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Assimilation via Prices or Quantities? Sources of Immigrant Earnings Growth in Australia, Canada and the United States

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Non-Technical Abstract

Using 1980/81 and 1990/91 census data from Australia, Canada, and the United States, we estimate the effects of time in the destination country on male immigrants' wages, employment, and earnings. We find that total earnings assimilation is greatest in the United States and least in Australia. Employment assimilation explains *all* of the earnings progress experienced by Australian immigrants, whereas wage assimilation plays the dominant role in the United States, and Canada falls in-between. We argue that relatively inflexible wages and generous unemployment insurance in countries like Australia may cause assimilation to occur along the "quantity" rather than the price dimension.

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Using 1980/81 and 1990/91 census data from Australia, Canada, and the United States, we estimate the effects of time in the destination country on male immigrants' wages, employment, and earnings. We find that total earnings assimilation is greatest in the United States and least in Australia. Employment assimilation explains *all* of the earnings progress experienced by Australian immigrants, whereas wage assimilation plays the dominant role in the United States, and Canada falls in-between. We argue that relatively inflexible wages and generous unemployment insurance in countries like Australia may cause assimilation to occur along the "quantity" rather than the price dimension.

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I. Introduction

Economists have been studying the economic assimilation of immigrants for over a quarter century (Chiswick 1978). Despite the widespread interest in this question, however, the vast majority of studies have focused their attention on a single country, usually the United States.[1] Further, almost all studies restrict attention to a single dimension of immigrant assimilation, typically the wages or earnings of those immigrants who are employed. Thus, relatively little is currently known about international differences in the amount of immigrant assimilation, or in the *form* (wages versus employment) this assimilation takes.

In this paper, we characterize both the amount and form of total earnings assimilation in three countries—Australia, Canada, and the United States—using (as far as possible) identical samples and procedures for the same period of time. We find large differences. Specifically, we find that new immigrants face by far the largest wage disadvantage in the United States, but also experience by far the greatest rate of wage growth after arrival. Estimated wage assimilation is smaller in Canada and is actually *negative* in Australia, as some immigrant cohorts to that country earn a positive wage premium upon arrival, and then assimilate downwards towards the Australian norm. On the employment dimension, we detect assimilation in all three countries, but do not find large differences among countries. Overall, the amount of total earnings assimilation is highest in the United States, and the share of total earnings assimilation attributable to wage growth is highest in that country as well, with Australia at the other extreme and Canada in-between.

What might cause these dramatic international differences in the amount and form of immigrant assimilation? After ruling out some obvious possible explanations—for example, differences in observable immigrant characteristics and the greater predominance of Latin American immigrants in the United

[1] A notable exception is Borjas (1988), who uses earlier data on the same countries as we do. Unfortunately, because he only had access to a single cross-section of data for Australia, he could not separately identify assimilation and cohort effects in that country. Miller and Neo (2001) compare the United States and Australia using a single cross-section in each country.

States—we note that the differences we document are strikingly similar to what one would predict from a simple model that emphasizes the effects on assimilation of two institutional features of the host country: the degree of wage inequality and the generosity of income floors for the unemployed. In particular, the observed patterns are consistent with a scenario in which Australia's (and to a lesser extent Canada's) more compressed wage distribution and generous income support (1) force assimilation to occur along the quantity rather than the price dimension, and (2) reduce the potential for immigrant wage growth after arrival.[2]

II. Data

We analyze individual-level data from the 1981 and 1991 Australian and Canadian censuses and the 1980 and 1990 U.S. census. For each country, these censuses provide comparable cross-section data at two points in time on demographic characteristics and labor force behavior, as well as the requisite information on country of birth and year of arrival for foreign-born individuals (henceforth referred to as immigrants). Having at least two cross-sections of data for each country is advantageous for estimating immigrant assimilation effects, as we explain in the next section, and the large samples of individuals available in census data produce relatively precise estimates. The Australian data constitute one-percent samples of the population, the Canadian data are three-percent samples, and the U.S. data are five-percent samples.[3]

The similarities between our three countries that make them, collectively, a good "laboratory" in which to study the determinants of immigrant assimilation are well known; they include a high level of economic development; a common Anglo-Saxon cultural heritage, language, and legal system; a definition of citizenship that is based on country of birth or "naturalization" rather than ethnicity; the feature of being

[2] To our knowledge, only two other papers have considered the interaction of national labor market institutions and immigration. Angrist and Kugler (2003) analyze how the impact of immigrants *on natives* varies with labor market flexibility. Kahn (2004) reports evidence consistent with the hypothesis that greater wage flexibility in the U.S. labor market makes it easier for male immigrants to find jobs, especially when the immigrants have low skills.

[3] The U.S. samples are much larger than the samples from the other two countries. To lighten the computational burden, we employ 0.1-percent (or one in a 1000) samples of U.S. natives, but we use the full five-percent samples of U.S. immigrants, and we use the full samples of

recently colonized by Europeans with only small aboriginal populations remaining in the country; relatively low population densities; a long tradition of immigration; and large immigrant population shares by international standards. As we argue below, these many basic similarities increase the likelihood that the large differences in immigrant assimilation patterns identified here are related to current institutional differences between the countries.

We restrict our analysis to men between the ages of 25 and 59 who are not institutional residents. We exclude women in order to minimize biases arising from selective labor force participation, and we choose this age range so as to focus on men who have completed their formal schooling and who have a strong attachment to the labor market. By comparing outcomes for immigrants with those for natives who reside in the same destination country, natives can serve as a control for cross-country differences in social or economic conditions or in how the census data were collected. To increase comparability of the native samples across countries and improve their usefulness as a control group, we exclude non-whites from the native (but not the immigrant) samples. In addition, residents of the Atlantic Provinces and the Territories are excluded from the Canadian samples, because for these individuals the information about country of birth and year of immigration is not reported in sufficient detail. In the U.S. samples, we exclude individuals born in Puerto Rico and other outlying areas of the United States, because the 1980 U.S. census does not provide information on year of arrival for such individuals. Finally, because the inclusion of immigrants who arrived as children can bias estimates of assimilation effects, we exclude all foreign-born individuals whose age and arrival cohort imply any possibility that they entered the destination country prior to age 16.

