THE IMMIGRANT WAGE DIFFERENTIAL WITHIN AND ACROSS ESTABLISHMENTS

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[FINAL DRAFT]

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Abstract

We use Canadian matched employer-employee data with rich information on worker and job characteristics to identify the relative importance and sources of immigrant wage differentials within and across establishments. Unlike existing explanations of immigrant wage differentials, in the latter case wage gaps may be entirely independent of the actual or perceived skills or quality of immigrants themselves. Our findings indicate that immigrants are highly non-randomly sorted across establishments within Canada's major cities and geographic regions, and for immigrant men, this sorting is a more important source of immigrant wage differentials than differences in how immigrant men are paid within establishments. For immigrant women, on the other hand, particularly those from less developed regions of the world, within-establishment wage differentials appear more important. Our findings raise numerous important questions for future research, such as whether the highly non-random sorting of immigrants across establishments primarily reflects the relative search behaviour of immigrants or the recruiting methods of employers.

1. Introduction

According to the 2001 Canadian Census, immigrant men in Canada have wages that are on average 13% lower than similarly aged native-born men with equal levels of schooling. Among immigrant women, the comparable wage differential is roughly 8%. Similar immigrant wage differentials are evident in the 2000 U.S. Census. Evidence of initial earnings disparities upon entry in a host country, and of subsequent economic assimilation, is now well established in the literature (Chiswick 1978; Borjas 1985). These studies, however, tell us little about *why*, conditional on observable human capital characteristics, immigrants initially face wage disparities. In developing public policy to help immigrants compete for jobs and wages in host country labour markets, and to insure that a future supply of immigrants can be attracted, understanding the source of these differentials is of critical importance.

More recently, much research has been directed towards obtaining a better understanding of the underlying sources of immigrant wage differentials. Examples include studies focused on immigrant language abilities (e.g. Chiswick 1991; Chiswick and Miller 1995; Carnevale et al. 2001; Dustmann and van Soest 2002); literacy skills (Ferrer, Riddell and Green 2004); schooling quality (Sweetman 2003); job tenure attainment (McDonald and Worswick 1998); occupational attainment and mobility (Green 1999; Weiss et al. 2003); and differential returns to foreign sources of schooling and labour market experience (e.g. Friedberg 2000; Bratsberg and Ragan 2002; Aydemir and Skuterud 2005). A common thread in all this research is the notion that immigrant human capital is, or is at least perceived to be, in some way inferior to that of natives with similar levels of schooling and experience. It is, however, also possible that these differentials reflect employer, as opposed to worker, heterogeneity and immigrants are non-randomly sorted across employers. In this case, the wage disadvantages immigrants experience

may be entirely independent of the actual or perceived skills or quality of immigrants themselves, which points to very different policy prescriptions.

The idea that employer wage effects may be responsible for wage disparities between particular groups in the population has been applied to gender (Groshen 1991a; Bayard et al. 1999a) and race and ethnic wage differentials (Bayard et al. 1999b). These studies offer valuable information on whether affected groups might be better served by policies that seek to address the segregation of particular types of workers across establishments (e.g. affirmative action policies) or differences in how workers are paid within establishments (e.g. comparable worth policies). In the context of immigrants, this line of research appears particularly relevant and fruitful. On the one hand, there is reason to believe that, within workplaces, immigrants may be less productive, or have more difficulty signalling their productivity, than their native-born colleagues with equivalent levels of schooling and experience. On the other hand, immigrants are also more likely to live in ethnic enclaves or urban ghettos where low-wage employers may be concentrated, and have, on average, had less time than their native-born counterparts to build the social networks necessary to obtain jobs with high-wage employers. Yet despite the relevance of these questions for immigration policy, to the best of our knowledge, this paper is the first to examine the immigrant wage differential at the level of the establishment. Given the fact that in both the U.S. and Canada, immigrants account for a large (11% in the U.S. in 2000 and 18% in Canada in 2001) and growing share of the population (since at least 1970 in the U.S. and 1951 in Canada), this analysis seems important and long overdue.

To identify the relative importance of within- and across-establishment wage variation in the relative wage outcomes of immigrants, we exploit establishment identifiers and rich information on worker characteristics (including immigrant status and detailed job

characteristics) available in Statistics Canada's Workplace and Employee Survey (WES). Our findings indicate that immigrants are highly non-randomly sorted across establishments within Canada's major cities and geographic regions, and for immigrant men this sorting is a more important source of immigrant wage differentials than differences in how immigrant men are paid within establishments. For immigrant women, on the other hand, particularly those from less developed regions of the world, within-establishment wage differentials appear more important. Interestingly, a substantial portion of the within-establishment wage disadvantage immigrant women experience, is not explained by either lower returns to foreign sources of human capital or by their job characteristics, including the occupation and educational requirements of their jobs.

The remainder of the paper is organized as follows. In the following section we describe the WES data. In the third section we examine if and to what extent immigrants are non-randomly sorted across establishments. In the fourth section we describe our approach to decomposing the immigrant wage differential into its within and across-establishment components and then examine the relative contribution of worker, job and establishment characteristics to the observed differentials. In the final section we summarize our main findings.

2. Data

The Workplace and Employee Survey (WES) is a nationally representative annual survey of Canadian business establishments.[1] What distinguishes the WES from usual establishment level data is that in addition to surveying the workplace, the WES randomly samples a small number of employees within each establishment and asks them to complete a separate employee

[1] In addition to all levels of public administration, the sample excludes primary industries (agriculture, fishing, hunting and trapping), religious organizations, and private households.

survey. The data are also longitudinal providing information on establishments for 6 consecutive years and on employees for 2. The major limitation of the WES is that employees are lost when there is an establishment separation (except in the rare case that the transition is to another establishment in the sample). This feature of the data has two consequences for our analysis. First, since the attrition in the employee data is likely highly non-random and potentially correlated with immigrant status (see for example the evidence of substantial onward migration rates among Canadian immigrants in Aydemir and Robinson 2006), including the second waves of the employee data potentially introduces sample selection biases. To avoid this we restrict our analysis to the first wave of 2 panels of employee data (1999 and 2001). The second consequence of the WES sample design is that estimating "pure" employer wage effects that are unconfounded by unobserved worker heterogeneity is impossible. Unfortunately, we are aware of no solution to this problem (see Section 4 for more on this issue).

The WES data does, however, have two important advantages over the matched employer-employee data found elsewhere in the literature. First, in contrast to the data examined in Groshen (1991a), Bronars and Famulari (1997), and Bayard et al. (1999a, 1999b), the WES data are nationally representative, which serves to raise the policy relevance of our findings. Second, unlike the administrative data used by Abowd, Kramarz and Margolis (1999) and Abowd, Kramarz and Finer (1999), the WES data offers a rich source of information on workers' human capital and job characteristics, including country of birth. This allows us to not only evaluate the role of sorting and employer heterogeneity in immigrant wage outcomes, but also go further than is possible with administrative data in identifying underlying sources of immigrant wage differentials within establishments.

When we pool the 1999 and 2001 employee data, we obtain samples of 36,473 native-born workers and 6,918 immigrants employed in 6,760 establishments (on average 6.4 workers per establishment). To separately identify immigrant and establishment wage effects, we need some establishments with a mixture of immigrants and native-born workers. Of the 6,760 establishments in our sample, 2,722 (40%) contain at least one immigrant and native-born employee. Using the sampling weights in the WES, immigrant shares are 19.3% (men) and 18.1% (women) in the full sample. In comparison, the percentage of workers who are foreign born in a comparable sample taken from the complete 20% master file of the 2001 Canadian Census is 20.4% (men) and 19.7% (women).

