The Performance of Immigrants in the Canadian Labor Market

Michael Baker, *University of Toronto*

Dwayne Benjamin, *University of Toronto*

In this article we examine the economic assimilation of immigrants to Canada. We provide new evidence on immigrants who arrived in the 1970s and document an increase in the dispersion of labor market outcomes across immigrants of different vintages over time. Our results confirm U.S. evidence of "permanent" differences across immigrant cohorts. What distinguishes the Canadian experience is small or negative rates of assimilation for most cohorts over the sample period. Finally, we test the overidentification of the assimilation process specified in previous studies and fail to reject the usual cohort fixed-effect specification.

I. Introduction

There has been a strong increase over the past decade in the number of studies examining the economic outcomes of immigrants. In the U.S. literature, research has evolved from the original cross-section evidence of economic assimilation (Chiswick 1978) through the discovery of the "declining quality" of recent immigrant cohorts (Borjas 1985) to controversies over measurement issues (LaLonde and Topel 1992) and subsidiary studies of related topics (e.g., Borjas 1993). Examination of Canadian data has not progressed as quickly. There have been assorted cross-section studies

of immigrant earnings (e.g., Tandon 1978; Abbott and Beach 1993), and, to our knowledge, only two analyses of information from more than one census (Bloom and Gunderson 1991; Borjas 1993). In this article we attempt to redress some of the imbalance in this development, by examining data on immigrant earnings from three Canadian censuses and addressing a number of measurement issues which have received insufficient attention in a Canadian context.

There are important differences between the Canadian and U.S. immigration experiences which highlight the benefits of this exercise. Canadian immigration policy in recent decades has been based on a "point system" which attempts to match the skills of immigrant inflows with perceived shortages in the Canadian labor market. In contrast, recent U.S. immigration policy has paid greater heed to the demands of family reunification. Borjas (1993) identifies the impact this difference has had on the source composition of immigrants to the two countries. At a more prosaic level, the myths which shape public perception toward immigrants in the United States and Canada are markedly different: the U.S. "melting pot" contrasts sharply with the explicit policies of multiculturalism espoused by various levels of government in Canada. Finally, the working parameters of study in the two countries are also distinct. The Canadian census is conducted every 5 years, providing more observations on immigrant cohorts than are currently available in U.S. data. The more frequent sampling of this population may help minimize the problems associated with remigration, which could bias estimates of economic assimilation, as well as provide a source of overidentification of this process.

The specific objectives of this article are threefold First, we seek to establish the important features of the economic experience of recent immigrants to Canada. Previous studies suggest that immigrant assimilation in Canada proceeds at a modest pace and offer some evidence of a decline in the fortunes of the most recent immigrant cohorts. We provide new evidence on the assimilation of these more recent cohorts over the 1970s and 1980s. Second, we address several measurement and specification questions. We consider the "normalization issue," which has hindered consensus on the relative labor market outcomes of recent immigrants to the United States. A comparison of the research of Borjas (1985) and LaLonde and Topel (1992) reveals that argument over what has provocatively been called the "quality" dimension turns on the method used to normalize the earnings growth of immigrant cohorts between censuses. This issue has received insufficient attention in the U.S. literature, none at all in a Canadian context, yet is critically important to the conclusions drawn in a particular study. Our investigation of the sensitivity of estimates of assimilation to the choice of "control group" should contribute to this discussion. We also explore the consequences of focusing on full-time employed males, the population of interest in the previous studies, and

question whether some important features of the assimilation process are missed through this selection criterion. Third, we use the three censuses as an arena to test the stability of the assimilation process that is traditionally measured in two censuses. This test provides evidence on the suitability of the cohort fixed-effect specification which is used in most studies in this area.

Our analysis proceeds as follows. In Section II, we describe the key features of the labor market outcomes of Canadian immigrants. This analysis reveals that the temporal decline in the economic status of successive immigrant cohorts is correlated with significant changes in their source-country composition and labor market behavior. We also show that immigrants assimilate quickly in several other labor market dimensions, for example, increasing their rates of year-round employment. In Sections III and IV we briefly outline our method of measuring assimilation and present the overidentification test of the assimilation profile. Section V contains our main results. We find that existing evidence of modest immigrant assimilation in Canada is confirmed over the three censuses; in fact it may be overstated. Many arrival cohorts experience no earnings growth or "dissimilation" over the period. This result is surprising. Earlier immigrant cohorts entered the labor market near parity with natives. Their slow rates of assimilation are associated with a relatively modest "earnings gap" and are conditional on a substantial prior period of residence in Canada. More recent cohorts enter the market at a much larger deficit, but they share these low rates of assimilation, at least in their first years in Canada. The data necessary to determine whether this is a trend will not be available until future censuses, but our evidence is suggestive that economic integration is becoming an increasingly elusive goal. This decrease in the entry earnings of recent immigrants is similar to findings in the U.S. literature and is indicative of "permanent" differences across arrival cohorts, whose identification is an important topic for future research. That this pattern is accompanied with very low rates of assimilation, however, distinguishes the Canadian experience. We examine the contributions of changes in immigrant composition, and in the returns to various forms of human capital, to these conclusions. In Section VI we reconcile our results with the literature, suggesting that the more restrictive methods used to measure assimilation in previous studies may not do justice to the differences across immigrant cohorts. Finally, Section VII contains our conclusions and some suggestions for future research.

II. A Sketch of Immigrants' Labor Market Experience

Our data are from the Public Use Microdata Files of the Canadian censuses in 1971, 1981, and 1986. The 1976 census does not contain any information on the period of immigration of respondents. Each census provides information corresponding to the preceding year (i.e., 1970, 1980,
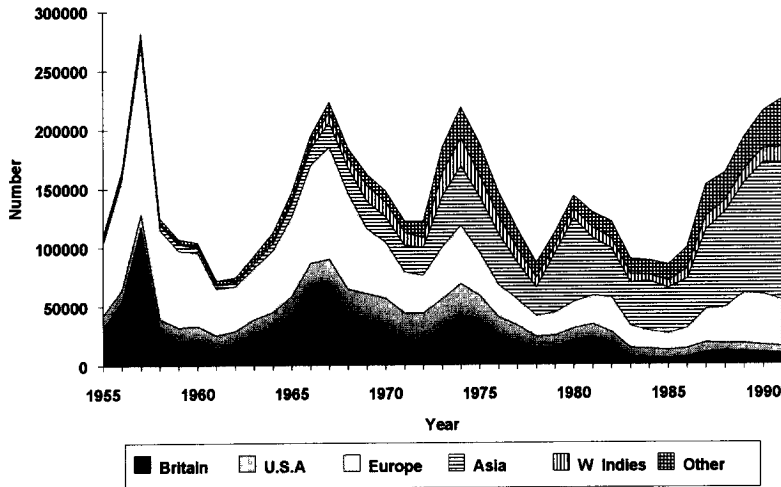
Fig. 1 —Immigration to Canada, by source region. Source —Statistics Canada (CANSIM Data Base)

and 1985). We use all available records for immigrants and blacks in each census and select a one-sixth random sample of other native-born respondents. We focus our attention on males who are between the ages of 16 and 64 on the relevant survey date. The sample sizes for immigrants of various vintages are reported in table A1 of the Appendix.

Information on the size of the immigrant flow and its source composition over time is presented in figure 1. The flow of immigrants is quite variable: its movements mark changes in Canada's official position toward immigration, as well as conditions in the domestic labor market. Bloom and Gunderson (1991) and Green and Green (1992) chart the course of Canada's immigration policy in the postwar period. Two of the more significant policy developments of the past few decades have been the evolution of the rights to family reunification and the implementation of the "point system" in 1967.[1] In the immediate postwar decade, Canada's immigration policy had a specific preference for immigrants from northern European countries. In particular, the right to sponsor family members for immigration to Canada was severely restricted for immigrants who were not from this area. Over the late 1950s and 1960s, full rights were gradually extended to immigrants from all regions. Equal access to the right of spon-

[1] The point system is used to assess prospective immigrants on the basis of their labor market skills and demographic characteristics. It applies only to independent applicants and sponsored relatives, although the latter group receive "bonus points" for their family ties to Canada The applications of "close" family members and refugees are not subject to this evaluation. Over the 1980s, approximately 40% of the immigrants entering Canada qualified under the point system

sorship, together with the fact that immigrants from nontraditional source countries were more likely to exercise this right, led to some of the changes in the composition of immigrant cohorts starting in 1960s. The "objective" evaluation of nonsponsored immigrants afforded by the point system reinforced this trend. In the 1950s and early 1960s, the immigrant flows originated primarily in Europe, the United States, and the British Isles. Starting in the late 1960s, however, these regions have a much less dominant position. During the 1970s and 1980s, we observe strong increases in the proportion of immigrants from Asia, Latin America, and Africa. These trends are most evident for the cohorts arriving after 1970.