III. Empirical Framework

As noted, a key goal of this paper is to compare the relative importance of employment versus wage

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natives and immigrants available in the Australian and Canadian data.

adjustments in accounting for the labor market assimilation of immigrants to Australia, Canada, and the United States. To do so, we start with the identity $E = pw$, where E denotes the expected earnings of an immigrant, p is the probability that the immigrant is employed, and w is the wage paid to the immigrant when he is employed. It is perhaps most natural to think of p as the fraction employed in a cohort of immigrants, w as the mean earnings of the employed members of the cohort, and E as the mean earnings of all members of the cohort (including those who are not employed and therefore have zero earnings). In our data, E, p, and w are all measured on a *weekly* basis; i.e., w represents weekly earnings of persons who are employed in the census reference week, p represents the probability of being employed during the reference week, and E is the average total weekly earnings of a representative member of an immigrant arrival cohort including both its employed and nonemployed members.

Consider how the cohort's earnings potential evolves over time as its members adapt to the destination country's labor market. To a first-order approximation, the above identity implies that

$$\%\Delta E = \%\Delta p + \%\Delta w . \tag{1}$$

In percentage terms, the growth in expected earnings arising from immigrant assimilation is equal to the sum of assimilation's impacts on employment rates and wages. To implement equation (1) empirically, we define assimilation as the independent effect of duration of destination-country residence on immigrant outcomes. In other words, for each of our three host countries, we shall ask how immigrant wage and employment outcomes change with greater exposure to that country.

To distinguish assimilation effects from cohort effects, we adopt the regression framework developed by Borjas (1985, 1995). Specifically, let y_j^g represent the outcome for individual j, where the superscript g takes on the values I for immigrants and N for natives. Pooling data from the 1981 and 1991 censuses,[4] immigrant outcomes are determined by the equation

[4] These are the years relevant for the Australian and Canadian census data. For the U.S. census data, the corresponding years are 1980 and 1990.

$$(2) \qquad y_j^I = C_j\lambda^I + A_j\delta^I + \pi T_j + (1-T_j)X_j\beta_{81}^I + T_jX_j\beta_{91}^I + \varepsilon_j^I,$$

where the vector *C* is a set of mutually exclusive dummy variables identifying immigrant arrival cohorts, the vector *A* is a set of mutually exclusive dummy variables indicating how long an immigrant has lived in the destination country, *T* is a dummy variable marking observations from the 1991 census, the vector *X* contains other determinants of outcomes, ε is a random error term, and the remaining parameters are the objects of estimation. This specification gives each immigrant arrival cohort its own intercept, and differences in these intercepts represent permanent outcome differentials between cohorts. The coefficients of the duration of destination-country residence dummies measure the effects of immigrant assimilation on the outcome variable. In addition, the coefficients of the variables in *X* are allowed to vary across census years, with the subscripts 81 and 91 indicating the survey year of a particular parameter vector.

The corresponding equation for natives is

$$(3) \qquad y_j^N = \alpha^N + \pi T_j + (1-T_j)X_j\beta_{81}^N + T_jX_j\beta_{91}^N + \varepsilon_j^N,$$

where α^N is the intercept for natives, and the arrival cohort and duration of destination-country residence variables are excluded from this equation because they are not relevant for natives.

An analysis of immigrant outcomes must confront the classic problem of distinguishing cohort, age, and period effects. The main identifying restriction imposed in equations (2) and (3) is that the period effect π is the same for immigrants and natives, as indicated by the absence of a superscript on this parameter. In essence, the period effect is estimated from natives, and this information is used to identify cohort and assimilation effects for immigrants. A key assumption of this approach is that compositional changes in the subsample of an immigrant cohort observed—such as those caused by emigration, mortality, and labor force entry and exit—do not bias measured outcome changes. To estimate the parameters of equations (2) and (3), we pool observations on immigrants and natives from both years of census data into a single regression, and then impose the restrictions implicit in these equations by introducing the

appropriate interaction terms between nativity, the 1990/91 census dummy, and the other explanatory variables.

Equation (2) also imposes the restriction that the rate of immigrant assimilation does not vary across arrival cohorts. This restriction conveniently synthesizes the experiences of various arrival cohorts over the 1980s into a single assimilation profile for each outcome and country, but we obtain similar results from less restrictive specifications that allow for cohort-specific assimilation profiles. For U.S. immigrants, Duleep and Regets (1999) and Borjas (2000) present evidence on how assimilation patterns differ by arrival cohort.

IV. Estimation Results

In this section, we use the empirical approach just described to estimate the impact of assimilation on the employment and wage opportunities of immigrants to Australia, Canada, and the United States. Interpreting these estimates in the context of equation (1), we then compare the relative importance of employment versus wage adjustments in accounting for immigrant labor market assimilation in these three countries.

a. Employment Assimilation

Table 1 presents selected coefficients from estimating equations (2) and (3) for employment. The dependent variable is a dummy identifying whether the individual was employed during the census survey week. The coefficients were estimated by least squares, and robust standard errors are shown in parentheses. In addition to the variables listed in Table 1, all regressions include controls for age and geographic location.[5] Two specifications are reported for each destination country. The first specification, in the columns labeled (1), includes the independent variables mentioned so far, whereas the second

[5] The age variables are dummies identifying five-year age groups from 30-34 through 55-59, with 25-29 year-olds as the omitted reference group. The geographic variables indicate region of residence within each destination country (with eight regions defined for Australia, six regions for Canada, and nine regions for the United States) and whether the individual lives in a metropolitan area. The coefficients of the

specification, in the columns labeled (2), also controls for years of schooling. Immigrants, even those who migrate as adults, frequently acquire additional education after arriving in the destination country (Chiswick and Miller1992; Betts and Lofstrom 2000). For this reason, we focus our discussion on results from the specification that does not control for education, because this specification allows for a broader notion of labor market assimilation that includes the effects of post-migration investments in schooling. In general, however, the two specifications yield similar results.