Table 1 reports sample means of the worker, job and establishment characteristics used in the decomposition analysis. The first two columns report the means separately for immigrants and native-born workers and in the third column an asterisk indicates if these means are statistically different. Raw mean log wages (first row) are virtually identical for immigrants and native-born workers. However, the following rows indicate that immigrants have significantly more labour market experience and are more educated. Whereas less than one-in-five native-born workers have a bachelor's degree (0.179), more than one-in-four immigrants do (0.263), and the incidence of graduate degrees is twice as high among immigrants (0.100 compared to 0.053). These raw means imply substantial wage disparities conditional on labour market experience and schooling. The job characteristics of immigrants are also, despite their apparent human capital advantage, not substantially different from native-born workers. Immigrants are more likely to be professionals and production workers and to be employed in jobs requiring professional or graduate degrees. On the other hand, they are less likely to be employed in technical jobs or trades; in a job requiring a high school diploma or less; or in a seasonal or

contract job. These differences are, however, relatively small and none of the remaining job characteristic means are statistically different. The following rows of Table 1 indicate establishment size distributions are not substantially different, but the geographic distributions of workplaces are. Immigrants are significantly more likely to be employed in Toronto and Vancouver and significantly less likely to work everywhere else in the country. The concentration of immigrant employment in Toronto (43% compared to 14% of native-born workers) is particularly remarkable and suggests that immigrants must be concentrated across the establishments in our data.

3. Sorting

A necessary (but not sufficient) condition for employer wage effects to contribute to an immigrant wage differential is that immigrants are non-randomly sorted across establishments. We therefore begin by more formally testing if, and to what extent, immigrant employment is segregated. Our approach is very similar to that of Carrington and Troske (1997), but rather than examine the distribution of a dissimilarity index or Gini coefficient, we focus on the variance of the within-establishment immigrant share, which allows us to straightforwardly test for non-random sorting across all workplaces, as well as within geography, industry and establishment size cells and within the full interaction of these cells.[2] In addition, we report separate results for men and women.

[2] Since our random sorting of immigrants across establishments makes little sense if the establishment sampling weights are used, the sorting analysis in this section is performed using unweighted data. We have performed similar tests (in at least 2 ways) using the sampling weights and our findings do not change. Arguably, since the WES sample design is stratified random sampling, where the stratification are based on 14 industries, 6 geographic regions and 3 establishment size groups, our results based on the full interaction of geography, industry and establishment size are nationally representative.

In particular, suppose we have a sample with N_j workers employed within establishment j, J establishments, and $N = \sum_j N_j$ observations in total. The expected immigrant share within establishment j is $\phi_j = E[m_i \mid i \in j]$, where m_i is an immigrant dummy. Since workers are randomly sampled within establishments, the sample immigrant share within establishment j, call it $\overline{m}_j$, is an unbiased estimator of ϕ_j. Of interest is the magnitude of the between-establishment variance of ϕ_j in the population. This statistic is $V[\phi_j] = E[(\phi_j - \phi)^2]$, where ϕ is the immigrant share in the population. An unbiased estimator of this value is $\hat{V}[\phi_j] = \sum_j \alpha_j (\overline{m}_j - \overline{m})^2$, where $\alpha_j = N_j / N$ and $\overline{m}$ is the grand sample mean of m_i. This is, in fact, just the sample variance of $\overline{m}_j$ between establishments, which we could also write as $\hat{V}[\overline{m}_j]$, not to be confused with the sampling variance of $\overline{m}_j$ for a given establishment $\hat{V}[\overline{m}_j \mid j] = \sigma_j^2 / N_j$, where $\sigma_j^2 = V[m_i \mid i \in j]$.[3]

In our full sample of all establishments the between-establishment variance of $\overline{m}_j$ is 0.047, which is shown in the first row of Table 2. Is this point estimate statistically large? The null hypothesis of "random sorting" of immigrants across establishments corresponds to $\phi_j = \phi$ for all j. Assuming a binomial distribution for m_i, under random sorting the expected variance of $\overline{m}_j$ in any single sample is $V[\overline{m}_j] = [\overline{m}(1-\overline{m})J]/N$. However, across samples there will be sampling variation in this statistic. To test our sample estimate of $V[\overline{m}_j]$ against the null of a random distribution of immigrants, we therefore need to know the variance of $V[\overline{m}_j]$ and not

[3] These quantities are clearly distinguished in the variance decomposition:

$$V[\overline{m}_j] = E_j[V(\overline{m}_j \mid j)] + V_j[E(\overline{m}_j \mid j)]$$

where the first term is the expected sampling variance of $\overline{m}_j$ for establishment j, whereas the second term is the expected between-establishment variance of $\overline{m}_j$.

just its expected value above. We bootstrap the sampling distribution of $V[\overline{m}_j]$ under the null hypothesis of a random distribution, which amounts to randomly resorting the immigrant dummy variable m_i in the data, but not the firm identifier, and recalculating $V[\overline{m}_j]$. This approach insures that the establishment-size distribution remains constant.[4] From 1000 replications of this resorting we use the 10th and 990th highest values of the variance as the bounds of our 99% confidence interval. Comparison of the empirical estimates to the 99% confidence intervals from a random distribution of the observations in our data suggests that immigrants are, in fact, highly non-randomly distributed across establishments (see first row of Table 2). This is true whether we consider men and women separately or together. In no case, do we obtain an empirical estimate of the variance that is close to falling within our 99% confidence interval.

It is of course possible that these results simply reflect the unequal geographic distribution of immigrants. To test this we calculate the between-establishment variance of $\overline{m}_j$ within geographic groups by replacing the grand mean, $\overline{m}$, with the mean of $\overline{m}_j$ within establishment *j*'s geographic region. The results, based on 9 cities and provinces, are shown in the second row of Table 2. As expected, the variances are substantially lower, but immigrant employment continues to appear highly segregated. In the following rows, we consider sorting within 90 3-digit industries, 4 establishment-size categories, and within the full interaction of our geography, industry and establishment-size cells. Even when we look within 1,811 geography-industry-size groups, we continue to find evidence of significant non-random sorting of immigrants across establishments. The interesting question then is to what extent this sorting is related to the idiosyncratic wage setting behaviour of establishments.

[4] When calculating the variance within groups (i.e., geography, industry and establishment size), m_i is randomly resorted within each group. This insures that both the establishment-size distribution and the immigrant share within groups remain constant.

4. Wage Decomposition

In this section we estimate establishment wage effects and examine the relative importance of within- and across-establishment immigrant wage differentials and the sources of these differentials. Our decomposition of the immigrant wage differential into its within- and across-establishment dimensions is based on the linear regression:

$$w_{ij} = \beta^c + m_{ij}\beta^m + x'_{ij}\beta^X + z'_{ij}\beta^Z + \mu_j + \varepsilon_{ij} \qquad (1)$$

where w_{ij} is the log hourly wage rate of worker i employed in establishment j; m_{ij} is an immigrant dummy; x_{ij} is a column vector of worker characteristics; z_{ij} is a column vector of job characteristics; μ_j is a fixed effect for individuals employed in establishment j; and ε_{ij} is a random error term. The returns to m_{ij}, x_{ij}, and z_{ij} in equation (1) reflect wage differentials within establishments, which may or may not exceed the population returns, depending on how these characteristics are sorted across establishments.[5] The estimated establishment fixed effects μ_j, on the other hand, essentially capture mean log wages within establishments after purging individual wages of their within-establishment returns. By including an immigrant dummy in (1) we insure that our estimate of μ_j does not reflect the combination of independent immigrant wage effects (e.g. discrimination) and the non-random sorting of immigrants across establishments.