This compositional variation is in turn correlated with changes in some basic labor market characteristics of immigrants. In figures 2–4, we plot age profiles of the differences between immigrants and natives in several labor market dimensions. In each census year, the comparison is between both natives and "recent immigrants," those who have been in Canada 1–5 years (top panel), and natives and "earlier immigrants," those who have been in Canada 16–25 years (bottom panel). Comparison across panels within a figure suggests the rate of economic assimilation in these dimensions.

When examining immigrant earnings, we restrict our sample to respondents who report 40 or more weeks of work in the previous year. Figure 2 is a plot of the native/immigrant differentials in the percentage of respondents who fulfill this criterion across the censuses. Recent immigrants are less likely than natives to work year round, and the difference in their participation grows markedly across time. An implication of this result is that one of our sample selection criteria, which has been used extensively in previous studies, is correlated with the arrival period of immigration. A comparison across the panels suggests that it is also correlated with years in Canada. As shown below, it is possible that the decision to work year round is therefore correlated with unobservables in immigrants' earnings functions. The sample selection on this variable could potentially undermine the identification of some of the measures of earnings assimilation outlined in the next section. We return to this issue in the discussion of the results below.

An alternative view of this result is shown in figure 3. Here we examine the unemployment rates (URs) of the two groups. The URs of recent immigrants are almost always higher than the URs of natives, and again the differential has been growing over time. The URs of earlier immigrants, however, are consistently lower than the URs of natives.

In figure 4, the native/immigrant differentials in the age profiles of unadjusted log earnings are presented. In the 1971 data, the differential between natives and both recent and earlier immigrants is very small. By 1986, however, recent immigrants of all ages earn considerably less than

Baker/Benjamin

Comparison with Recent Immigrants

1971 ---- 1981 ——— 1986

Comparison with Earlier Immigrants

1971 ---- 1981 ——— 1986
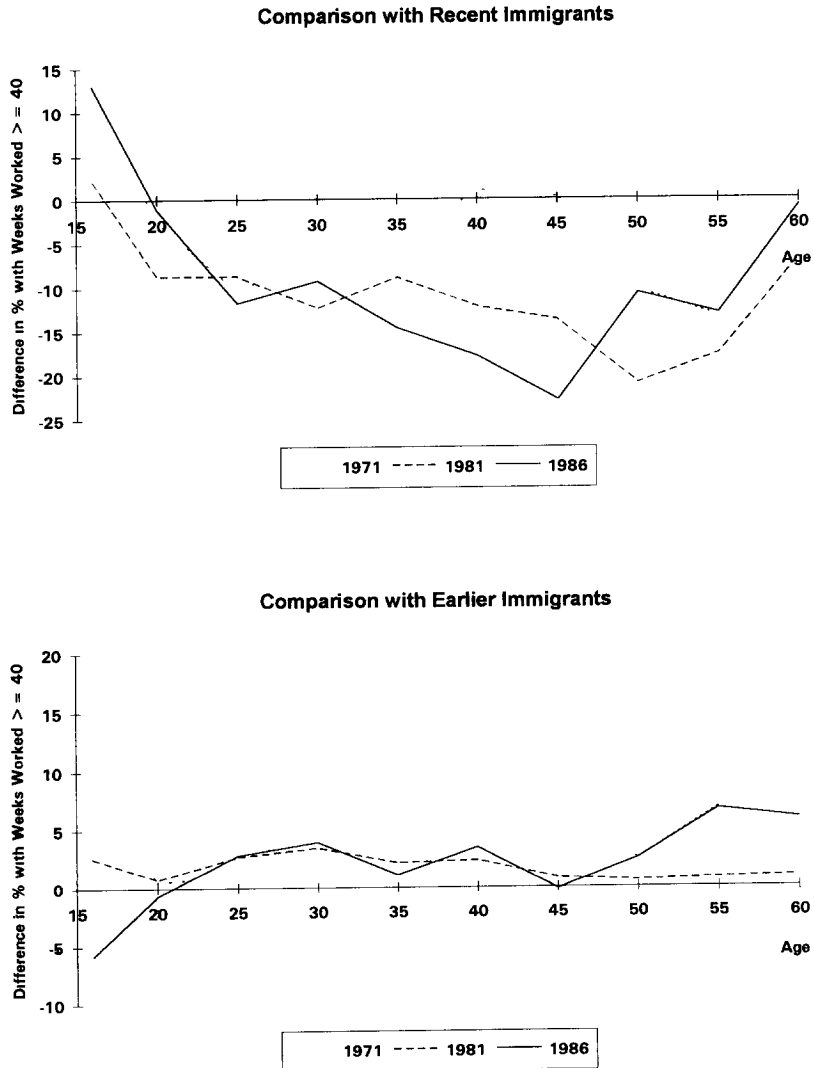
FIG 2.—Difference in percentage of natives and immigrants who worked at least 40 weeks Earlier immigrants are those who have been in Canada 16–25 years, while recent immigrants are those who have been in Canada for less than 5 years The vertical scale differs between the two panels of the figure Source.—Canadian census, 1971, 1981, and 1986

natives. The lower panel shows that earlier immigrants in each census have earnings which equal or exceed those of natives.

The preceding evidence suggests that the labor market experience of recent immigrants has changed markedly across the sample period. An obvious dimension in which recent immigrant cohorts could differ from

Comparison with Recent Immigrants

Comparison with Earlier Immigrants

FIG. 3 —Difference in unemployment rates of natives and immigrants Earlier immigrants are those who have been in Canada 16–25 years, while recent immigrants are those who have been in Canada for less than 5 years The vertical scale differs between the two panels of the figure Source.—Canadian census, 1971, 1981, and 1986

their predecessors is the levels of observable skills they bring to Canada. In table 1 the average education levels of the various immigrant cohorts in each census are presented. We show the differential in immigrant and native years of schooling, as well as in age-adjusted differences, recognizing that the ages of individuals in immigrant cohorts differ from the native