Table 1 reports the immigrant cohort and assimilation effects, as well as the period effects, from the employment regressions.[6] The estimated period effects, which are the coefficients on the 1990/91 census dummy, indicate that employment opportunities deteriorated between 1981 and 1991 in Australia and Canada and did not change much in the United States over the same decade. The immigrant arrival cohort coefficients reported in Table 1 have been normalized to represent immigrant-native employment differentials for men who are aged 25-29 (in both specifications) and who have 12 years of education in 1990/91 (in specification (2)). In addition, these differentials pertain to immigrants from the relevant arrival cohort when they have lived in the destination country for five years or less. For example, the estimated coefficient for 1976-80 Australian immigrants in column (1) indicates that, in their first five years after arriving, this cohort had an employment rate 14.5 percentage points below that of otherwise similar natives.

That the cohort coefficients are uniformly negative implies that, in all three countries, immigrants from every arrival period initially experienced lower employment than natives, but these employment deficits for new immigrants are much larger in Australia and the United States than in Canada. Within each country, the coefficients tend to be similar in magnitude for the various arrival cohorts. This finding

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geographic controls are restricted to be the same for immigrants and natives, but these coefficients can differ across survey years. The coefficients of the age and education variables are allowed to vary both by nativity and survey year.

[6] The intervals listed for immigrant arrival cohorts are those defined in the Australian and Canadian data; the slightly different immigrant cohorts defined in the U.S. data are as follows: pre-1960, 1960-64, 1965-69, 1970-74, 1975-79, 1980-84, and 1985-90. The 1991 Australian census does not distinguish 1960s arrivals from earlier immigrants, and therefore "pre-1971" is the most precise arrival cohort that can be defined consistently across censuses for Australian immigrants. For Canada and the United States, however, immigrants arriving during these

suggests that, after controlling for years spent in the destination country, employment rates do not differ much across cohorts. The one important exception is the 1986-91 cohort of Canadian immigrants, whose employment rate is estimated to be permanently below that of other Canadian arrival cohorts by at least 6 percentage points.

We now turn to the assimilation effects that are the focus of our analysis. In Table 1, the coefficients of the "time in destination country" dummy variables indicate how employment rates change as an immigrant cohort becomes more familiar with its new surroundings. Australian and American immigrants display virtually identical patterns in which the bulk of employment assimilation takes place within the first decade after arrival.[7] In both Australia and the United States, employment rates shoot up by 10 percentage points as immigrants pass from 0-5 to 6-10 years in the destination country, but thereafter employment increases only modestly (2-4 percentage points) with further exposure to the host labor market.

Employment assimilation for Canadian immigrants, by contrast, is a much more continuous process that takes longer to play out. For example, according to the estimates that do not control for education (specification (1)), immigrant employment rates rise (relative to their level during the initial five years of Canadian residence) by 4 percentage points after 6-10 years, 6 percentage points after 11-15 years, 8 percentage points after 16-20 years, and 10 percentage points after more than 20 years in Canada. Despite the fact that employment assimilation beyond the first decade of residence is strongest for Canadian immigrants, the much greater initial adjustments of Australian and American immigrants result in total employment growth, even after more than 20 years of assimilation, that is larger in Australia and the United States (12-14 percentage points) than in Canada (9-10 percentage points).

Finally, recall the negative cohort coefficients discussed earlier. These coefficients indicate that,

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years are disaggregated into "1966-70," "1961-65," and "pre-1961" cohorts.

[7] For the United States, several earlier studies find this same pattern of immigrant employment adjustment. See for example Chiswick, Cohen, and Zach (1997) and Funkhouser (2000). For Australia, McDonald and Worswick (1999b) report a similar finding for *unemployment*: the

upon arrival, all immigrant cohorts had employment rates lower than those of comparable natives. Employment growth from assimilation, however, eventually erases all or most of this initial employment deficit for every immigrant arrival cohort. Consider, for example, the 1971-75 cohort of U.S. immigrants. According to the specification (1) estimates that do not control for education, during its first five years in the United States this cohort had an employment rate 14 percentage points below that of natives. After just 6-10 years of U.S. residence, however, assimilation narrows the employment gap of this cohort by 10 percentage points, and after 20 years in the United States the cohort's employment rate closes to within a percentage point of the rate for comparable natives. Immigrants from other arrival cohorts and in other host countries display the same basic pattern. With sufficient time for adjustment, male immigrants in these three countries attain employment rates similar to those of natives.

b. Wage Assimilation

Table 2 presents analogous estimates for the natural logarithm of wages, our other outcome variable. These log wage regressions are identical in structure to the employment regressions in Table 1, except that now the sample is restricted to employed men, and controls have been added for hours worked during the census survey week. These controls for weekly hours of work are included so that our estimates using the available information on *weekly* income (for Australia) or earnings (for Canada and the United States) more closely approximate the effects on *hourly* wages (i.e., the "price" of labor) that we seek. The coefficients of the weekly hours indicators are allowed to vary across census years but not by nativity. Because the dependent variables in Table 2 represent nominal wages, the estimated period effects (i.e., the coefficients on the 1990/91 census dummy) reflect whatever inflation occurred during the 1980s, as well as the effects on real wages of any changes in national economic conditions that took place over the decade.