The major advantage of the WES data in estimating equation (1) is the richness of the worker and job characteristics observed, which allow us to go further than otherwise possible in identifying the sources of within-establishment immigrant wage differentials. Of particular interest here is the extent to which the relatively low returns to foreign sources of schooling and experience, identified in Aydemir and Skuterud (2005) for example, reflect wage differentials

[5] In general we find, as do Bronars and Famulari (1997), a strong positive correlation between observable worker skills and our estimated establishment wage effects. This implies that our estimated returns to worker skills will be smaller than those estimated for the population (i.e., if the vector μ_j were omitted from equation (3)).

between immigrants and natives employed in similar jobs in the same establishments, as opposed to a concentration of immigrants with lots of foreign human capital in low-wage establishments. The major limitation of the WES data, however, is that its sampling design does not allow us to separately identify unobserved person effects. To the extent that any residual wage variation (conditional on worker and job characteristics and an immigrant dummy) is correlated with our firm identifiers, i.e., $E(\mu_j \varepsilon_{ij}) \neq 0$, our estimates of the establishment fixed effects will be biased (see equation (2.4) in Abowd, Kramarz and Margolis (1999) for the exact omitted variable bias term). Our hope is that the observable individual-level covariates included in x_{ij} and z_{ij} are rich enough to purge our estimated establishment wage effects of enough individual heterogeneity that our main results primarily reflect rents or compensating differentials as opposed to unobserved worker heterogeneity.[6] However, given this limitation of our data our estimated establishment fixed effects should be interpreted with some caution. To gauge the meaningfulness of our results, in the final section of the paper we consider whether our main findings are robust to two strong correlates of establishment-level wage rents – reported wage satisfaction and union status.

A critical feature of equation (1) to note is that all the returns, except the constant, are restricted to be the same for immigrants and natives. As a result, any immigrant wage differentials must be captured by either differences in the observable characteristics of workers, including their job characteristics and in which establishments they work, or by the coefficient on the immigrant dummy. In the case of the establishment fixed effects this restriction makes sense since these effects reflect unmeasured characteristics of establishments, which are the same

[6] Interestingly, Abowd et al. (2002) can account for 84.4% (French data) and 90.6% (Washington data) of total wage variation in their data when they estimate both unobserved person and establishment effects (our own calculations based on their reported covariance matrix). In contrast, our full set of worker and job characteristics, together with our establishment fixed effects, account for only 72%, suggesting that much of the unobserved worker heterogeneity remaining in our data is orthogonal to how workers are sorted across establishments.

for immigrants and the native-born. As for the human capital and job characteristic returns, we avoid allowing different returns because we find such differences difficult to interpret. In contrast, wage differentials resulting from differences in the observable characteristics of workers offer a straightforward interpretation. So for example, rather than estimate different returns to immigrant and native-born human capital, in our x_{ij} vector we use information on age at migration to distinguish labour market experience and schooling obtained abroad from that obtained in Canada. Since many immigrants will have obtained some or all of their schooling and experience in Canada, these approaches are by no means equivalent. To the extent that immigrants are paid less than native-born workers in the same establishments with truly identical human capital and job characteristics, perhaps due to discrimination for example, there will be an unexplained gap captured by a negative estimate of β^m. Since the experience of immigrant women may be very different from that of immigrant men, but female wage differentials are not of primary interest, we do, however, allow for a full interaction of all the covariates, including the constant but excluding μ_j, with a female dummy.

The raw difference in mean log wages between immigrants and natives (identified in Table 1) can be decomposed as:

$$\overline{w}^m - \overline{w}^n = \beta^m + (\overline{x}^m - \overline{x}^n)'\beta^X + (\overline{z}^m - \overline{z}^n)'\beta^Z + (\overline{\mu}^m - \overline{\mu}^n) \qquad (2)$$

where the superscripts *m* and *n* denote the immigrant and native-born means respectively. The first term on the right hand side of (2) is the unexplained differential; the second term is the effect of variation in worker characteristics; the third term is the effect of variation in job characteristics; and the fourth term is the effect of sorting of immigrants across establishments. This decomposition amounts to nothing more than a restrictive form of the standard Oaxaca

decomposition in which the returns to characteristics are restricted to be identical between groups.

Finally, as the results in Tables 1 and 2 reveal, immigrant employment is highly concentrated in Canada's major urban centres, which accounts for an important part of the non-random sorting of immigrants across the establishments in our data. The increasing tendency for more recent immigrant cohorts to settle in Canada's major urban centers (particularly Toronto and Vancouver) has in recent years been getting much attention in policy discussions. This is, however, quite a different issue than how immigrants are sorted across establishments within Canada's cities and regions. To the extent that policymakers can more easily influence the distribution of immigrants within Canada's regions and cities, the immigrant differential in establishment wage effects within geography is of more policy relevance than the overall differential. In addition, because much of the geographic variation in our establishment wage effects likely reflects locational amenities, such as climate and living costs (see Rosen 1986), which have unclear implications for economic well-being, the across-geography variation is arguably less interesting than the within-geography variation, which is more likely to reflect rents or other types of compensating differentials.

To decompose the establishment wage effects differential into their within- and across geography components, we estimate, at the individual level, the equation:

$$\hat{\mu}_j = m_{ij}\alpha^m + w_j'\alpha^w + \eta_{ij} \qquad (3)$$

where $\hat{\mu}_j$ is the fixed effect of establishment j estimated in equation (1); m_{ij} is again an immigrant dummy; w_j is a vector of 9 geography dummies defined in Table 1; and η_{ij} is an error term which, in part, captures any measurement error in $\hat{\mu}_j$, which we assume is uncorrelated with m_{ij} and w_j. We also estimate specifications in which w_j is defined as industry, establishment size and the full

interaction of geography, industry and size, as with the tests of sorting in Section 3. The establishment wage effect differential in equation (2) can then be decomposed as:

$$(\overline{\mu}^{m} - \overline{\mu}^{n}) = \alpha^{m} + (\overline{w}^{m} - \overline{w}^{n})'\alpha^{w} \quad (4)$$

where the first term on the right-hand-side is the differential within establishment characteristic cells (e.g. geography) and the second term is the differential across these cells.

5. Results

5.1. Worker characteristics

In Table 3 we report the results from estimating versions of equation (1) and performing the decomposition in equation (2) with no job-characteristic vector. In the first column of Table 3 we include only a constant, an immigrant dummy and a year 2001 dummy to capture any cyclical variation in our inflation-adjusted wages. The coefficient on the immigrant dummy is 0.004 for both men and women, which simply duplicates the result of essentially identical mean log wages reported in the first row of Table 1. In column 2, we add the establishment fixed effects, which explains an additional 56% of the overall variation in log wages (R^2 increases from 0.046 to 0.610). The coefficient on our immigrant dummy can now be thought of as identifying the difference in mean log wages between immigrants and natives within the 40% of establishments that have a mixture of immigrant and native-born workers. The establishment fixed effects, in turn, identify mean log wages within establishments after accounting for this "independent" immigrant wage effect, and the fact that some establishments have more immigrants than others. The results imply a within-establishment wage disadvantage for immigrants, but on average, higher establishment wage effects. Interestingly, these effects are substantially larger for immigrant women (6% compared to 2%). Given that immigrants are

much more likely to live (and work) in Canada's major cities, where we know wages are higher, the former result is perhaps not surprising (although this does not explain the larger female effects). What is more surprising is that even before conditioning on the observable human capital advantages identified in Table 1, immigrants appear to earn lower wages within establishments. A possible explanation is that the immigrant human capital advantage occurs entirely across establishments.