Comparison with Recent Immigrants

Comparison with Earlier Immigrants

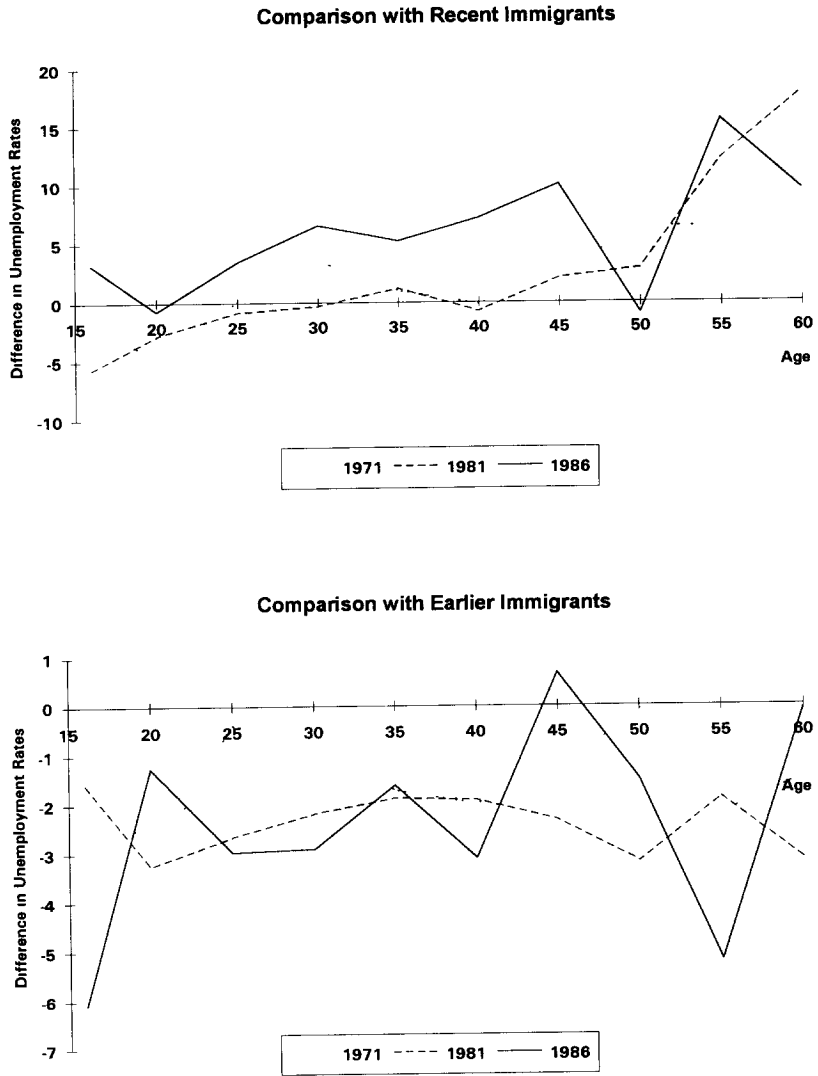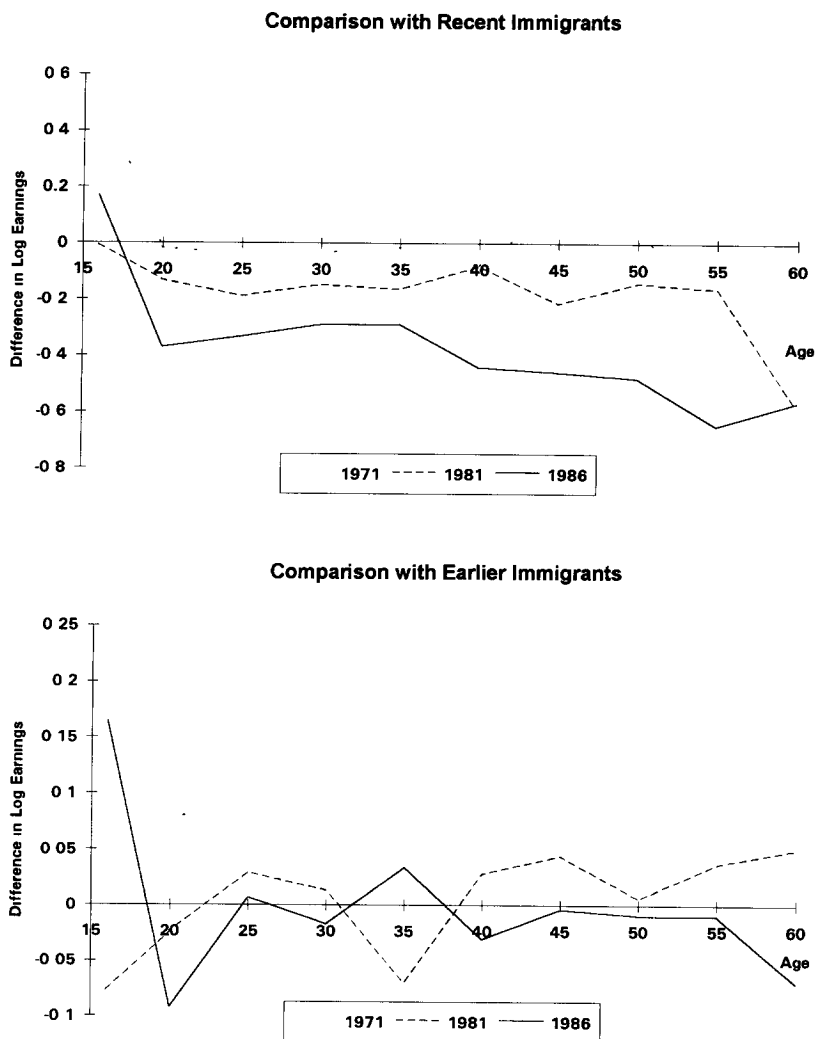

FIG 4.—Difference in log earnings between natives and immigrants Earlier immigrants are those who have been in Canada 16–25 years, while recent immigrants are those who have been in Canada for less than 5 years. The vertical scale differs between the two panels of the figure Source —Canadian census, 1971, 1981, and 1986

comparison group. The most important result from this table is that immigrants to Canada tend to be more highly educated than natives. In contrast, immigrants to the United States have fewer years of schooling than their native counterparts (Borjas 1993). Also, the immigrant advantage in this dimension appears to be declining over time—most dramatically, between 1981 and 1986—as well as declining across recent cohorts.

Table 1
Years of Schooling for Immigrant Cohorts and Native-Born Canadians

	IM46P	IM4655	IM5660	IM6165	IM6670	IM7175	IM7680	IM8185	Natives
1971 census									
Years	10.25	11.22	11.16	11.35	12.51	…	…	…	11.01
Raw difference	-.76	.21	.15	.33	1.49	…	…	…	
	(.11)	(.08)	(.10)	(.13)	(.10)				
Age-adjusted difference	.00	.40	.18	.15	1.18		…	…	
	(.11)	(.08)	(.10)	(.13)	(.10)				
1981 census:									
Years	12.09	12.66	12.88	12.99	14.23	14.20	14.21	…	12.82
Raw difference	-.72	-.16	.07	.18	1.41	1.38	1.39	…	
	(.13)	(.07)	(.08)	(.09)	(.07)	(.08)	(.10)		
Age-adjusted difference	.36	.47	.45	.31	1.48	1.25	1.14	…	
	(.13)	(.07)	(.08)	(.09)	(.07)	(.08)	(.10)		
1986 census									
Years	12.62	13.01	13.21	13.22	14.28	14.38	14.32	14.50	13.76
Raw difference	-1.14	-.75	-.55	-.54	.52	.62	.56	.74	
	(.18)	(.07)	(.08)	(.10)	(.07)	(.08)	(.09)	(.12)	
Age-adjusted difference	-.32	-.34	-.33	-.56	.42	.36	.20	.28	
	(.18)	(.07)	(.08)	(.10)	(.07)	(.08)	(.09)	(.12)	

NOTE.—Standard errors are in parentheses IM5660, IM6165, IM6670, IM7175, IM7680, and IM8185 refer to immigrant arrival cohorts between the indicated years (e g , 1956–60, etc) The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings Age-adjusted mean differences ("Age-adjusted difference") are the regression-adjusted differences in years of schooling for immigrants and natives This is accomplished by including a linear age term in the regression that computes the raw differences of schooling between natives and each cohort

Before proceeding, we draw another interesting comparison between immigrants to Canada and the United States. In figure 5 we plot the age profile of the U.S. native/immigrant log-earnings differential in 1980. The U.S. cross section displays the celebrated assimilation profile identified by Chiswick (1978), among others. Note that the log-earnings gap between natives and recent immigrants is larger than in 1981 Canadian results. Furthermore, it is only in 1986 that the Canadian data display a cross-section assimilation profile comparable to that in the U.S. data.

III. Measuring Assimilation

A standard earnings function in year t for immigrants who arrived in Canada in periods ι is

$$y_t = X'_t\beta_t + \sum_\iota \delta_{\iota,t} + \varepsilon_t, \tag{1}$$

where X_t and β_t are vectors of observable characteristics and parameters, respectively, and the $\delta_{\iota,t}$ are cohort-specific intercepts.[2] The identification of measures of assimilation (differences in the values of the $\delta_{\iota,t}$ across ι or t) rests on assumptions concerning the properties of any unobservable

Comparison with Immigrants: U.S. 1980
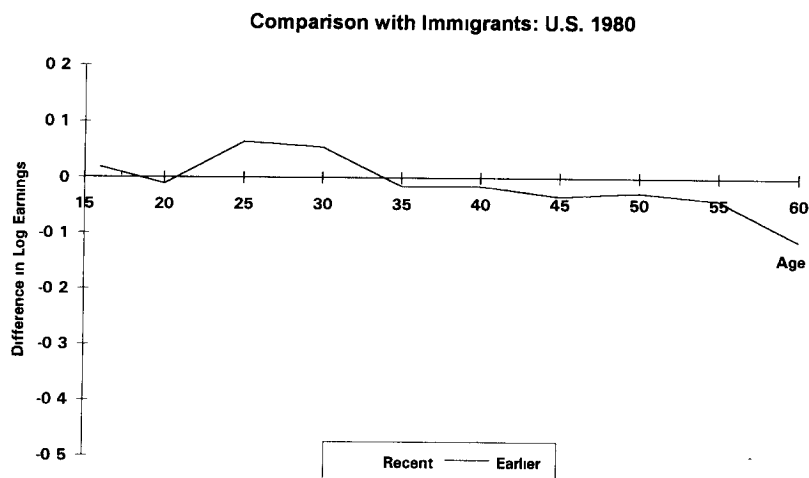
Fig. 5 —Difference in log earnings between natives and immigrants for the United States in 1980. Earlier immigrants are those who have been in the United States for 16–30 years, while recent immigrants are those who have been in the United States for less than 5 years. The scale differs between this figure and the previous ones Source —U S census, 1980

[2] The methods described in this section have been developed by, among others, Chiswick (1978), Borjas (1985), and LaLonde and Topel (1992)

cohort-specific effects in the error term. LaLonde and Topel (1992) propose an error term for cohort i in year t of the form

$$\varepsilon_{i,t} = a_{i,t} + b_{i,t} + u_i. \tag{2}$$

The first component, $a_{i,t}$, is a time-dependent cohort effect related to elements of the assimilation process, such as the accumulation of Canada-specific human capital. The second component represents all other unobserved time effects which may differ across cohorts.[3] The final component is a cohort-specific fixed effect which is assumed fixed on entry to Canada. It is this factor which is sometimes referred to as the "quality" of an immigrant cohort.