In Table 2, the estimated coefficients of the arrival cohort dummies reveal the extent of permanent wage differences between immigrant cohorts. Such wage differences are relatively modest in Australia and

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unemployment rates of immigrant men decline sharply, both in absolute terms and relative to native unemployment rates, during the first

somewhat larger in Canada and the United States. Wage profiles tend to be lower for more recent arrival cohorts, especially in Canada and the United States. For example, in the specification (1) regression that does not control for education, Canadian immigrants arriving in 1986-91 have a permanent wage disadvantage of about 30 percent relative to their predecessors who arrived before 1970. The corresponding wage deficit is smaller but still sizeable for the most recent cohort of U.S. immigrants. The pattern in Table 2 of a steady decline in wages for successive cohorts of male immigrants to Canada and the United States confirms the findings of previous studies (e.g., Baker and Benjamin (1994) and Bloom, Grenier, and Gunderson (1995) for Canada, and Borjas (1985, 1995) and Funkhouser and Trejo (1998) for the United States).

The estimated coefficients of the "time in destination country" dummy variables measure wage growth due to immigrant assimilation. Consistent with earlier research by Borjas (1988) and McDonald and Worswick (1999a), we find no evidence of positive wage assimilation for Australian immigrants. Although both Canadian and U.S. immigrants enjoy significant wage boosts arising from increased exposure to the destination country's labor market, the magnitude and duration of such wage assimilation is greater in the United States. For example, without controlling for education, the estimates imply that wages grow by 11 percent as an immigrant cohort in Canada extends its time in the country from 0-5 to 11-15 years, but additional exposure to Canada beyond this point produces little wage improvement. For U.S. immigrants, the corresponding wage growth is 14 percent after 11-15 years in the country and 24 percent after 20-plus years of residence. Estimates of immigrant wage assimilation and the pattern of differences across destination countries are similar in specification (2), which controls for education.

c. Total Earnings Assimilation and its Components

Given the estimates, from Tables 1 and 2, of how immigrant employment and wage opportunities evolve with greater exposure to the host country, we can now implement equation (1). As discussed

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decade after arrival.

earlier, equation (1) decomposes the labor market assimilation of immigrants into employment and wage components, where each component is simply the percentage impact of assimilation on the relevant outcome. The log specification of the dependent variable in the wage regressions implies that the assimilation coefficients from these regressions already approximate percentage effects, but the corresponding coefficients in the employment regressions do not. We transform the estimated employment effects of assimilation into percentage terms by comparing these effects with the employment rates of the most recent arrival cohort in the 1990/91 data.

For each destination country, Table 3 reports the resulting estimates of the components of equation (1), with standard errors in parentheses. The top panel of Table 3 presents estimates based on the regressions that do not control for education, whereas the bottom panel shows results from the alternative specification that conditions on education. As prescribed by equation (1), "total" immigrant earnings growth due to assimilation is computed as the sum of the estimates of earnings growth from employment assimilation and from wage assimilation. These calculations are reported for the assimilation-induced growth that occurs for an immigrant cohort between its first five years in the destination country and each of the durations of residence ranging from "6-10 years" to "more than 20 years." Finally, in order to highlight differences across countries in the nature of immigrant labor market adjustment, Table 3 also shows the percentage of total earnings growth from assimilation that arises from employment assimilation rather than from wage assimilation.

Initially consider the estimates in the top panel of Table 3, which do not control for education. Employment assimilation is an important contributor to immigrant earnings growth in all three countries, but the timing of this contribution varies. In Australia and the United States, the vast majority of immigrant employment assimilation occurs during the first decade after arrival, whereas employment rates for Canadian immigrants rise more continuously with duration of residence. In addition, the ultimate impact of employment assimilation is somewhat less in Canada than in the other two countries. After more

than two decades in the destination country, employment assimilation increases immigrant earnings by about 17 percent in Australia and the United States and by 13 percent in Canada. Earnings growth from wage assimilation, on the other hand, is largest in the United States, sizeable in Canada, and zero or negative in Australia. Summing together the effects of employment and wage assimilation, earnings grow with duration of residence the most for U.S. immigrants and the least for Australian immigrants. After more than 20 years in the destination country, for example, total earnings growth from immigrant assimilation is 40 percent in the United States, 25 percent in Canada, and 8 percent in Australia.

Finally, Table 3 quantifies the *relative* contributions of wage and employment assimilation to total immigrant earnings assimilation in these three countries using the simple decomposition in equation (1). The top panel of Table 3 shows that, at almost any duration of residence, the earnings growth of Canadian immigrants derives in roughly equal parts from employment assimilation and from wage assimilation. For Canadian immigrants, employment and wages rise at about the same rate with greater exposure to their adopted country. For U.S. immigrants, however, wage assimilation proceeds continuously but employment gains are concentrated in the first decade after arrival. As a result, for the United States, the share of immigrant earnings growth attributable to employment assimilation falls from 71 percent after 6-10 years of residence to 41 percent after more than 20 years of residence. For the first 15 years after arrival, employment adjustments account for a larger share of immigrant earnings growth in the United States than in Canada, but the opposite pattern emerges at longer durations of residence.

The bottom panel of Table 3 reports analogous estimates that control for education. Overall, the patterns are very similar to the top panel. For Canada and the United States, controlling for education generates somewhat lower estimates of employment assimilation and the share of total earnings growth arising from employment assimilation, but the comparisons across countries remain as described above. We note, however, that only for the United States is the share of earnings growth due to employment assimilation estimated with much precision, so although cross-country differences in our estimates of this

share are suggestive, they are not statistically significant.