In the third and fourth columns of Table 3 we condition on labour market experience (quadratic) and the set of education variables in Table 1, respectively. The results for both men and women imply large human capital advantages for immigrants even within establishments. For immigrant men, the estimated human capital returns imply a wage advantage of 7%. For immigrant women the implied effect is slightly smaller at 5%. Moreover, the relative distribution of establishment wage effects, continue to imply, if anything, wage advantages for immigrants, although for men the difference is now very close to zero. The combined positive effects of establishment sorting and human capital on the relative wages of immigrants now imply large unexplained wage gaps. For immigrant men the unexplained differential is 7.6%, while for women it is 10.3%. An obvious explanation for this result is our estimates fail to distinguish Canadian and foreign sources of schooling and experience and thereby, on average, overvalue immigrant human capital. This could happen, for example, if foreign credentials and work experience are noisier signals of worker productivity than credentials and experience earned in Canada.

In the final column of Table 3 we distinguish labour market experience and schooling obtained abroad from that obtained in Canada. Although we do not directly observe the foreign quantities of experience and schooling, we do observe immigrants' year of migration and can

estimate their total years of schooling.[7] Assuming schooling is strictly continuous, these two variables, together with current age, allow us to uniquely separate potential labour market experience and schooling into its Canadian and foreign components.[8] Consistent with our findings in Aydemir and Skuterud (2005), the results indicate substantially lower returns to experience and schooling obtained abroad (for brevity these results are not shown, but the results from the full specification, shown in the appendix, are very similar). So for example, for men with 5 years experience working in Canada, an additional year of Canadian experience is expected to raise wages by 2.5%. The comparable return to foreign experience is only 0.6%. In fact, neither the male or female foreign experience profiles are statistically distinguishable from perfectly flat profiles. Similarly, a bachelor's degree obtained abroad boosts male wages by 18.3%, compared to 25.3% if it came from a Canadian university. The fact that these large differential returns are observed *within* establishments employing both immigrants and native-born workers – so they do not simply reflect sorting of immigrants with lots of foreign human capital into relatively low-wage establishments – is an important result that has, to our knowledge, not been documented elsewhere.

When we distinguish the source of immigrants' human capital, both the male and female unexplained wage gaps decrease by 7 percentage points (and become statistically insignificant). This decrease is entirely explained by the decrease in the implied value of immigrants' education

[7] Specifically we use the complete 20% master file of the 2001 Canadian Census, which provides information on both credentials obtained and total years of schooling, to estimate mean years of schooling conditional on the list of credentials identified in the WES. These estimates are available from the authors.

[8] To the extent that immigrants arrive in Canada with foreign labour market experience and return to school in Canada, our measures will overstate years of foreign schooling and Canadian experience by the number of years spent in Canadian school and understate years of Canadian schooling and foreign experience by the exactly same amount. This introduces a very special form of non-classical measurement error, which depending on the relative magnitudes of the true returns to Canadian and foreign experience and schooling may result in upward or downward biases in the estimated returns (see Aydemir and Skuterud (2005) for more details). Our results are, however, virtually identical if we instead allow the returns to total schooling and experience to vary between immigrants and natives (these estimates are available from the authors).

and experience. Now, despite immigrants appearing much more educated (if all university degrees are treated equally), immigrants' human capital characteristics, on average, imply small wage disadvantages of 2% (men) and 3% (women). The effect of establishment sorting, however, continues to be positive, and if anything, increases slightly (relative to column 4), suggesting some concentration of foreign human capital across establishments.

5.2. Job characteristics

Even after conditioning on observable human capital characteristics, immigrants may be performing very different jobs than native-born workers employed in the same establishments. In Table 4 we add job characteristics to our estimation of equation (1) and the wage decomposition in equation (2). We include indicators of occupation, supervisory duties, the educational requirements of jobs, current job tenure, computer usage and various details of work arrangements, such as indicators of night shifts and temporary contracts (see the notes to Table 4 for details). With the exception of the occupation (Green 1999) and job tenure (McDonald and Worswick 1998) variables, to our knowledge, none of these variables have been examined elsewhere in analyses of immigrant wage differentials.

In the first column of Table 4 we add occupation controls, which explain an additional 4.5% of the variation in log wages. The results indicate that, even after controlling for their education and experience, immigrant men are employed in relatively high-paid occupations, although the implied wage effect of 1.7% is small. Immigrant women, on the other hand, tend to be employed in relatively low-paid occupations, although again the implied wage effect is small (-1.4%). The difference is explained by the fact that immigrant men are significantly more likely to be employed as professionals and less likely to be working in technical jobs or trades, whereas

immigrant women are significantly more likely to be production workers (see means in Table 1). As a result, the small positive unexplained gap for men in Table 4 (0.6%) becomes somewhat negative (1.5%), whereas the negative gap for women (3.2%) becomes smaller in magnitude, though remains negative (1.3%). The effect on the establishment and worker characteristic effects is even smaller.

In the remaining 6 columns of Table 4 we gradually add the other job characteristic controls, which together account for an additional 2% of the overall wage variation. Of relative importance are the additional human capital indicators – minimum educational requirements and the indicator of whether a computer is used on the job. Overall, job characteristics tend to imply slightly higher wages for immigrant men, but, if anything, slightly lower wages for immigrant women. For men this advantage, compensates for their lower human capital returns and a persistent small negative unexplained gap, so that in the final specification there is no evidence of any within-establishment immigrant wage differential (-0.015 + 0.024 – 0.009). In contrast, within establishments immigrant women appear to experience roughly a 5% wage disadvantage (-0.017 - 0.010 - 0.021). Nearly half of this differential (2.1%) is not explained by either lower returns to foreign sources of human capital or by the relative job characteristics of immigrant women within establishments. Still, relative to the wage gaps obtained if all human capital is treated equally (column 4, Table 3), this differential is small. What is more interesting and surprising is the apparent 5% relative wage advantage resulting from the non-random sorting of immigrant women across establishments.

5.3. Establishment characteristics

We have argued that the relative distribution of establishment wage effects *within* Canada's major cities and regions is more interesting than the distribution *across* these large geographic areas. In Table 5, we report the results from decomposing the immigrant establishment wage effect differentials identified in the final column of Table 4 (0.5% for men and 5.1% for women) into their within and across geography, industry and establishment size components (as given in equation (4)). Our prior is that much of the apparent positive sorting of immigrants across establishments, particularly immigrant women, reflects their concentration in Toronto and Vancouver, where wages (and living costs) tend to be substantially higher.

Indeed, the first column of Table 5 indicates that once we condition on major cities and regions, immigrants appear concentrated in relatively low-wage establishments. So *within* Toronto and Vancouver, where the majority of Canada's immigrant workers live, the non-random sorting of immigrants across business establishments, if anything, implies a wage disadvantage. This effect is particularly large for immigrant men (5.3%) and exceeds any of the within-establishment wage differentials estimated in Table 4. For immigrant women, on the other hand, sorting within geography implies a much smaller wage disadvantage (1.5%), which is less than the overall within-establishment wage differentials identified in the final column of Table 4. These results are entirely consistent with the popular perception that immigrants lack the social networks necessary to obtain jobs with high-wage employers. What is interesting, though, is that this sorting appears to matter much more for immigrant men than immigrant women.

