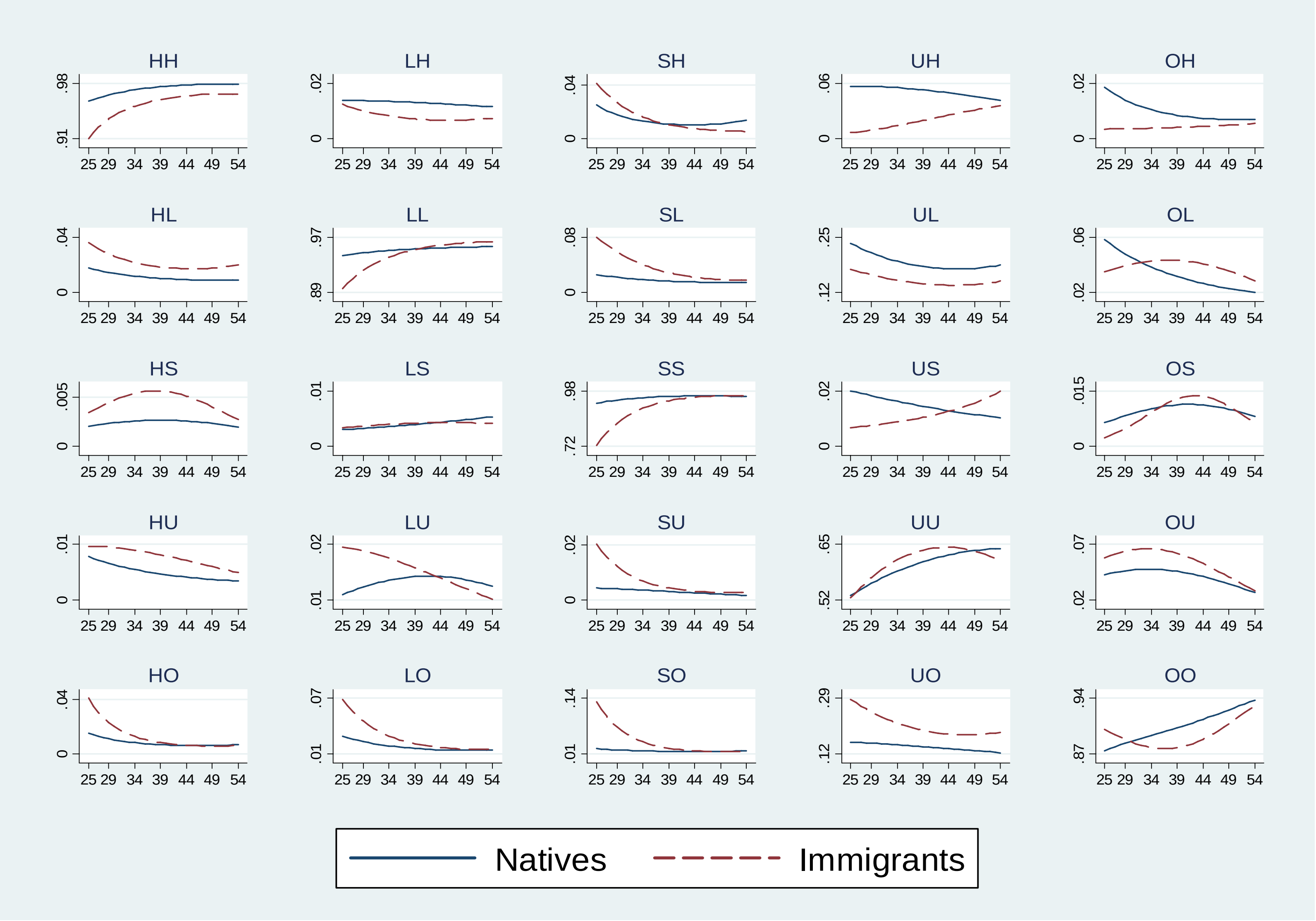


Table A1: Fixed effects log hourly wage regression used to identify job quality heterogeneity.