V. Possible Explanations

One obvious factor that might explain the dramatic differences in immigrant assimilation documented above is the marked difference in the source country composition of immigrant flows to Australia, Canada and the United States (Reitz 1998; Antecol, Cobb-Clark, and Trejo 2003). In particular, Borjas (1993) and Antecol, Cobb-Clark, and Trejo (2003) show that the skill deficit for U.S. immigrants relative to Australian and Canadian immigrants arises primarily because the United States receives a much larger share of immigrants from Latin America than do the other two countries. Consequently, an important concern is whether broad differences in region of origin drive the cross-country patterns of immigrant assimilation that we observe.

To investigate this issue, we replicated our analyses for two subsamples of the immigrant population that are fairly homogeneous in national origins yet still provide sufficiently large sample sizes for each country: only men born in Europe and only men born in Asia. The patterns for European and Asian immigrants considered separately are similar to those for all source countries combined (we do not report these results here, but they are available upon request). Thus it does not appear that broad differences in region of origin, and in particular the large role of Latin American immigrants in the United States, explain our results.

Could host-country differences in immigration policy (including perhaps their effects on the more detailed national origin mix of immigrants) explain why immigrant assimilation patterns are so different across these three countries? On the surface, this might be an appealing explanation of at least the differences in wage assimilation: could it be that, because of Australian immigration policy, Australian immigrants are so well "matched" to the Australian labor market that they earn as much as (or more than) Australian natives on arrival, making further progress relative to natives impossible? Since a larger fraction

of Australian (and Canadian) immigrants are selected on the basis of labor market qualifications, this is a potentially appealing hypothesis. However, as Borjas (1993) and Antecol, Cobb-Clark and Trejo (2003) have shown, once the large share of U.S. immigrants from Latin America is controlled for, the Australian and Canadian points systems have little demonstrable impact on the qualifications of immigrants. Since our main results continue to hold very strongly for subsets of immigrants from Europe or Asia, these "points systems" are thus unlikely to account for all the international differences in assimilation patterns documented here. Further, a more labor-market-oriented immigration policy should *raise* immigrants' relative employment rates on arrival, and this is clearly not the case in Australia or Canada relative to the United States.[8]

Another possible explanation of differences in immigrant assimilation patterns is international differences in host-country labor market institutions *other* than immigration policy. Such differences, including unionization and income support policies, have recently been linked to international differences in wage inequality (DiNardo, Fortin, and Lemieux 1996; Blau and Kahn 1996), in the manner in which economies respond to adverse shocks to the demand for unskilled labor (Card, Kramarz, and Lemieux 1999; McDonald and Worswick 2000), in the size of the gender wage gap (Blau and Kahn 2000), in the magnitude of wage losses experienced by displaced workers (Kuhn 2002), in youth unemployment (Abowd et al. 2000), in work hours (Bell and Freeman 2001), in technical progress (Moene and Wallerstein 1997), and in the amount of labor reallocation across industries (Bertola and Rogerson 1997).

Given this extensive literature, it seems natural to ask whether a nation's labor market institutions might also shape the way in which new immigrants integrate into its economy. For example, any national policy or institution that effectively imposes a binding wage floor, or any policy that provides income

[8] Another possible source of bias in our results stems from the fact that universities in Australia, Canada, and the United States host a sizeable number of foreign undergraduate and graduate students who typically return to their home countries after completing their studies. Return migration by these foreign students could cause immigrant employment rates to rise sharply after an arrival cohort has spent 5-10 years in the destination country. More generally, the presence of temporary immigrants such as foreign students in our samples can bias estimates of assimilation profiles, and the nature of this bias might vary across destination countries. To explore this issue, we redid our analyses after dropping from the samples anyone currently enrolled in school. Very little change was observed.

support for unemployed immigrants, might "force" immigrant assimilation to occur along the employment rather than the wage dimension (e.g., Harris and Todaro 1970). Any institution that *compresses* a country's wage distribution would operate in two distinct ways. The first of these is purely mechanical: suppose that, over the course of his first ten years in the country, an immigrant to *any* country advances five percentiles in the native wage distribution. Simply because the rungs of the wage "ladder" are farther apart in high-inequality countries, immigrants to those countries will experience greater wage growth (relative to natives) than immigrants to other countries.[9] The second effect is behavioral: suppose that the investment required to rise one rung on the wage ladder (e.g., learning English) is equally costly in these three countries. Then immigrants to compressed-wage countries will be less inclined to make such investments.

Do the actual institutional differences across the three countries studied in this paper accord with the differences required by the above discussion? Concerning the wage-setting process, Table 4 shows the well-known difference in union density between the United States and Canada, as well as the well-known decline in U.S. union density between 1980 and 1990. While union density in both countries is low by OECD standards, by the end of our sample period union density in Canada was more than double that in the United States (36 versus 16 percent). In both countries, coverage is only marginally greater than density, and wage bargaining is extremely decentralized (among 19 OECD countries, only one country ranks lower than Canada and the United States in terms of bargaining centralization). Australia's union membership rates are higher than both Canada's and the United States's, but the most dramatic difference is in union coverage: in both our sample years, 80 percent or more of Australian workers' wages were determined by collective bargaining agreements. Further, this wage-setting process is highly centralized and coordinated. In 1990, Australia was ranked first (tied with Austria, Belgium, Finland, Norway, Portugal, and Sweden) among 19 countries in bargaining centralization by the OECD.[10]

[9] For the United States, this "mechanical" effect of wage structure on the immigrant-native wage gap has been explored by Butcher and DiNardo (2002) and Lubotsky (2001).