In the second and third columns of Table 5 we perform the decomposition given in equation (4), but now using industry and establishment size cells, respectively, instead of geography cells. The results indicate that immigrants are employed in industries with, on

average, slightly lower establishment wage effects (1.3% for men and 0.5% for women), but within industries the sorting is positive (1.8% for men and 5.6% for women). Sorting across establishment size, on the other hand, plays little role, which is consistent with the roughly similar distribution of immigrants and native-born workers across establishment size shown in Table 1. What about sorting within geography-specific industry-size cells? Again, both the male and female results suggest negative sorting, but for men the magnitude of this effect (1.5%) is now considerably smaller than in column (1) (5.3%). What explains the difference? It must be that much of the negative sorting of immigrants within geography is in fact sorting across industry. This is interesting in light of the evidence from elsewhere (e.g. Krueger and Summers 1988) that industry wage differentials are related to the payment of efficiency wages. This provides some very limited evidence that the negative sorting of immigrant men within Canada's major cities and regions has welfare implications.

5.4. Region of Birth and Years Since Migration

Up to now we have made no distinctions between immigrants. Of course there are many dimensions of immigrants in which our results may vary in important ways. For example, we might expect the relative importance of establishment sorting to vary with years since migration, entry cohort, age at arrival, country of origin, or the language abilities of immigrants. Over the past two decades Canada has experienced a dramatic shift in the source countries of new immigrants from relatively developed countries with similar cultures and languages to relatively underdeveloped countries where cultures and languages are often very different from those in Canada. As a result of this shift, even with many years of data all these variables of interest tend to be highly correlated, which makes disentangling their effects difficult. With only 2 years

separating our cross-sections (1999 and 2001), distinguishing assimilation and cohort effects in any meaningful way is particularly difficult (Borjas 1985).

In what follows we distinguish immigrants along two dimensions. First, we distinguish immigrants from traditional source regions, defined as those regions comprising a stable or declining share of arrival cohorts, and non-traditional source regions, defined as those comprising a rising share. Traditional regions include North and South America, the Caribbean, Oceania, and Northern, Western and Southern Europe and non-traditional regions are Eastern Europe, Africa and all of Asia. Evidence from the Canadian Census over a 20-year period suggests that this broad distinction is an important one that captures much of the deterioration in the labour market performance of recent immigrant cohorts relative to cohorts of the 1960s and 1970s (Aydemir and Skuterud 2005). Our hope is that conditioning on source region in this way substantially reduces between-cohort heterogeneity, so that differentials between recent and earlier immigrants primarily reflect assimilation. To the extent that our approach is successful, our results provide evidence on the extent to which the well-established wage assimilation patterns of immigrants reflect improved sorting across establishments, perhaps due to the accumulation of social capital, as opposed to human capital accumulation or improved job matches.

In Table 6 we report the results from performing the complete decomposition of the immigrant wage differential given by equations (2) and (4) separately for recent and non-recent immigrants from both traditional and non-traditional source regions. We define recent immigrants as those with less than 10 years since migration and non-recent immigrants as 10 years or more since migration. This provides sample sizes of 3,416 traditional/non-recent immigrants; 436 traditional/recent immigrants; 1,981 non-traditional/non-recent immigrants; and

1,085 non-traditional/recent immigrants.

Perhaps not surprisingly, the raw immigrant-native difference in mean log wages is in all cases substantially more negative for recent immigrants. For example, among men from non-traditional source regions, the immigrant-native wage gap is 18.8% for recent immigrants compared to 5.8% for non-recent immigrants. The remaining rows of Table 6 indicate that in all cases the larger unconditional wage gaps for recent arrivals appear to be primarily driven by differences in worker characteristics. Examination of the individual worker characteristics reveals that in all cases this result reflects the greater accumulation of Canadian work experience among non-recent immigrants (note that assuming mean age at migration has not changed dramatically over time, our definition of "recent" implies that non-recent immigrants must be substantially older, on average, than recent immigrants). More interestingly, conditioning on geography, the immigrant-native disadvantage in establishment fixed effects is, in all cases, larger for more recent arrivals. For example, among immigrant men from non-traditional regions, the gap in establishment fixed effects within geography is 8.2% for non-recent immigrants compared to 14.2% for recent immigrants. This apparent improvement in establishment wage effects through time is observed even among similarly sized establishments within industries in a particular city or region. These results suggest that at least part of immigrant wage assimilation reflects sorting of immigrants into relatively high-wage establishments through time.

Equally striking are the results in Table 6 if we compare traditional to non-traditional immigrants with similar years since migration. In all cases, non-traditional source region immigrants face substantially larger unconditional wage gaps (relative to natives) than immigrants from traditional source regions (the point estimates for non-recent immigrant women actually suggest wage advantages). For example, among recent immigrant men, those from

traditional source regions face a 4.5% wage disadvantage compared to an 18.8% disadvantage among those from non-traditional source regions. What explains the poor wage outcomes of Canadian immigrants from non-traditional source regions? Whether we compare recent or non-recent arrivals, among men the biggest contributing factor, by a considerable margin, appears to be the relative concentration of non-traditional immigrants in low-wage workplaces within Canada's major cities and regions. For women, on the other hand, the large relative wage disadvantages of non-traditional immigrants are by and large unexplained, although even here there is evidence that non-traditional immigrants are concentrated in low-wage workplaces. These large unexplained within-establishment differentials among immigrant women from non-traditional source regions are remarkable given our human capital controls, which distinguish Canadian and foreign sources of schooling and experience, and the detailed job characteristic controls including occupation and the educational requirements of jobs.

As for the large negative effects of establishment sorting within geography for men, it is unclear to what extent they reflect rents, as opposed to compensating differentials or sorting of unobserved ability across establishments. Interestingly, the WES data contains a subjective wage satisfaction question. Specifically, all employees are asked: "Considering the duties and responsibilities of this job, how satisfied are you with the pay and benefits you receive?" with responses coded into 4 levels of satisfaction. In addition, the WES data identifies the union status of individual employees. Since both variables should be highly correlated with rents, to the extent that our establishment wage differentials reflect true premiums, we should expect to see similar differentials using these measures. Indeed, immigrant men from non-traditional source regions do report significantly lower wage satisfaction levels and are significantly less likely to be unionized than either native-born workers or immigrants from traditional source regions

(these results are available from the authors on request). Similarly, immigrant men who arrived in Canada within the past 10 years (whether from traditional or non-traditional source regions) consistently report lower wage satisfaction levels and unionization rates than either native-born workers or immigrant men who have lived in Canada for more than 10 years. Finally, consistent with the smaller role of establishment wage effects in explaining immigrant wage differentials for women, differences in wage satisfaction levels between non-traditional and either natives or traditional immigrant women and between recent and either native-born or non-recent immigrant women are much smaller and in most cases not statistically significant (relative unionization rates of non-traditional and recent immigrant women are, however, consistently negative and significant). These results also suggest that despite the limitation of the WES data in separately identifying unobserved person effects, the differences in establishment wage effects between immigrants and native-born workers and between different immigrant groups do, at least in part, reflect something other than unobserved worker heterogeneity.