In this framework the returns to k years assimilation are $(a_{i,t} - a_{i+k,t})$ in a single cross section of data or $(a_{i,t} - a_{i,t-k})$ using two cross sections k years apart. In each case we estimate these returns using the $\delta_{i,t}$. In the cross-section measure, we must assume that (1) $E[b_{i,t} - b_{i+k,t}] = 0$, and (2) $E[u_i - u_{i+k}] = 0$, to identify the returns to assimilation. Some researchers (e.g., Borjas 1985) argue that the average level of the cohort-specific fixed effect has declined over time, $u_i > u_{i+k}$, lending a positive bias to cross-section estimates of assimilation.[4]

Estimates of assimilation free of the fixed-effect bias, as well as evidence of the stability of the u_i across cohorts, may be obtained using quasi-panel methods. In this case we estimate the returns to assimilation as $(\delta_{i,t} - \delta_{i,t-k})$. The assumptions required to identify these returns are (1) the u_i are fixed over time, so they net out in the calculation,[5] and (2) $E[b_{i,t} - b_{i,t-k}] = 0$. This latter condition is most certainly not true. For example, general earnings trends in the economy, captured by the difference $(b_{i,t} - b_{i,t-k})$, will bias the estimate. A solution to this problem is to normalize the secular growth in immigrant earnings against that of some base group n. In an additional regression of the form

$$y_{n,t} = X'_{n,t}\lambda_t + \delta_{n,t} + \varepsilon_{n,t}, \tag{3}$$

---

[3] Thus, fluctuations in the level of economic activity may affect the earnings of immigrant cohorts differently.

[4] Therefore, earlier arrivals earn more than recent immigrants, not because they have been in Canada longer, but because they possess a higher average level of this unobserved factor.

[5] An obstacle to this assumption is the remigration of immigrants. If the emigration is selective, then the average value of u_i within a cohort may change across censuses Unfortunately, the data necessary to give this issue the attention it deserves are not available. Another hurdle is suggested by the evidence in the preceding section, that year-round employment is correlated with years in Canada. Again, this could cause the average value of u_i in our sample to change across censuses We explicitly consider the effects of this sample-selection criterion in the presentation of the regression results below (see n. 17 below)

the error term includes a fixed effect, u_n, a time effect, $b_{n,t}$, but by definition no assimilation effect. Therefore, the difference $(\delta_{i,t} - \delta_{i,t-k}) - (\delta_{n,t} - \delta_{n,t-k})$ will equal $(a_{i,t} - a_{i,t-k})$, if $E[b_{i,t} - b_{i,t-k}] - E[b_{n,t} - b_{n,t-k}] = 0$; there are no time effects on the relative earnings of immigrants. This assumption is valid only if the base group is chosen appropriately. For example, if immigrants' earnings are normalized against a base group which does relatively poorly in the period between the two cross sections, the estimate of assimilation will be overstated. In the absence of strong arguments for a "natural" base group, we investigate the sensitivity of our inference to the choice of the group used for this earnings normalization.

The relationship between the quasi-panel and cross-section approaches may be stated as follows. The predicted average level of earnings of cohort i in period t, using the average levels of their observables in this period, is

$$\hat{y}_{i,t} = \bar{X}'_{i,t}\hat{\beta}_t + \hat{\delta}_{i,t}. \tag{4}$$

The predicted average level of earnings for this same cohort in year $t - k$, *using the average levels of the observables in t*, is

$$\hat{y}_{i,t-k} = \bar{X}'_{i,t}\hat{\beta}_{t-k} + \hat{\delta}_{i,t-k}. \tag{5}$$

The year-t predicted earnings, for a cohort that has the same years in Canada as cohort i does in $t - k$, using the average levels of cohort i's observables, is

$$\hat{y}_{i+k,t} = \bar{X}_{i,t}\hat{\beta}_t + \hat{\delta}_{i+k,t}; \tag{6}$$

that is, in t, cohort $i + k$ has the same years since migration (YSM) as cohort i does in year $t - k$. Finally, we define the predicted earnings for the base group in year t, again using the average levels of observables for the immigrant cohort i:

$$\hat{y}_{n,t} = \bar{X}'_{i,t}\hat{\lambda}_t + \hat{\delta}_{n,t}. \tag{7}$$

Using (4) and (6), the cross-section estimate of assimilation $(\delta_{i,t} - \delta_{i+k,t})$ is equal to $(\hat{y}_{i,t} - \hat{y}_{i+k,t})$.[6] As pointed out by Borjas (1985), we may reexpress this estimate as the sum of two components:

---

[6] These two expressions are equal, since the same average values of the observables are used in the construction of $\hat{y}_{i,t}$ and $\hat{y}_{i+k,t}$.

$$\hat{y}_{i,t} - \hat{y}_{i+k,t} = [(\hat{y}_{i,t} - \hat{y}_{i,t-k}) - (\hat{y}_{n,t} - \hat{y}_{n,t-k})] \tag{8}$$
$$+ [(\hat{y}_{i,t-k} - \hat{y}_{i+k,t}) - (\hat{y}_{n,t-k} - \hat{y}_{n,t})].$$

The first term on the right-hand side of (8) measures the "within-cohort" growth of cohort i's earnings across the two data sets, the quasi-panel measure of assimilation. Substituting from above, it equals

$$\bar{X}'_{i,t}[(\hat{\beta}_t - \hat{\beta}_{t-k}) - (\hat{\lambda}_t - \hat{\lambda}_{t-k})] + (a_{i,t} - a_{i,t-k}) \tag{9}$$
$$+ (b_{i,t} - b_{i,t-k}) - (b_{n,t} - b_{n,t-k}).$$

Assuming common net time effects on immigrant and base group earnings, this measure of assimilation contains (1) a component which captures the net change in the "prices" of observables across immigrants and the base group between $t - k$ and t,[7] and (2) a component capturing the change in intercept due to assimilation ($a_{i,t} - a_{i,t-k}$).

The second term in (8) measures the change in earnings for a cohort with a fixed number of years in Canada across the two data sets. If this term is positive, we say that the labor market outcomes of recent cohorts have declined relative to those of their predecessors in the earlier cross section. This "across-cohort" growth measures, among other things, the fixed-effect bias on cross-section estimates of assimilation. Again substituting from above, the across-cohort growth equals

$$\bar{X}'_{i,t}[(\hat{\beta}_{t-k} - \hat{\beta}_t) - (\hat{\lambda}_{t-k} - \hat{\lambda}_t)] + (a_{i,t-k} - a_{i+k,t}) \tag{10}$$
$$+ (b_{i,t-k} - b_{i+k,t}) - (b_{n,t-k} - b_{n,t}) + (u_i - u_{i+k}).$$

Given the assumption on the unobserved time effects, this estimate has three components: (1) the net effect of changes in the prices of observables, (2) ($a_{i,t-k} - a_{i+k,t}$), the difference across time in the labor market outcomes of two cohorts at similar stages of assimilation, and (3) ($u_i - u_{i+k}$), the difference in the fixed effects across cohorts. Estimates of the within- and across-cohort earnings growth of various immigrant cohorts are presented in the following analysis.

IV. Comparing Results across Censuses

The use of three censuses in this study implies that our measures of assimilation are overidentified. We get one set of estimates using the 1971 and 1981 censuses, and another using the 1981 and 1986 censuses. This allows us to examine the stability of the assimilation profile over the 15-

[7] If the base group is itself a group of immigrants, as in some of the results presented below, this component goes to zero as $\lambda_t = \beta_t$ (see Sec. V).

year period 1970–85. For example, does the estimate of the returns to the first 10 years in Canada from the 1971 and 1981 censuses agree with the corresponding estimate from the 1981 and 1986 censuses? Alternatively, we could examine the stability of the fixed-effect differentials among cohorts. As noted above, across-cohort earnings growth implicitly compares the labor market outcomes of cohorts at similar stages of the assimilation process. By comparing estimates of this growth from the 1971/1981 and 1981/1986 data sets, we may determine if these differentials are constant over time. Since the within- and across-cohort growth must sum to the cross-section estimate, these tests are not independent. We choose to test the stability of the within-cohort growth estimates across censuses, believing it to have a more intuitive interpretation.