[10] During our sample period, the dominant institution in Australian wage-setting was the "awards" system, a system whereby unions,

The consequences of these different wage-setting institutions for wage dispersion can be seen in panel B of Table 4. As Blau and Kahn (1996) have argued, high levels of union coverage tend to be associated with low levels of wage dispersion, and this is certainly borne out in our data. By all measures—the 90/10 ratio (ratio of the 90th to the 10th percentiles of the weekly earnings distribution), 90/50 ratio, 50/10 ratio, or the standard deviation of log wages—Australia had the most compressed wage distribution in both years of our data, and the United States the most dispersed. Canada stands between these two extremes on most measures, though it is tied with the United States on two of these measures in 1990, perhaps reflecting a more severe recession at that time. All three countries exhibit increasing wage inequality between 1980 and 1990.

Concerning the income support available to unemployed workers, an aggregate, comparable index of benefit generosity computed by the OECD in Table 4 shows similar overall replacement rates in Canada and Australia, and a much lower rate in the United States. While this probably summarizes overall generosity reasonably well, there are a number of reasons to suspect that these figures understate the differences among the three countries, especially as it affects immigrants. One such difference is the take-up rate of unemployment insurance (UI) benefits: in 1990, the ratio of UI beneficiaries to the total number of unemployed was 34 percent in the United States, 82 percent in Australia, and 87 percent in Canada.[11] Thus it is much less likely that an unemployed worker in the United States will actually receive UI benefits than in Australia or Canada. Second, the Australian income support system has three features that make it especially generous for immigrants: unlike the United States and Canadian systems, eligibility does not require prior employment, recent immigrants are not explicitly disqualified from receiving benefits, and

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employers, and government representatives met at the national level to negotiate wage rates specific to hundreds of occupations. Although firms were free to pay above-award wages, this was rare in practice. Thus, for all intents and purposes, Australian wages during our sample period were centrally administered at the occupation level. Statutory minimum wages were set at similar (low) fractions of the average wage in Canada and the United States, and they did not exist in Australia because they were superseded by the awards system.

[11]OECD, 1994, Table 8.4, plus CANSIM Series v384773 [the OECD's table includes UI *and* welfare cases for Canada; thus we retrieved our own beneficiary counts from Statistics Canada's CANSIM database]. Australian figures refer to 1991. For Canada, our figures include regular UI beneficiaries only (thus they exclude UI benefits for job training, maternity, sickness, etc.). As noted, Australia has only a means-tested program—these figures refer to it. U.S. figures, like those for Canada, include UI claimants only (thus excluding welfare). In all cases the count of beneficiaries refers to an annual average stock (not to the total number of persons receiving benefit at any time during the year).

benefits do not depend on previous wages. Furthermore, in Australia these benefits are payable for an indefinite period, in contrast to maximum entitlement periods of a year in Canada and 26 weeks in the United States. Overall, it thus appears that Australia's income support system is the most generous to immigrants, and both Canada and Australia are clearly more generous than the United States.

In sum, the institutional differences summarized above are consistent with the patterns of immigrant assimilation documented in this paper. The broad institutional features of these labor markets lead us to expect wages to be the primary mode of assimilation in the United States, employment in Australia, with Canada in between. Empirically we find that employment gains explain *all* of the labor market progress experienced by Australian immigrants, that the magnitude of wage assimilation is greatest in the United States, and that (for sufficiently long periods of adjustment) the share of immigrant earnings growth due to wage assimilation rather than employment assimilation is also largest in the United States.

A final concern with the "institutional" hypothesis described above is the notion that institutional differences among these three countries cause systematically different types of immigrants to be *attracted* to each country. For example, individuals with high learning capacities should be disproportionately attracted to the U.S. market, where investments in additional human capital are more likely to be rewarded. We do not dispute this possibility; in fact we think it is quite likely. Instead we simply note, first, that any self-selection of this nature that is *induced* by international institutional differences would simply reinforce the international differences in assimilation patterns that we observe. Second, self-selection on "ambition" or "learning ability" that is induced by international institutional differences can be seen as a logical extension of Borjas's (1987) argument that international differences in wage inequality should affect the average ability *level* of immigrants. Indeed, it is exactly what we should expect if host country labor market institutions really matter.

VI. Conclusion

In this paper we generate estimates of employment and wage assimilation among immigrants to Australia, Canada, and the United States using census data spanning the decade of the 1980s. We find that total earnings assimilation is greatest in the United States and least in Australia. Further, employment assimilation explains *all* of the earnings progress experienced by Australian immigrants, whereas wage assimilation plays the dominant role in the United States, and Canada falls in-between.

We argue that these patterns are suggestive of an effect of host country labor market institutions on the immigrant assimilation process, with relatively inflexible wages and generous unemployment insurance in countries like Australia causing assimilation to occur along the "quantity" rather than the price dimension. Also, Australia's relatively compressed wage distribution reduces the scope for immigrant wage growth and might reduce incentives to make post-arrival investments in human capital.

Of course, it is certainly possible that the dramatic international differences in immigrant assimilation documented here derive from idiosyncrasies of these countries other than the labor market institutions that we emphasize. After all, with only three countries, we have very few degrees of freedom for discriminating among alternative hypotheses. Nonetheless, our results strongly suggest that greater attention to the role of national labor market institutions—in particular those that influence the dispersion of wages and the incomes of the unemployed—may help to advance our understanding of why the immigrant assimilation process appears to operate so differently across destination countries.