6. Summary

Our major finding is the concentration of immigrant men in low-wage establishments within Canada's major cities and regions, is a more important source of immigrant wage differentials than differences in how immigrant men are paid within establishments. Certainly immigrant men are, on average, more educated and have more labour market experience than native-born men doing similar jobs in the same establishments, but once we distinguish human capital obtained abroad from that obtained in Canada, this apparent human capital advantage implies neither a wage advantage nor disadvantage. Among immigrant women, on the other hand, there is relatively little evidence of low establishment wage effects. Immigrant women,

however, appear to experience relatively large within-establishment wage disadvantages. Interestingly, an important part of this disadvantage is not explained by either lower returns to their human capital or by the types of jobs immigrant women do, including the occupation and educational requirements of jobs. Finally, when we produce separate results for recent immigrants and immigrants from non-traditional source regions, we find strong evidence, for both men and women, of negative sorting across establishments within Canada's major cities and regions and large unexplained wage gaps within establishments.

These findings raise a number of important questions for future research. First, what are the mechanisms leading to the highly segregated distribution of immigrant workers across Canadian business establishments? In particular, does it primarily reflect the relative search methods of immigrants or the recruiting methods of employers? Secondly, why does this sorting appear to result in relative wage disadvantages for immigrant men, but not immigrant women? And to what extent does this difference reflect true wage premiums, as opposed to differing preferences for job attributes or sorting of unobserved ability? Of particular interest here are the roles of ethnic enclaves, social networks and job referrals. Finally, what explains the large unexplained within-establishment wage disadvantages experienced by recent immigrants, particularly women, from non-traditional source regions, even after allowing for lower returns to human capital from these regions and controlling for detailed job characteristics? In answering these questions, our results emphasize the importance of wherever possible distinguishing the experiences of immigrant men and women, as well as the source countries of immigrants.

References

Abowd, J., R. Creecy and F. Kramarz (2002), "Computing Person and Workplace Effects Using Linked Longitudinal Employer-Employee Data," unpublished manuscript.

Abowd, J., H. Finer and F. Kramarz (1999), "Individual and Workplace Heterogeneity in Compensation: An Analysis of Matched Longitudinal Employer-Employee Data for the State of Washington," in J. Haltiwanger et al., eds., *The Creation and Analysis of Employer-Employee Matched Data* (Amsterdam: North Holland), pp. 3-24.

Abowd, J., F. Kramarz and D. Margolis (1999), "High Wage Workers and High Wage Firms," *Econometrica* 67(2): 251-333.

Aydemir, A. and C. Robinson (2006), "Return and Onward Migration among Working Age Men," Analytical Studies Brach Research Paper Series, Statistics Canada, catalogue no. 11F0019MIE – 273.

Aydemir, A. and M. Skuterud (2005), "Explaining the Deteriorating Entry Earnings of Canada's Immigrant Cohorts: 1965-2000," *Canadian Journal of Economics*, 38(2): 641-71.

Bayard, K, J. Hellerstein, D. Neumark and K. Troske (1999a), "New Evidence On Sex Segregation And Sex Differences In Wages From Matched Employee-Employer Data," NBER Working Paper, no.7003.

---------- (1999b), "Why Are Racial and Ethnic Wage Gaps Larger For Men Than For Women? Exploring The Role Of Segregation Using The New Worker-Establishment Characteristics Database," NBER Working Paper, no.6997.

Borjas, G. (1985), "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants," *Journal of Labor Economics*, 3(4): 463-89.

Bratsberg, B. and J. Ragan (2002), "The Impact of Host-Country Schooling on Earnings," *Journal of Human Resources*, 37(1), 63-105.

Bronars, S. and M. Famulari (1997), "Wage, Tenure, and Wage Growth Variation Within and Across Establishments," *Journal of Labor Economics*, 15(2): 285-317.

Carnevale, A., R. Fry and B. Lowell (2001), "Understanding, Speaking, Reading, Writing, and Earnings in the Immigrant Labor Market," *American Economic Review*, 91(2), 159-64.

Carrington, W. and K. Troske (1997), "On Measuring Segregation in Samples with Small Units," *Journal of Business and Economic Statistics*, 15(4): 402-9.

Chiswick, B. (1978), "The Effect of Americanization on the Earnings of Foreign-Born Men," *Journal of Political Economy*, 86(5): 897-921.

---------- (1991), "Speaking, Reading and Earnings Among Low-Skilled Immigrants," *Journal of Labor Economics*, 9(2), 149-70.

Chiswick, B. and W. Miller (1995), "The Endogeneity Between Language and Earnings: International Analyses," *Journal of Labor Economics*, 13(2), 246-87.

Dustmann, C. and A. van Soest (2002), "Language and the Earnings of Immigrants," *Industrial and Labor Relations Review*, 55(3): 473-92.

Ferrer, A., D. Green and C. Riddell (2004), "The Effect of Literacy on Immigrant Earnings," unpublished manuscript.

Friedberg, R. (2000), "You Can't Take It With You? Immigrant Assimilation and the Portability of Human Capital," *Journal of Labor Economics*, 18(2), 221-51.

Green, D. (1999), "Immigrant Occupational Attainment: Assimilation and Mobility over Time," *Journal of Labor Economics*, 17(1): 49-79.

Groshen, E. (1991a), "Sources of Intra-Industry Wage Dispersion: How Much Do Employers Matter," *Quarterly Journal of Economics*, 106: 869-84.

McDonald , T. and C. Worswick (1998), "The Earnings of Immigrant Men in Canada: Job Tenure, Cohort, and Macroeconomic Conditions," *Industrial and Labor Relations Review*, 51(3): 465-82.

Rosen, S. (1986), "The Theory of Equalizing Differences," in O.Ashenfelter and R.Layard (eds.) *Handbook of Labor Economics*, Volume 1, Amsterdam: North-Holland, pp. 641-92.

Sweetman, A. (2003). "Immigrant Source Country Educational Quality and Canadian Labour Market Outcomes," unpublished manuscript.

Weiss, Y., R. Sauer and M. Gotlibovski (2003), "Immigration, Search and Loss of Skill," *Journal of Labor Economics*, 21(3), 557-91.

Table 1: Sample means by immigrant status

	Immigrants	Native-born	Total
Log hourly wage	2.842	2.834	2.835
Worker characteristics			
Immigrant	1.0	0.0	0.187
Male	0.503	0.484	0.487
Experience	22.9	19.3	20.0*
Years of grade school	11.8	11.8	11.8
Trade/vocational	0.085	0.124	0.117*
College diploma	0.263	0.244	0.247
Bachelor's degree	0.263	0.179	0.195*
Graduate degree	0.100	0.053	0.062*
Job characteristics			
Managers	0.127	0.133	0.132
Professionals	0.192	0.166	0.171*
Technical/trades	0.382	0.410	0.405*
Marketing/sales	0.082	0.079	0.080
Clerical/administrative	0.129	0.142	0.140
Production workers	0.089	0.069	0.073*
Supervisor	0.379	0.367	0.369
Number supervised	5.3	5.1	5.1
High school or less required	0.541	0.597	0.587*
Some post-secondary required	0.270	0.245	0.250
Bachelor's degree required	0.100	0.104	0.103
Professional/graduate degree required	0.088	0.054	0.060*
Job tenure (years)	6.3	6.4	6.4
Use a computer	0.600	0.612	0.610
Flexible hours	0.357	0.375	0.371
Works weekends	0.239	0.268	0.263
Works evenings or nights	0.211	0.228	0.225
Seasonal	0.009	0.021	0.019*
Contract	0.037	0.053	0.050*
Establishment characteristics			
Atlantic provinces	0.009	0.071	0.059*
Montreal	0.099	0.128	0.122*
Rest of Quebec	0.011	0.136	0.113*
Toronto	0.434	0.138	0.193*
Rest of Ontario	0.184	0.247	0.235*
Manitoba/Saskatchewan	0.037	0.067	0.061*
Alberta	0.082	0.099	0.096*
Vancouver	0.112	0.057	0.067*
Rest of British Columbia	0.034	0.057	0.052*
1-19 employees	0.293	0.312	0.309
20-99 employees	0.273	0.287	0.285
100-499 employees	0.225	0.187	0.195*
500 or more employees	0.208	0.213	0.212
Number of observations	6,918	36,473	43,391

Notes: * indicates if the immigrant and native-born means are statistically different at the 5% level, which is obtained by regressing each variable on a constant and an immigrant dummy. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.