	Men		Women	
Age	0.0294***	(0.0015)	0.0249***	(0.0014)
Age squared	-0.0277***	(0.0018)	-0.0244***	(0.0017)
Elementary school				
High school incomplete	0.0210	(0.0117)	0.0334*	(0.0160)
High school graduate	0.0706***	(0.0114)	0.0288	(0.0191)
Some post-secondary	0.0656***	(0.0122)	0.1261***	(0.0160)
Trade or college credential	0.1085***	(0.0113)	0.1529***	(0.0154)
University below Bachelor's	0.1313***	(0.0149)	0.2054***	(0.0171)
Bachelor's degree	0.1579***	(0.0122)	0.2470***	(0.0159)
Graduate degree	0.2046***	(0.0140)	0.3231***	(0.0168)
Married	0.0563***	(0.0032)	0.0292***	(0.0030)
Time trend	0.0014**	(0.0005)	0.0014**	(0.0005)
Time trend squared	-0.0006	(0.0013)	-0.0001	(0.0012)
Newfoundland				
Prince Edward Island	-0.0634***	(0.0090)	0.0346***	(0.0075)
Nova Scotia	0.0078	(0.0078)	0.0313***	(0.0065)
New Brunswick	-0.0142	(0.0076)	0.0175**	(0.0066)
Quebec	0.0919***	(0.0069)	0.1180***	(0.0059)
Ontario	0.1834***	(0.0068)	0.1890***	(0.0058)
Saskatchewan	0.0765***	(0.0076)	0.0979***	(0.0065)
Manitoba	0.1137***	(0.0076)	0.1063***	(0.0063)
Alberta	0.2341***	(0.0076)	0.1891***	(0.0065)
British Columbia	0.2142***	(0.0074)	0.2127***	(0.0065)
CMA urban				
CA urban	-0.0170***	(0.0037)	-0.0273***	(0.0034)
Non-CA urban	-0.0254***	(0.0045)	-0.0416***	(0.0042)
Urban fringe	0.0131	(0.0081)	-0.0019	(0.0081)
Rural	-0.0015	(0.0036)	-0.0244***	(0.0033)
Union	0.0923***	(0.0027)		
Part-time	-0.0484***	(0.0037)		
Hourly-paid	-0.1218***	(0.0027)		
Paid commission/tips	0.0791***	(0.0055)		
Temporary contract	-0.0766***	(0.0039)		
Establishment less than 20				
Firm less than 20				
Firm 20 to 99	0.0355***	(0.0069)		
Firm 100 to 500	0.0662***	(0.0065)		
Firm more than 500	0.0743***	(0.0046)		
Establishment 20 to 99				
Firm 20 to 99	0.0803***	(0.0038)		
Firm 100 to 500	0.1093***	(0.0054)		
Firm more than 500	0.1224***	(0.0040)		
Establishment 100 to 500				
Firm 100 to 500	0.1397***	(0.0046)		
Firm more than 500	0.1656***	(0.0041)		
Establishment more than 500				
Firm more than 500	0.1958***	(0.0045)		
Female	-0.0403	(0.0455)		
Constant	1.9758***	(0.0326)		

R-squared	0.5670
Number of observations	179,597

Notes: Sample restricted to native-born workers in the first month of their sample rotation. Regression also includes 1,447 job-skill/industry fixed effects. The R-squared statistic in the equivalent regression with no job characteristics is 0.2937, so the marginal explanatory power of the job characteristics is 0.5670-0.2937=0.2733.

Table A2: Mean values of personal and job characteristics across samples.

	Men			Women		
	Same respondent	Different respondent	Attrition	Same respondent	Different respondent	Attrition
Log hourly wage[a]	3.064	3.051*	2.975*	2.885	2.864*	2.809*
Job quality[a]	0.086	0.080*	0.038*	0.022	0.010*	-0.022*
High-wage rate[a]	0.486	0.479*	0.415*	0.481	0.464*	0.420*
Immigrant	0.163	0.175*	0.249*	0.180	0.200*	0.272*
Age	40.352	39.787*	38.650*	40.296	39.948*	38.797*
Married	0.656	0.728*	0.536*	0.692	0.784*	0.595*
Elementary	0.029	0.032*	0.037*	0.023	0.028*	0.039*
High school incomplete	0.098	0.101*	0.119*	0.072	0.076*	0.095*
High school graduate	0.193	0.204*	0.222*	0.198	0.205*	0.211*
Some post-secondary	0.066	0.068*	0.086*	0.063	0.064	0.077*
Trade or college credential	0.347	0.337*	0.292*	0.347	0.338*	0.297*
University below Bachelor's	0.025	0.025	0.020*	0.030	0.029*	0.025*
Bachelor's degree	0.164	0.157*	0.152*	0.193	0.191	0.190
Graduate degree	0.079	0.075*	0.072*	0.073	0.070*	0.067*
CMA urban	0.601	0.595*	0.668*	0.605	0.599*	0.666*
CA urban	0.116	0.118	0.124*	0.116	0.116	0.117
Non-CA urban	0.064	0.064	0.057*	0.065	0.064	0.060*
Urban fringe	0.024	0.024	0.019*	0.026	0.025*	0.020*
Rural	0.195	0.199*	0.133*	0.188	0.196*	0.137*
Union[a]	0.348	0.341*	0.299*	0.363	0.355*	0.317*
Part-time[b]	0.044	0.049*	0.060*	0.192	0.195*	0.176*
Hourly-paid[a]	0.588	0.593*	0.637*	0.599	0.613*	0.633*
Paid commission/tips[a]	0.067	0.067	0.067	0.061	0.062	0.077*
Temporary contract[a]	0.078	0.084*	0.107*	0.096	0.099*	0.112*
Number of observations	417,142	273,495	22,475	453,486	279,262	20,897

Notes: [a]Conditional on being a paid employee. [b]Conditional on being employed. * indicates that the mean is statistically significantly different than the same-respondent mean at the 5% level.