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Table 1
Employment Regressions
Assimilation, Cohort and Period Effects

	Australia		Canada		United States	
Regressor	(1)	(2)	(1)	(2)	(1)	(2)
Time in Destination Country:						
6-10 Years	.101	.099	.039	.031	.099	.100
	(.029)	(.029)	(.016)	(.016)	(.006)	(.006)
11-15 Years	.112	.120	.060	.055	.113	.110
	(.023)	(.025)	(.012)	(.013)	(.005)	(.005)
16-20 Years	.121	.130	.083	.070	.115	.113
	(.027)	(.029)	(.017)	(.019)	(.007)	(.008)
More than 20 Years	.126	.140	.096	.086	.130	.122
	(.031)	(.033)	(.019)	(.021)	(.009)	(.010)
Immigrant Arrival Cohort:						
Pre-1961			-.069	-.023	-.160	-.118
			(.021)	(.027)	(.010)	(.013)
1961-65			-.060	-.014	-.141	-.103
			(.019)	(.024)	(.009)	(.011)
1966-70			-.044	-.011	-.147	-.107
			(.016)	(.021)	(.007)	(.010)
Pre-1971	-.150	-.168				
	(.029)	(.038)				
1971-75	-.147	-.161	-.054	-.017	-.141	-.101
	(.030)	(.036)	(.017)	(.020)	(.007)	(.009)
1976-80	-.145	-.164	-.054	-.026	-.140	-.103
	(.018)	(.026)	(.009)	(.012)	(.004)	(.006)
1981-85	-.167	-.172	-.065	-.037	-.146	-.113
	(.033)	(.035)	(.018)	(.019)	(.007)	(.008)
1986-91	-.125	-.140	-.130	-.110	-.124	-.094
	(.017)	(.018)	(.008)	(.009)	(.004)	(.004)
1990/91 Census Dummy	-.086	-.188	-.053	-.128	.008	-.017
	(.010)	(.019)	(.004)	(.007)	(.006)	(.007)
R^2	.033	.045	.033	.059	.024	.034
Controls for Education	No	Yes	No	Yes	No	Yes

Note: The dependent variable is a dummy identifying whether the individual was employed during the census survey week. The coefficients were estimated by least squares, and robust standard errors are shown in parentheses. Data are from the 1981 and 1991 Australian and Canadian censuses and the 1980 and 1990 U.S. censuses. The samples include men ages 25-59, with non-whites excluded from the native but not the foreign-born samples. The sample sizes for these regressions are 52,664 for Australia, 259,777 for Canada, and 432,179 for the United States. In addition to the variables listed above, all regressions include indicators for age and geographic location. The coefficients of the geographic controls are restricted to be the same for immigrants and natives, but these coefficients can differ across census years. The coefficients of the age and education variables are allowed to vary both by nativity and census year. The reference group for the "time in destination country" dummies is 0-5 years. The intervals listed above for the immigrant arrival cohorts are those defined in the Australian and Canadian data; the slightly different immigrant cohorts defined in the U.S. data are as follows: pre-1960, 1960-64, 1965-69, 1970-74, 1975-79, 1980-84, and 1985-90. The immigrant cohort coefficients reported in this table have been normalized to represent immigrant-native employment differentials for men who are aged 25-29 (in both specifications) and who have 12 years of education in 1990/91 (in specification (2)).

Table 2
Wage Regressions
Assimilation, Cohort and Period Effects

	Australia		Canada		United States	
Regressor	(1)	(2)	(1)	(2)	(1)	(2)
Time in Destination Country:						
6-10 Years	.032	.009	.046	.052	.052	.070
	(.047)	(.046)	(.043)	(.042)	(.017)	(.015)
11-15 Years	-.063	-.086	.111	.139	.144	.183
	(.037)	(.039)	(.028)	(.031)	(.011)	(.012)
16-20 Years	-.061	-.087	.094	.115	.158	.203
	(.044)	(.046)	(.045)	(.047)	(.018)	(.018)
More than 20 Years	-.090	-.120	.123	.160	.236	.271
	(.049)	(.053)	(.046)	(.051)	(.020)	(.022)
Immigrant Arrival Cohort:						
Pre-1961			-.083	-.019	-.102	-.056
			(.052)	(.064)	(.023)	(.028)
1961-65			-.109	-.042	-.135	-.082
			(.047)	(.057)	(.020)	(.024)
1966-70			-.102	-.087	-.224	-.146
			(.038)	(.049)	(.017)	(.022)
Pre-1971	-.009	.065				
	(.046)	(.060)				
1971-75	-.058	.004	-.174	-.139	-.253	-.142
	(.048)	(.057)	(.045)	(.049)	(.018)	(.020)
1976-80	-.040	-.009	-.222	-.196	-.300	-.206
	(.025)	(.038)	(.021)	(.029)	(.009)	(.013)
1981-85	-.137	-.100	-.239	-.206	-.338	-.230
	(.053)	(.053)	(.048)	(.048)	(.018)	(.017)
1986-91	-.077	-.098	-.393	-.354	-.373	-.271
	(.023)	(.024)	(.021)	(.021)	(.008)	(.009)
1990/91 Census Dummy	.705	.560	.510	.337	.435	.354
	(.016)	(.031)	(.009)	(.018)	(.013)	(.016)
R^2	.334	.369	.148	.189	.184	.288
Controls for Education	No	Yes	No	Yes	No	Yes

Note: The dependent variable is the natural logarithm of weekly personal income (for Australia) or weekly earnings (for Canada and the United States). The coefficients were estimated by least squares, and robust standard errors are shown in parentheses. Data are from the 1981 and 1991 Australian and Canadian censuses and the 1980 and 1990 U.S. censuses. The samples include employed men ages 25-59, with non-whites excluded from the native but not the foreign-born samples. The sample sizes for these regressions are 43,590 for Australia, 217,773 for Canada, and 359,999 for the United States. In addition to the variables listed above, all regressions include indicators for age, geographic location, and hours worked during the census survey week. The coefficients of the controls for geographic location and weekly hours of work are restricted to be the same for immigrants and natives, but these coefficients can differ across census years. The coefficients of the age and education variables are allowed to vary both by nativity and census year. The reference group for the "time in destination country" dummies is 0-5 years. The intervals listed above for the immigrant arrival cohorts are those defined in the Australian and Canadian data; the slightly different immigrant cohorts defined in the U.S. data are as follows: pre-1960, 1960-64, 1965-69, 1970-74, 1975-79, 1980-84, and 1985-90. The immigrant cohort coefficients reported in this table have been normalized to represent immigrant-native wage differentials for men who are aged 25-29 (in both specifications) and who have 12 years of education in 1990/91 (in specification (2)).