Table 2 - Variance of within-establishment immigrant shares and 99% confidence interval under null of random distribution of immigrants

	Empirical estimate	99% confidence interval
		1. Total
Between all establishments	0.047	(0.020 – 0.022)
Between establishments within geography (9)	0.035	(0.018 – 0.020)
Between establishments within 3-digit industries (90)	0.043	(0.020 – 0.021)
Between establishments within establishment size (4)	0.047	(0.020 – 0.021)
Between establishments within geog. x industry x firm size (1811)	0.031	(0.025 – 0.027)
		2. Men
Between all establishments	0.056	(0.030 – 0.032)
Between establishments within geography (9)	0.045	(0.027 – 0.030)
Between establishments within 3-digit industries (90)	0.052	(0.029 – 0.032)
Between establishments within establishment size (4)	0.056	(0.029 – 0.032)
Between establishments within geog. x industry x firm size (1734)	0.029	(0.022 – 0.024)
		3. Women
Between all establishments	0.062	(0.037 – 0.040)
Between establishments within geography (9)	0.048	(0.033 – 0.036)
Between establishments within 3-digit industries (90)	0.058	(0.035 – 0.038)
Between establishments within establishment size (4)	0.062	(0.036 – 0.039)
Between establishments within geog. x industry x firm size (1675)	0.031	(0.025 – 0.027)

Note: The 99% confidence interval represents the 10th and 990th highest values from 1000 replications of randomly resorting workers across establishments. The number of cells conditioned on is shown in parentheses in the first column. The geography and firm-size cells are those shown in Table 1.

Table 3 – Contribution of worker characteristics to immigrant wage differentials.

	(1)	(2)	(3)	(4)	(5)
Male Decomposition					
Establishment fixed effects	-	0.022*	0.023*	0.006	0.018*
		(0.008)	(0.007)	(0.007)	(0.009)
Worker characteristics	-	-	0.031*	0.074*	-0.019
			(0.002)	(0.003)	(0.022)
Unexplained	0.004	-0.018	-0.050*	-0.076*	0.006
	(0.021)	(0.017)	(0.017)	(0.018)	(0.022)
Female Decomposition					
Establishment fixed effects	-	0.055*	0.064*	0.057*	0.066*
		(0.007)	(0.007)	(0.007)	(0.007)
Worker characteristics	-	-	0.019*	0.050*	-0.030
			(0.002)	(0.002)	(0.023)
Unexplained	0.004	-0.051*	-0.079*	-0.103*	-0.032
	(0.022)	(0.016)	(0.016)	(0.014)	(0.028)
Covariates					
Immigrant dummy	Yes	Yes	Yes	Yes	Yes
Year 2001 dummy	Yes	Yes	Yes	Yes	Yes
Establishment fixed effects	-	Yes	Yes	Yes	Yes
Experience (quadratic)	-	-	Yes	Yes	-
Education	-	-	-	Yes	-
Canadian experience (quadratic)					Yes
Foreign experience (quadratic)					Yes
Canadian education					Yes
Foreign education					Yes
R-squared	0.046	0.610	0.632	0.664	0.667

Note: Each column represents a single linear regression using a pooled sample of 43,391 men and women. All covariates (including the constant) are interacted with a gender dummy, but restricted to be the same for immigrants and natives. Decompositions represent the difference in mean predicted log wages between immigrants and natives using subsets of the covariate coefficients. Worker characteristics are labour market experience and education (with Canadian and foreign quantities distinguished in the final column). The unexplained difference is given by the coefficient on an immigrant dummy. * indicates significance at the 5% level. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.

Table 4 – Contribution of job characteristics to immigrant wage differentials.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male Decomposition							
Establishment fixed effects	0.007	0.004	0.002	0.004	0.004	0.004	0.005
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Worker characteristics	-0.004	-0.008	-0.018	-0.023	-0.017	-0.015	-0.015
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
Job characteristics	0.017*	0.019*	0.028*	0.027*	0.024*	0.024*	0.024*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Unexplained	-0.015	-0.011	-0.009	-0.004	-0.007	-0.009	-0.009
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)
Female Decomposition							
Establishment fixed effects	0.057*	0.052*	0.052*	0.052*	0.051*	0.051*	0.051*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Worker characteristics	-0.027	-0.016	-0.012	-0.017	-0.017	-0.017	-0.017
	(0.019)	(0.021)	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)
Job characteristics	-0.014*	-0.013*	-0.007*	-0.006*	-0.006*	-0.009*	-0.010*
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Unexplained	-0.013	-0.019	-0.030	-0.026	-0.024	-0.021	-0.021
	(0.022)	(0.024)	(0.025)	(0.024)	(0.024)	(0.024)	(0.024)
Covariates							
Immigrant dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year 2001 dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Establishment fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canadian experience (quadratic)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign experience (quadratic)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Canadian education	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign education	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supervisory duties	-	Yes	Yes	Yes	Yes	Yes	Yes
Educational requirements	-	-	Yes	Yes	Yes	Yes	Yes
Job tenure (quadratic)	-	-	-	Yes	Yes	Yes	Yes
Computer use	-	-	-	-	Yes	Yes	Yes
Work arrangements	-	-	-	-	-	Yes	Yes
Temporary job	-	-	-	-	-	-	Yes
R-squared	0.711	0.717	0.723	0.726	0.727	0.728	0.729

Note: Each column represents a single linear regression using a pooled sample of 43,391 men and women. All covariates (including the constant) are interacted with a gender dummy, but restricted to be the same for immigrants and natives. Decompositions represent the difference in mean predicted log wages between immigrants and natives using subsets of the covariate coefficients. Worker characteristics are Canadian and foreign, labour market experience and education. Job characteristics are 6 occupation categories (managers, professionals, technical/trades, marketing/sales, clerical/administrative and production/operation/maintenance workers), 2 indicators of supervisory duties (a supervisor dummy and number supervised), educational requirements of job (4 credential categories), job tenure (quadratic), computer use, work arrangements (flexible hours, Saturday or Sunday work, night work) and indicators of seasonal and contract work. The unexplained difference is given by the coefficient on an immigrant dummy. * indicates significance at the 5% level. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.

Table 5 – Decomposition of establishment fixed wage effects.