We wish to compare the returns to residence in Canada at the same stage in the assimilation process across the three censuses. Let t represent the 1981 census. Therefore, the 1971 census is $t - 10$, and the 1986 census is $t + 5$. A measure of the within growth for cohort i from the 1971/1981 censuses is

$$W1 = (\hat{y}_{i,t} - \hat{y}_{n,t}) - (\hat{y}_{i,t-10} - \hat{y}_{n,t-10}). \qquad (11)$$

For example, if i equals the 1966–70 cohort, then $W1$ is an estimate of the returns to the first 10 years in Canada. For the 1981/1986 censuses, we can define two within estimates which are relevant:

$$W2A = (\hat{y}_{i+5,t+5} - \hat{y}_{n,t+5}) - (\hat{y}_{i+5,t} - \hat{y}_{n,t}), \qquad (12)$$

and

$$W2B = (\hat{y}_{i+10,t+5} - \hat{y}_{n,t+5}) - (\hat{y}_{i+10,t} - \hat{y}_{n,t}). \qquad (13)$$

Again, if i is the 1966–70 cohort, then $i + 5$ is the 1971–75 cohort and $i + 10$ is the 1976–80 cohort. Therefore, $W2A$ would be an estimate of the returns to the second 5 years in Canada from the 1981/1986 censuses, and $W2B$ an estimate of the returns to the first 5 years. A test of the stability of the assimilation profile across the three censuses is

$$W1 = W2A + W2B. \qquad (14)$$

The test determines whether the two cross-census comparisons (1971/1981 and 1981/1986) provide similar estimates of a given section of the assimilation profile. Each component in the test restriction (14) may be estimated from the data.

V. Estimates of Assimilation

To motivate the following analysis, we present estimates of assimilation based on cross-section samples of the immigrant population from each census. They are constructed from estimates of the cohort-specific effects, $\delta_{i,t}$, discussed above. In the underlying regressions we control for education, experience, marital status, hours worked in the census reference week,[8] and weeks worked in the census year.[9] The estimates of the coefficients on these explanatory variables are presented in table A2 of the Appendix.

We also include a dummy variable for blacks in the regressions. Given the dramatic changes in the composition of immigrants to Canada reviewed in figure 1, it would appear important to control for membership in various visible minority groups. In contrast to analyses of U.S. data, however, this is not a straightforward exercise with the Canadian censuses. Although Canada has an increasing number of citizens who are black or belong to various Asian nationalities, they still represent a small percentage of the total population; their presence within the native-born population is even smaller. Blacks are the only visible minority group that can be identified fairly consistently across the three censuses. Although we oversample this group in each census, we obtain very few observations; for example, there are only 97 native-born blacks available in the 1986 census.[10] Given this limitation of the data, we interpret the estimates of the dummy variable for blacks with caution in the discussion of the results.

The cross-section estimates are presented in table 2. Given that immigrant cohorts are coded somewhat differently across the three censuses, different parts of the assimilation profile are identified in each data set. We estimate the returns to sequential 5-year periods of assimilation. To interpret, the estimate of the returns to the first 5 years in Canada from the 1971 census, 0.054, is constructed as the difference between the dummy variables for the cohorts that immigrated between 1961 and 1965 (IM6165) and 1966 and 1970 (IM6670). The results indicate that the assimilation profile is quite unstable across the three data sets. For example, the return to the first 5-year period grows from about 5% in the 1971 and 1981 census to over 20% in the 1986 census. Similar fluctuations are observed in the returns to the second, third, and fourth 5-year periods in Canada.

Taken at face value, the results suggest that immigrants to Canada do assimilate and that the pace of their economic integration into Canadian

---

[8] The "census reference week" is the week immediately preceding the week in which the survey is conducted.

[9] Given that our sample is restricted to people who work at least 40 weeks in the previous year, we enter a dummy variable for those who worked 40–48 weeks in this period.

[10] In 1971 and 1981, there are, respectively, 30 and 60 native-born blacks who satisfy our weeks-worked and earnings criteria.

Table 2
Cross-Section Estimates of Assimilation (Returns to 5 Years in Canada)

Time in Canada	1971 Census		1981 Census		1986 Census	
	Difference in Cohort Coefficients	Assimilation	Difference in Cohort Coefficients	Assimilation	Difference in Cohort Coefficients	Assimilation
21–25 years	...	...	...	...	IM5660 − IM6165	.061 (.021)
16–20 years	...	...	IM5660 − IM6165	.051 (.018)	IM6165 − IM6670	.038 (.020)
11–15 years	...	...	IM6165 − IM6670	−.011 (.017)	IM6670 − IM7175	.079 (.017)
6–10 years	IM5660 − IM6165	.000 (.024)	IM6670 − IM7175	.097 (.015)	IM7175 − IM7680	.051 (.020)
First 5 years	IM6165 − IM6670	.054 (.024)	IM7175 − IM7680	.050 (.019)	IM7680 − IM8185	.202 (.025)

NOTE —Standard errors are in parentheses Assimilation is estimated as the difference between the estimated dummy variable coefficients for two adjacent cohorts The cross-section estimates are based on the specification described in the Appendix Control variables are as follows experience, experience squared, years of schooling, black indicator, marital status, and indicators for hours and weeks worked The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e g , 1956–60, etc)

society has increased over time. The lack of consistency of the estimates across the data sets, however, is an initial indication that the cohort effects may be biasing the cross-section inference. To evaluate this possibility we must combine information from more than one census and examine estimates of within- and across-cohort earnings growth.

Recall that, in constructing the quasi-panel estimator, we assume that there are no time effects on the relative earnings of immigrants ($E[b_{i,t+k} - b_{i,t}] - E[b_{n,t+k} - b_{n,t}] = 0$).[11] The American evidence suggests that estimates of within- and across-cohort earnings growth can be sensitive to the choice of the base group, n. Borjas (1985) argues that across-cohort growth is substantial, indicating that recent immigrant cohorts have not prospered as much as their predecessors at similar stages of assimilation. LaLonde and Topel (1992) contest this view and argue that cross-section estimates of assimilation compare favorably with quasi-panel estimates. As noted in the latter study, a major reason for the difference in these conclusions appears to be the choice of base group. A similar debate has arisen in the Canadian literature. Bloom and Gunderson (1991) side with LaLonde and Topel, and Borjas (1993) replicates his result with Canadian data.

We experiment with three different base groups to try to determine the sensitivity of our estimates on this margin, while acknowledging that each implies a different definition of assimilation. The first is the fixed-cohort approach of Borjas (1985). We use the earnings of immigrants who arrived prior to 1946 (IM46P) for the 1971/1981 comparisons and the earnings of immigrants who arrived between 1946 and 1955 (IM4655) for the 1981/1986 analysis.[12] In this case assimilation is defined as the cross-census earnings growth an immigrant cohort experiences, in excess of the growth enjoyed by a specific group of their predecessors. The second uses immigrants with similar years in the country as a benchmark—in our case, immigrants with more than 24 years in Canada (a comparison of IM46P

[11] One aspect of this assumption which has gained importance in the studies of U.S. data is the well-documented increase in earnings inequality in the U S. economy over the past 2 decades (e g., see Bound and Johnson 1992; Katz and Murphy 1992). This trend has favored more highly skilled workers, who are relatively underrepresented among recent immigrants to the United States Therefore, the use of some base groups, e.g., natives, may lead to underestimates of assimilation, because they are made up of a higher proportion of skilled workers. This point is of less concern for Canadian immigrants As noted in table 1, they typically have higher levels of observable skills than natives. Therefore, any advantage to highly skilled workers should not a priori benefit natives relative to immigrants. Also, in Baker and Benjamin (1992), we present evidence that the trend toward inequality has not been as pronounced in Canada as in the United States See also Blackburn and Bloom (1993).

[12] There are not enough members of IM46P left by 1986 to make this a useful control group for analysis.

in 1970 and IM4655 in 1981 across the 1971/1981 censuses, and of IM4655 and IM5660 across the 1981/1986 censuses)—and is comparable to the normalization used by LaLonde and Topel (1992). Again assimilation is defined as earnings growth in excess of that experienced by earlier immigrants, but in this case the comparison is to a fixed point on the assimilation profile rather than to a fixed group of individuals. Finally, the third normalization is the earnings growth of natives. The first two approaches have the advantage of netting out any permanent effects of immigration on earnings. A higher proportion of earlier immigrant cohorts will be domestically educated, however, an important consideration, as our evidence will attest. The native base group provides a more popular definition of assimilation but may offer an impossible standard because of factors such as discrimination or any permanent income differences across natives and immigrants. Finally, positive estimates of assimilation under the first two normalizations imply that the adjusted earnings profiles of recent and earlier immigrants are converging over time. In the third approach, however, positive estimates do not necessarily imply similar convergence between the native and immigrant profiles, as the "prices" on observables are allowed to vary across the two groups.[13]

In table 3 we present decompositions of the 1981 and 1986 cross-section estimates of assimilation into their within- and across-cohort components (alternative specifications are presented in table 4). The first panel contains the results for the 1971/1981 censuses. We begin our analysis with IM5660, because earlier cohorts are used as base groups in some of the earnings normalizations, and they do not provide sufficient sample sizes to permit analysis across all three censuses.[14] In the first column of this panel, cross-section estimates of the effects of 10 years of assimilation, based on the 1981 census, are presented for each cohort. These are constructed as the sum of the corresponding 5-year estimates presented in table 2. For example, the 1981 results indicate that cohort IM6670 enjoyed 14.7% earnings growth over its first 10 years in Canada (0.050 + 0.097 from table 2). In the last row of each panel of table 3, we present the results of a joint test of significance of the assimilation estimates. Clearly, the cross-section results indicate that immigrants to Canada enjoy statistically and economically significant assimilation.