Table 3
Components of Immigrant Earnings Growth from Assimilation

	Australia				Canada				United States			
	Percentage Earnings Growth from Assimilation in:			Percent of Total Due to	Percentage Earnings Growth from Assimilation in:			Percent of Total Due to	Percentage Earnings Growth from Assimilation in:			Percent of Total Due to
	Emp	Wage	Total	Emp	Emp	Wage	Total	Emp	Emp	Wage	Total	Emp
A. Without Education Controls												
Time in Destination Country:												
6-10 Years	13.5	3.2	16.7	80.9	5.3	4.6	9.9	53.7	12.5	5.2	17.7	70.7
	(3.9)	(4.7)	(6.1)	(23.2)	(2.2)	(4.3)	(4.8)	(25.4)	(0.8)	(1.7)	(1.9)	(6.9)
11-15 Years	15.0	-6.3	8.7	>100	8.2	11.1	19.3	42.5	14.3	14.4	28.7	49.9
	(3.1)	(3.7)	(4.8)		(1.6)	(2.8)	(3.2)	(7.9)	(0.6)	(1.1)	(1.3)	(2.2)
16-20 Years	16.2	-6.1	10.1	>100	11.3	9.4	20.7	54.7	14.6	15.8	30.4	48.0
	(3.6)	(4.4)	(5.7)		(2.3)	(4.5)	(5.1)	(12.9)	(0.9)	(1.8)	(2.0)	(3.2)
More than 20 Years	16.9	-9.0	7.9	>100	13.1	12.3	25.4	51.6	16.5	23.6	40.1	41.1
	(4.1)	(4.9)	(6.4)		(2.6)	(4.6)	(5.3)	(10.6)	(1.1)	(2.0)	(2.3)	(2.6)
B. With Education Controls												
Time in Destination Country:												
6-10 Years	13.3	0.9	14.2	93.6	4.2	5.2	9.4	44.9	12.7	7.0	19.7	64.4
	(3.9)	(4.6)	(6.0)	(30.5)	(2.2)	(4.2)	(4.7)	(23.7)	(0.8)	(1.5)	(1.7)	(5.1)
11-15 Years	16.1	-8.6	7.5	>100	7.5	13.9	21.4	35.1	13.9	18.3	32.2	43.2
	(3.3)	(3.9)	(5.1)		(1.8)	(3.1)	(3.6)	(7.4)	(0.6)	(1.2)	(1.4)	(2.0)
16-20 Years	17.4	-8.7	8.7	>100	9.6	11.5	21.1	45.4	14.3	20.3	34.6	41.4
	(3.9)	(4.6)	(6.0)		(2.6)	(4.7)	(5.4)	(12.2)	(1.0)	(1.8)	(2.1)	(2.8)
More than 20 Years	18.7	-12.0	6.7	>100	11.7	16.0	27.7	42.3	15.5	27.1	42.6	36.3
	(4.4)	(5.3)	(6.9)		(2.9)	(5.1)	(5.9)	(9.8)	(1.3)	(2.2)	(2.5)	(2.7)

Note: These calculations are based on the employment and wage regressions reported in Tables 1 and 2, with standard errors shown in parentheses. The results in panel A, which do not control for education, derive from regression specification (1), and the results in panel B, which do control for education, derive from regression specification (2). The estimated effects of assimilation on immigrant employment probabilities are converted into percentage terms using the employment rates (reported in Table 1) of the most recent immigrant arrival cohort in the 1990/91 data. Because the dependent variables of the wage regressions are in natural logarithms, the estimated coefficients of the "time in destination country" dummies represent the percentage effects of assimilation on immigrant wage growth. Total immigrant earnings growth due to assimilation is the sum of the earnings growth from employment assimilation and the earnings growth from wage assimilation.

Table 4: Institutional Differences Among Australia, Canada, and the United States

	Australia		Canada		United States	
A. Indicators of Union Power	**1980**	**1990**	**1980**	**1990**	**1980**	**1990**
1. Density (%)	48	41	36	36	22	16
2. Coverage (%)	88	80	37	38	26	18
3. Centralization (ranking)	3	1	17	17	17	17
4. Co-ordination 1980 (ranking)	7	5	18	17	18	17
B. Indicators of Wage Dispersion						
1. 90/10 wage ratio, men	2.67	3.93	3.73	4.21	4.04	4.80
2. 90/50 wage ratio, men	1.78	2.00	1.78	1.82	1.89	2.08
3. 50/10 wage ratio, men	1.50	1.96	2.10	2.31	2.13	2.31
4. Standard deviation of log wages	.499	.596	.684	.797	.775	.797
C. Indicators of Income Support						
1. UI Benefit Replacement Rate Index (%)	24	26	25	28	13	13

Notes:
Rankings of bargaining centralization and co-ordination are among 19 OECD countries; 1 is highest, ties allowed.
Australian wage data refer to weekly income of employees.
Canadian and U.S. wage data refer to weekly earnings of employees.
UI replacement rate index is an average of replacement rates for two earnings levels, three family situations, and three durations of unemployment, computed by OECD.

Sources:
Union data from OECD, *Employment Outlook*, July 1997, Table 2.3.
Wage data from the 1981 and 1991 Australian and Canadian censuses and the 1980 and 1990 U.S. census. Sample is restricted to employed, white native-born men aged 25-59.

UI replacement rate index is from OECD *Employment Outlook*, July1996, Chart 2.2 (numerical rates estimated from graph).