	(1)	(2)	(3)	(4)
Male Decomposition				
Within cells	-0.053*	0.018	0.001	-0.015*
	(0.016)	(0.010)	(0.012)	(0.007)
Across cells	0.058*	-0.013	0.004	0.020
	(0.007)	(0.010)	(0.006)	(0.014)
Female Decomposition				
Within cells	-0.015	0.056*	0.045*	-0.009
	(0.014)	(0.009)	(0.012)	(0.006)
Across cells	0.066*	-0.005	0.006	0.060*
	(0.007)	(0.010)	(0.007)	(0.013)
Cells				
Geography (9)	Yes	-	-	-
Industry (90)	-	Yes	-	-
Size (4)	-	-	Yes	-
Geography x industry x size (1,811)	-	-	-	Yes
R-squared	0.090	0.419	0.208	0.740

Note: Each specification represents a single linear regression using a pooled sample of 43,391 men and women. The dependent variable in all specifications is the estimated establishment fixed effect from the final specification of table 4. The cells (i.e. covariates) in the four specifications are respectively: 9 geography dummies; 90 3-digit industry dummies; 4 workplace size dummies (1-19 employees; 20-99 employees; 100-499 employees; and 500 or more employees); and the full interaction of all 3 (1,811 cells). With the exception of the constant term, the covariate effects are restricted to be the same between men and women and between immigrants and natives. The within cell difference represents the coefficient on the immigrant dummy (interacted with male and female dummies). The between cell difference represents the difference in mean predicted log wages between immigrants and natives using the estimated geography, industry and size effects (and their full interaction in the final specification). * indicates significance at the 5% level. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.

Table 6 – Decomposition of immigrant wage differential separately for traditional and non-traditional source country immigrants.

	Traditional		Non-traditional	
	Non-recent	*Recent*	*Non-recent*	*Recent*
Male Decomposition				
Establishment fixed effects	0.051*	0.026	-0.016	-0.067*
	(0.006)	(0.015)	(0.010)	(0.014)
- within geography	-0.001	-0.018	-0.082*	-0.142*
	(0.022)	(0.033)	(0.031)	(0.039)
- within industry	0.042*	0.005	0.015	-0.020
	(0.016)	(0.027)	(0.022)	(0.024)
- within size	0.042*	0.041	-0.019	-0.067*
	(0.020)	(0.032)	(0.026)	(0.028)
- within geography x industry x size	0.006	-0.026	-0.028*	-0.045*
	(0.010)	(0.026)	(0.014)	(0.013)
Worker characteristics	0.025	-0.132*	-0.002	-0.102*
	(0.015)	(0.032)	(0.037)	(0.048)
Job characteristics	0.043*	0.003	0.020*	-0.016*
	(0.003)	(0.005)	(0.003)	(0.005)
Unexplained	0.008	0.058	-0.061	-0.003
	(0.019)	(0.049)	(0.037)	(0.050)
Immigrant-native difference in mean log wage	0.126*	-0.045	-0.058	-0.188*
	(0.025)	(0.071)	(0.037)	(0.038)
Female Decomposition				
Establishment fixed effects	0.079*	0.012	0.042*	0.009
	(0.006)	(0.014)	(0.009)	(0.012)
- within geography	0.019	-0.050	-0.034	-0.071*
	(0.019)	(0.039)	(0.025)	(0.026)
- within industry	0.064	0.002	0.056	0.060*
	(0.012)	(0.032)	(0.021)	(0.022)
- within size	0.059*	0.036	0.035	0.036
	(0.016)	(0.041)	(0.024)	(0.023)
- within geography x industry x size	0.001	-0.027	-0.016	-0.019
	(0.009)	(0.024)	(0.010)	(0.013)
Worker characteristics	0.007	-0.115*	0.085*	-0.012
	(0.017)	(0.032)	(0.034)	(0.045)
Job characteristics	-0.002	-0.022*	-0.005	-0.037*
	(0.003)	(0.003)	(0.003)	(0.003)
Unexplained	0.003	0.026	-0.109*	-0.182*
	(0.027)	(0.050)	(0.036)	(0.054)
Immigrant-native difference in mean log wage	0.087*	-0.099	0.013	-0.222*
	(0.027)	(0.052)	(0.046)	(0.027)
R-squared	0.730			

Note: All results, except the establishment fixed effects decomposition (i.e. the "within" estimates), are based on a single linear regression using a pooled sample of 43,391 men and women, of which 36,473 are Canadian-born; 3,416 are non-recent immigrants (<10 years since migration) from a traditional source region (North and South America, the Caribbean, Oceania, and Northern, Western and Southern Europe); 436 are recent immigrants (≥10 years since migration) from a traditional source region; 1,981 are non-recent immigrants from a non-traditional source region (the rest); and 1,085 are recent immigrants from a non-traditional source region. The dependent variable is the log wage and controls include the full set of covariates in the final specification of Table 4. All covariates (including the constant) are interacted with a gender dummy, but restricted to be the same for all immigrants and natives. The establishment fixed effects decomposition is performed in the same way as in Table 5. * indicates significance at the 5% level. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.

Table A1: Establishment fixed effects log wage regression (equation 3).

	Men		Women	
Year 2001 dummy	0.020*	(0.009)	-0.008	(0.008)
Immigrant	-0.009	(0.019)	-0.021	(0.024)
Canadian experience	0.019*	(0.002)	0.017*	(0.002)
Canadian experience squared	-0.030*	(0.003)	-0.028*	(0.003)
Foreign experience	0.006*	(0.003)	-0.008	(0.005)
Foreign experience squared	-0.005	(0.015)	0.026	(0.020)
Canadian years of grade school	0.018*	(0.003)	0.007	(0.004)
Foreign years of grade school	0.013*	(0.004)	0.007	(0.005)
Canadian trade/vocational	0.024	(0.015)	0.009	(0.019)
Foreign trade/vocational	0.028	(0.032)	0.047	(0.067)
Canadian college diploma	0.045*	(0.014)	0.047*	(0.011)
Foreign college diploma	0.019	(0.030)	0.059	(0.034)
Canadian bachelor's degree	0.062*	(0.021)	0.109*	(0.016)
Foreign bachelor's degree	0.039	(0.046)	0.100*	(0.037)
Canadian graduate degree	0.059*	(0.027)	0.108*	(0.023)
Foreign graduate degree	0.099	(0.054)	0.021	(0.054)
Professionals	-0.157*	(0.020)	-0.068*	(0.026)
Technical/trades	-0.234*	(0.016)	-0.205*	(0.026)
Marketing/sales	-0.312*	(0.032)	-0.269*	(0.038)
Clerical/administrative	-0.375*	(0.024)	-0.310*	(0.026)
Production workers	-0.310*	(0.026)	-0.308*	(0.038)
(Managers)				
Supervisor	0.087*	(0.010)	0.083*	(0.012)
Number supervised / 100	0.022	(0.013)	0.076*	(0.019)
Some post-secondary required	0.067*	(0.014)	0.073*	(0.016)
Bachelor's degree required	0.202*	(0.025)	0.144*	(0.019)
Prof/graduate degree required	0.196*	(0.031)	0.186*	(0.026)
(High school or less required)				
Job tenure (years)	0.006*	(0.003)	0.009*	(0.002)
Job tenure squared	-0.007	(0.011)	-0.020*	(0.008)
Use a computer	0.095*	(0.012)	0.033*	(0.016)
Flexible hours	0.037*	(0.011)	0.008	(0.012)
Works weekends	-0.013	(0.014)	0.018	(0.022)
Works evenings or nights	-0.007	(0.013)	0.033	(0.020)
Seasonal	0.020	(0.026)	0.109	(0.075)
Contract	-0.003	(0.032)	-0.036*	(0.018)
Constant / Female dummy	2.447*	(0.046)	0.074	(0.075)
Establishment fixed effects		Yes		
R-squared		0.730		
Number of observations		43,391		

Note: Results are from a single linear regression where all the covariates, except the establishment fixed effects, are interacted with a female dummy. * indicates significance at the 5% level. Standard errors are estimated by bootstrapping to take account of the WES complex survey design.