In the next two columns of table 3, these cross-section estimates are broken down into their within- and across-cohort components. There appears to be no systematic bias to the cross-section results: they both under- and overestimate the within-cohort growth of different cohorts. For ex-

---

[13] In particular, lower returns to experience may negate the relative progress immigrants make through assimilation. See the discussion below at table 6.

[14] Also, earlier cohorts are identified over arrival intervals which are greater than 5 years.

ample, the cross-section estimate of 14.7% earnings growth for IM6670 is similar to the within-cohort estimate of 12.9%, which we obtain by comparing the relative position of this cohort across the two censuses ($\hat{y}_{IM6670,1981}$ − $\hat{y}_{IM6670,1971}$).[15] The estimate of the across-cohort growth, about 2%, suggests that the cross-section bias is relatively minor for this cohort. Much the same conclusion holds for IM6165. For cohort IM5660, the cross-section estimate is biased, but in a direction we might not expect. Here, the cross-section result *underestimates* the within-cohort growth observed across the two censuses. Taken literally, this suggests that the cross-section bias arises because we compare the earnings of this cohort relative to more recent cohorts which attained *higher* outcomes. Overall, each of the cohorts appears to have enjoyed substantial assimilation over the period, and this is reflected in the joint test.

Before settling on any conclusion, however, we must control for general earnings trends within the economy over the decade. The within-cohort estimates may reflect economy-wide changes in compensation and may be unconnected with assimilation. In the last six columns of table 3, we present decompositions controlling for secular earnings growth with the base groups discussed above. The general effect of any of these normalizations is to dampen most of the within-cohort growth; in most cases the cross-section estimates are very poor summaries of the within-cohort results. For example, using the fixed-cohort (IM46P) normalization, we estimate negative or zero returns to assimilation for all three cohorts across the censuses; for IM6165 the income decline is substantial. In each case the estimate of across-cohort growth exceeds the cross-section estimate. Therefore, the positive returns to assimilation in the cross section are due to comparisons across cohorts whose fortunes are declining over time, not because recent immigrant cohorts are attaining the economic outcomes of their predecessors. The within-cohort estimates improve marginally when we use the earnings growth of a cohort with fixed years in Canada as a normalization but indicate at best no returns to assimilation over the period. Some positive within estimates for IM5660 and IM6670 are obtained when natives are used as a base group, although both within estimates are insignificant at conventional levels. Taken jointly, we cannot reject the hypothesis that there is no immigrant assimilation.

Similar analysis for the 1981 and 1986 censuses is presented in the second panel of table 3. In this case we decompose cross-section estimates of the effects of 5 years of assimilation, which are transcribed directly from table 2. In the decomposition without a base group (cols. 2 and 3), the estimates of within-cohort growth are uniformly negative for all cohorts, although some of them are imprecisely estimated. Normalizing for secular earnings

[15] This calculation excludes the "price" effect, since the comparison excludes any base group. See n. 7 above.

Table 3
Decomposition of Cross-Section Growth in Immigrant Earnings (Base Specification)

Arrival Cohort	Cross Section (1)	None Within (2)	None Across (3)	Control (Base) Group — Immigrants prior to 1945 Within (4)	Across (5)	Immigrants in Canada > 25 years Within (6)	Across (7)	Natives Within (8)	Across (9)
1971 and 1981 censuses—estimates of effect of 10 years in Canada									
IM5660	.040 (.015)	.122 (.018)	-.082 (.018)	-.047 (.033)	.088 (.034)	-.005 (.027)	.046 (.028)	.030 (.022)	.010 (.022)
IM6165	.086 (.018)	.070 (.024)	.017 (.023)	-.099 (.038)	.185 (.037)	-.057 (.032)	.143 (.032)	-.025 (.027)	.112 (.026)
IM6670	.147 (.018)	.129 (.019)	.018 (.022)	-.034 (.035)	.181 (.037)	.008 (.029)	.139 (.032)	.037 (.024)	.110 (.027)
Joint test (p-value)	119.2 (.00)	92.4 (.00)		8.0 (.05)		5.2 (.16)		5.9 (.12)	
1981 and 1986 censuses—estimates of effect of 5 years in Canada									
IM5660	.061 (.021)	-.017 (.017)	.078 (.019)	.044 (.022)	.017 (.024)	.047 (.014)	.014 (.025)	.026 (.020)	.035 (.022)
IM6165	.038 (.020)	-.033 (.021)	.071 (.018)	.034 (.026)	.004 (.024)	.037 (.027)	.001 (.024)	.031 (.023)	.007 (.020)
IM6670	.079 (.017)	-.082 (.016)	.161 (.017)	-.015 (.022)	.094 (.023)	-.012 (.023)	.091 (.024)	-.017 (.019)	.096 (.020)

388

IM7175	.051 (.020)	.202 (.025)	−.068 (.017)	−.073 (.021)	.120 (.019)	.275 (.025)	.003 (.024)	.002 (.028)	.048 (.026)	.200 (.030)	.006 (.024)	.005 (.028)	.045 (.026)	.197 (.031)	.009 (.021)	.014 (.024)	.042 (.022)	.188 (.027)
IM7680																
Joint test (p-value)	375.3 (.00)		57.8 (.00)				8.5 (.13)				15.5 (.01)				5.5 (.36)	

NOTE.—Standard errors are in parentheses. Within growth is the difference in regression-adjusted earnings of a cohort over the two censuses and is given by $(\hat{y}_{it} - \hat{y}_{it-k})$, while across growth is the change in the cross-section comparison group $(\hat{y}_{jt-k} - \hat{y}_{jt+k})$. These changes are compared to the earnings growth of the base group $(\hat{y}_{nt} - \hat{y}_{nt-k})$. IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e.g., 1956–60, etc.). The cross-section estimates are based on the specification described in the Appendix. Control variables are as follows: experience, experience squared, years of schooling, black indicator, marital status, and indicators for hours and weeks worked. The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings. The joint test of significance is a Wald test of whether the within growth of all cohorts is statistically significantly different from zero. For the 1971–81 estimates, this is distributed as χ^2 (5), while for the 1981–86 estimates it is χ^2 (3).

389

Table 4
Decomposition of Cross-Section Growth in Immigrant Earnings (Alternative Specifications)

Arrival Cohort	No Regressors			Composition Constant			Foreign Human Capital		
	Cross Section (1)	Within (2)	Across (3)	Cross Section (4)	Within (5)	Across (6)	Cross Section (7)	Within (8)	Across (9)
1971 and 1981 censuses—estimates of effect of 10 years in Canada									
IM5660	330 (.016)	052 (.023)	-022 (.023)	042 (.015)	028 (.023)	014 (.023)	040 (.018)	024 (.026)	016 (.026)
IM6165	086 (.019)	-006 (.028)	092 (.027)	040 (.018)	-051 (.027)	091 (.026)	151 (.021)	021 (.031)	130 (.029)
IM6670	261 (.020)	125 (.023)	136 (.026)	089 (.018)	032 (.023)	056 (.026)	238 (.020)	104 (.027)	135 (.029)
Joint test (p-value)	254 1 (.00)	33 1 (.00)		51 3 (.00)	9 4 (.02)		196 6 (.00)	15.7 (.00)	
1981 and 1986 censuses—estimates of effect of 5 years in Canada									
IM5660	106 (.023)	057 (.021)	048 (.023)	052 (.021)	019 (.020)	034 (.022)	049 (.026)	-016 (.025)	065 (.028)
IM6165	003 (.022)	048 (.025)	-045 (.022)	038 (.020)	026 (.023)	012 (.021)	005 (.024)	-014 (.028)	019 (.024)
IM6670	116 (.019)	-021 (.019)	137 (.020)	060 (.018)	-011 (.019)	071 (.020)	110 (.020)	000 (.022)	110 (.023)
IM7175	083 (.022)	015 (.021)	068 (.023)	010 (.020)	-016 (.019)	026 (.021)	099 (.022)	052 (.022)	046 (.024)

390

IM7680	264 (027)	041 (025)	223 (028)	165 (025)	028 (024)	137 (027)	258 (026)	063 (025)	195 (028)
Joint test (p-value)	617 1 (00)	15.4 (01)		203 8 (00)	5 4 (37)		365.7 (00)	12.4 (03)	

NOTE.—Standard errors are in parentheses. All assimilation estimates are presented with native base (comparison group). Within growth is the difference in regression-adjusted earnings of a cohort over the two censuses and is given by $(\hat{y}_{i,t} - \hat{y}_{i,t-k})$, while across growth is the change in the cross-section comparison group $(\hat{y}_{i,t-k} - \hat{y}_{i,t+k})$. These changes are compared to the earnings growth of the base group $(\hat{y}_{n,t} - \hat{y}_{n,t-k})$. Cross-section estimates are based on specification described in the Appendix. Control variables are as follows experience, experience squared, years of schooling, black indicator, marital status, and indicators for hours and weeks worked. The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings. The joint test of significance is a Wald test of whether the within growth of all cohorts is statistically significantly different from zero. For the 1971–81 estimates, this is distributed as χ^2 (3), while for the 1981–86 estimates it is χ^2 (5). The no regressors specification is a comparison IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e g, 1956–60, etc). The no regressors specification employs the same regression as in the base specification (experience, experience of unadjusted mean earnings for the immigrant cohorts, the composition constant specification employs the composition constant specification so that each census year has the squared, years of schooling, black indicator, marital status, and indicators for hours and weeks worked) but weights the immigrant regressions so that each census year has the same regional composition as 1980, and the foreign human capital specification employs the same base specification but excludes those immigrants who arrived in the country at an age early enough for them likely to have received their education in Canada

391

growth, however, reveals that most groups within the population made out rather poorly over this period. For example, using the fixed-cohort approach (IM4655), the signs on most of the estimates of within-cohort growth become positive. Note that the estimates for IM5660 and IM6165 are at least 70% of the cross-section estimate. In contrast, the bias of across-cohort growth is particularly large for cohorts which arrived after 1965. In each of these cases, the estimate of within-cohort growth is effectively zero. These conclusions are much the same when other base groups are used. The estimates of within-cohort growth for IM5660 and IM6165 are slightly smaller when we use natives as a base group, but the contrast between the pre- and post-1965 cohorts is preserved.

In the first panel of table 5 we present the results of our tests of cross-census restrictions on within-cohort growth (eq. [14]). Without exception, we cannot reject the hypothesis that the assimilation profile is stable across censuses. In some cases this is due to the lack of precision of the underlying estimates of assimilation. Nevertheless, other estimates match up surprisingly well across the data sets. We also perform a joint test that the different sections of the assimilation profile are simultaneously equal across censuses; again we cannot reject the hypothesis that they are.

These findings distinguish the Canadian and U.S. immigrant experiences. First, we do not find that the choice of base group has much effect on our

Table 5
Selected Wald Tests of Cross-Census Assimilation Restrictions
A. Base Specifications for Different Comparison Groups
(Based on Table 3)

Cohort	None	Fixed Cohort	Immigrants in Canada > 25 Years	Natives
IM5660	54 33 (.00)	1.65 (.20)	43 (51)	19 (66)
IM6165	43 66 (00)	2 63 (.10)	1 10 (29)	.18 (.67)
IM6670	66.35 (00)	50 (48)	00 (96)	11 (74)
Joint test	150 61 (00)	3 18 (36)	1 75 (63)	83 (84)

B. Alternative Specifications for Native Comparison Group
(Based on Table 4)

Cohort	No Regressors	Composition Constant	Foreign Human Capital
IM5660	40 (53)	12 (72)	77 (38)
IM6165	.00 (1.00)	.38 (54)	48 (49)
IM6670	3 04 (08)	29 (.59)	.07 (79)
Joint test	3 74 (29)	1 32 (72)	1.89 (60)

NOTE.—p-values are in parentheses Details of the tests are described in the text The specified cohorts represent the predicted assimilation from the 1971/1981 censuses compared with a cohort with the same years in Canada in the 1981/1986 census The tests are of the stability of immigrant earnings growth at a given point on the assimilation profile The joint test is a test of the stability at all points on the profile IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e g , 1956–60, etc)

evaluation of cross-section inference or on the size of the bias from across-cohort growth. The estimates of within-cohort growth for IM5660 and IM6670 from the 1971/1981 censuses do change sign when we use natives as a base group, but the size of the associated standard errors suggests that the assimilation of these cohorts has been minimal. Also, the estimates under different normalizations do not lead to different conclusions regarding the reliability of cross-section inference, as is the experience in U.S. studies. Second, the returns to assimilation, our estimates of within-cohort growth, are very small. A generous estimate of the effects of 10 years of assimilation for most cohorts would be a −3% through 3% earnings change.[16] The estimates reported by Borjas (1985) and LaLonde and Topel (1992) for U.S. data are at least twice as large. Small returns to assimilation are not so remarkable for the earlier cohorts, who entered the labor market with relatively high earnings, had a large skill advantage over natives, and have already spent a considerable period in Canada. The confirmation of this result for recent cohorts is more surprising, however, as their entry earnings are relatively lower, their skill advantage is smaller, and they are on what is likely the steepest segment of their assimilation profile.

One finding that is in agreement with U.S. evidence is the declining fortunes of successive immigrant cohorts. The results from the 1981/1986 censuses are particularly instructive in this regard. As noted above, the bias from across-cohort growth is particularly large for cohorts who arrived after 1965. The across-cohort estimates for the IM5660 and IM6165 cohorts are based on comparisons to cohorts who arrived before 1970 (the IM6165 and IM6670 cohorts). In each of these cases, the across-cohort growth accounts for a relatively small percentage of the cross-section estimates. Starting with the IM6670 cohort, however, the across-cohort comparisons are to post-1970 cohorts. In these instances, the across-cohort growth accounts for a substantially greater proportion of the cross-section growth. The most extreme example is the IM6670 cohort, whose across-growth comparison crosses the 1970 delineation. In this case, the across-cohort growth accounts for between 115% and 121% of the cross-section estimate, depending on the base group used. Therefore, the bias induced by the decline in the cohort fixed effects over time appears particularly large when the comparison is to cohorts who arrived after 1970. This result is also roughly discernible in the results from the 1971/1981 censuses. Here it is the IM6165 and IM6670 cohorts whose across-cohort growth is constructed through comparison to post-1970 cohorts, and it is generally 100% or more of the cross-section result. For the IM5660 cohort, the estimate of across-cohort growth is more sensitive to the choice of base group. For the fixed-cohort normalization, it is much larger than the cross-section

---

[16] The result is more likely positive and larger for the earlier cohorts.

estimate. When natives are the base group, the across growth is about 25% of the cross-section result.

This decline in the fortunes of recent immigrants also has economic significance. For example, the 1971/1981 results suggest the IM7680 cohort's entry earnings are between 11% and 18% lower than those of the IM6670 cohort. A similar deficit is observed between the IM7175 and IM6165 cohorts. The 1981/1986 results confirm the trend. The entry earnings of the IM8186 cohort are between 19% and 20% lower than those of the IM7680 cohort. There has been a substantial deterioration in the economic status of recent cohorts consistent with the patterns observed in figure 4.

It is possible, however, that our meager estimates of within-cohort growth, and evidence of significant differences across cohorts, are a product of the particular earnings function specification that we use. We now examine the robustness of our estimates to innovations in the specification of the observables used in the regressions, along with the choice of sample.[17] To avoid excessive clutter, we report only the results using natives as the base group. Any changes in inference as a result of using the other base groups are noted when necessary.

To gain a general view of the effects of the observables on our estimates, we present a set of unadjusted estimates in the first three columns of table 4; that is, with no controls for any differences in observables within the sample. Therefore, these estimates include the effects of assimilation along any of the observable dimensions. The results display some of the same patterns as the adjusted estimates in table 3. There is an increase in the estimate of the within growth of the most recent cohort in each census, indicating that immigrants assimilate along standard observables on entry to Canada. The estimates of assimilation for other cohorts are for the most part very small or negative, however, and the across-growth effects are

---

[17] In addition to results presented below, we also replicate our analysis by adding controls for language and relaxing our sample selection criteria so that all respondents who worked more than 1 week in the preceding year are included. We obtain results that are very similar to those reported in table 3 when we include controls for "mother tongue" and "language spoken at home." The only substantive effects of expanding our sample to include all respondents who worked positive weeks are on the results for the most recent cohort in each census. This is not surprising, as we have seen that the assimilation in weeks worked occurs shortly after arrival in Canada. For the most recent cohort, there is some change in the estimate of across-cohort growth, but it works in different directions in the two censuses. For example, in the 1971/1981 censuses, the estimate of across-cohort growth for IM6670 rises to .257 from .110 in the base results (native base group). In the 1981/1986 censuses the across growth for IM7680 is .188 in the base sample and .133 in the sample with no weeks restrictions. These results indicate some correlation between the unobservables and the sample selection criteria, although it is not consistently identified across the censuses

still substantial, especially where the comparison is to post-1970 cohorts. Again, it is the earlier immigrants in each sample who appear to have made the most progress between censuses.

The pattern of the across-cohort growth estimates matches changes in the composition of immigrants after 1970, noted in Section II. It would be interesting, therefore, to determine how much of the decline in the economic fortunes of recent immigrants can be accounted for by these composition effects. As shown in figure 1, an increasing share of Canada's immigrants belong to visible minority groups. We attempt to control for some of the effects of this trend by including the dummy variable for blacks in our regressions. The success of this procedure is thwarted somewhat by the fact that this group represents such a small proportion of our sample. In regressions for natives, the coefficient for blacks is at most marginally significant, and its value varies widely across the censuses. In the immigrant regressions, the black coefficient is generally more precisely estimated and varies over a smaller range over time. In a separate regression (not reported), however, in which the native and immigrant populations are pooled, the estimates of both the dummy variable for blacks, and its interaction with a dummy variable for immigrants, are insignificant, although the two coefficients are jointly significant. Therefore, while the control for blacks is significant, little can be made of a native/immigrant distinction. More important, our results are virtually unaffected if the control for blacks is excluded from the analysis.

A direct way to control for composition would be to perform separate analyses for immigrants from different source regions. Again we are frustrated in this task by small sample sizes. Although we oversample immigrants in all censuses, a meaningful separation of immigrants by source region leads to sample sizes which are too small for reliable inference. Given this hurdle, we take another approach to the problem. In the fourth through sixth columns of table 4, we present a set of estimates for which we hold the composition of immigrants constant. As an example, consider the estimates for the IM6165 cohort in the 1971/1981 censuses. We measure assimilation for this cohort, restricting all cohorts in the two censuses to the same composition as that observed across all immigrants in the 1981 census. The observations from each cohort are weighted so that their composition is identical, but they retain their original sample size. This weighting scheme removes the part of the across-cohort estimate that is due to changes in the source countries of immigrants over time. The source-region definitions we use in the weighting are described in the Appendix.

Not surprisingly, the biggest effects of this adjustment in the 1971/1981 results are for cohorts whose across-cohort growth is measured relative to post-1970 cohorts. The across-cohort estimates for these cohorts are as little as one-half their value in the base results. For example, the entry earnings of IM7680 are now about 6% lower than those of the IM6670

cohort. For IM5660, however, who is compared to a pre-1970 cohort, the across-growth estimate is marginally larger than the base result, although still statistically insignificant. We conclude that the changing composition of immigrants accounts for up to one-half of the decline in the labor market outcomes of the post-1970 cohorts.[18]

The results for the 1981/1986 censuses tell a similar story. The composition correction has marginal influence on the results for the IM5660 and IM6165 cohorts, whose across-cohort growth is measured relative to a pre-1970 cohort. For each of the later cohorts, the composition constant across-cohort growth is between 60% and 70% of its value in table 3. The differences are less striking than in the 1971/1981 results, but we expect less dramatic changes in composition over 5 years than 10 years.

In the second panel of table 5, we report the results of the cross-census restrictions on within-cohort growth for these alternative specifications. As with the base specification, we fail to reject the hypothesis of cross-census stability of the assimilation profile.

A final consideration is whether we are overvaluing the observables of some immigrants and, more important, whether there has been any change in the relative valuation of the characteristics of these same immigrants over time. Assimilation is thought to be the process through which immigrants gain human capital that is specific to their adopted country. We might expect the prices of immigrants' education and experience, for example, to be lower than those of natives, if they were gained in the "home" country. They would possess a country-specific component that would be lost on arrival in Canada. This explanation of the assimilation experience, however, cannot be that relevant for people who immigrate to Canada at a very young age. While they are, strictly speaking, immigrants, the majority of their human capital will be gained in Canada. We expect the human capital prices of this group to be closer to those of natives and certainly to be higher than those of immigrants who enter Canada with some education or labor market experience. The failure to make this distinction in our analysis will lead to an overvaluation of many immigrants' observables.[19]

---

[18] The across-cohort estimates for the other base groups are generally larger, although their ratio to the base results is never greater than two-thirds.

[19] Friedberg (1991) explores the possible biases that arise because of failure to account for age at migration in the analysis. She focuses on the compositional changes that occur in a cohort between censuses; the more recent cohort will contain a higher proportion of immigrants who are likely to have been educated outside the United States Our analysis is in this same spirit, although not strictly comparable, as Friedberg restricts immigrants' and natives' prices of observables to be equal. Tandon (1978) provides some earlier evidence that age at migration can affect estimates of assimilation

To explore this possibility, we construct another sample that excludes immigrants who are likely to have gained a substantial part of their education in Canada. These immigrants are identified by their arrival in Canada before the age of 16 (AGE − YSM < 16). While the choice of age 16 is somewhat arbitrary, the following results do not change substantively if other ages are used.

In table 6, we compare the returns to experience and education across natives and immigrants in the base ("all immigrants") and restricted ("foreign human capital") samples. Immigrants generally earn relatively lower returns to both education and experience. The returns to experience are particularly small in the foreign human capital sample. These facts have already been noted by Borjas (1985) and LaLonde and Topel (1992) in U.S. data. The authors argue the difference results from the fact that immigrants to the United States are typically less skilled than natives: less skilled workers have flatter earnings profiles. It is interesting, therefore, that as noted in table 1, immigrants to Canada are typically more skilled than natives; the skill argument will not work in this case.

The returns to education in the three samples follow the same general patterns over time. The same is not true for the returns to experience: between 1971 and 1986 the returns to experience in the restricted sample remain steady, while the returns for natives and all immigrants increase. Therefore, the relative returns to experience for members of the restricted sample have been deteriorating over time. This deterioration has significant implications for the more recent cohorts. They will contain a higher proportion of immigrants who were educated outside Canada, a group whose position within the labor market has been declining over time. This trend undermines the identification of our estimates of within-cohort growth and could lead us to undervalue the assimilation of these cohorts.

New estimates of within- and across-cohort growth, based on the restricted sample, are presented in columns 7–9 of table 4. In each of the cross-census comparisons, the estimates of within-cohort growth for the recent cohorts are larger then the results from the base sample. Therefore, the relative decline in the returns to experience for this group has led us to underestimate their assimilation.

As noted above, however, greater assimilation does not necessarily mean faster convergence with natives. In both the base and foreign human capital results, immigrants receive lower returns to experience than natives, which more than negates any returns to assimilation. In the second panel of table 6, we present cohort-specific estimates of the relative returns to experience. For example, using the 1971/1981 results, we estimate the effect of an additional 10 years of experience on earnings of various cohorts relative to the earnings of natives (5 years for the 1986/1981 results). These results may be compared to the corresponding estimates of within-cohort growth from tables 3 and 4. Almost without exception, the combined effect of

Table 6
Implied Effects of Aging (Experience) on the Relative Earnings
of Immigrants
A. Sample

	Natives	All Immigrants	Foreign Human Capital
1971 coefficients.			
Experience	046	033	020
	(003)	(002)	(003)
Experience squared (×100)	− 074	−.057	− 037
	(004)	(.004)	(004)
Schooling	073	048	.047
	(003)	(.002)	(002)
1981 coefficients			
Experience	.052	037	019
	(002)	(001)	(002)
Experience squared (×100)	−.087	− 063	−.035
	(003)	(003)	(.003)
Schooling	.066	044	.040
	(.002)	(.001)	(.002)
1986 coefficients.			
Experience	.059	043	019
	(.002)	(.002)	(003)
Experience squared (×100)	− 091	− 073	− 035
	(.004)	(003)	(004)
Schooling	.076	049	.045
	(.002)	(001)	(.002)

B. Implied Aging Effects

	All Immigrants		Foreign Human Capital	
	1971–81 (10 years)	1981–86 (5 years)	1971–81 (10 years)	1981–86 (5 years)
IM5660	− 051	−.035	− 051	− 014
	(.007)	(004)	(009)	(001)
IM6165	−.071	−.043	− 107	− 042
	(009)	(004)	(009)	(006)
IM6670	−.083	− 047	− 165	− 071
	(011)	(005)	(012)	(.005)
IM7175	− 098	−.052	− 211	− 096
	(013)	(.005)	(.015)	(006)
IM7680	− 108	− 055	− 240	− 116
	(015)	(.006)	(018)	(008)

NOTE —Standard errors are in parentheses The cross-section estimates are based on the specification described in the Appendix Control variables are as follows experience, experience squared, years of schooling, black indicator, marital status, and indicators for hours and weeks worked The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e g , 1956–60, etc) The estimated aging effects represent the difference in the estimated returns to 10 (or 5) years of experience between each immigrant cohort and natives Take the 1971–81 estimates as an example If all other explanatory variables are held constant, the predicted difference in 1981 and 1971 earnings because of the increase in age is $\beta_1 X + \beta_2 X^2 - [\beta_1(X - 10) + \beta_2(X - 10)^2]$, where X is a cohort's mean experience in 1980, and β_1 and β_2 are the estimated immigrant returns to experience and experience squared The comparable term for natives is $\lambda_1 X + \lambda_2 X^2 - [\lambda_1(X - 10) + \lambda_2(X - 10)^2]$, where λ_1 and λ_2 are the native experience coefficients, and X is evaluated at the immigrant cohort's mean experience in 1980 The implied aging effect for a cohort is the difference between these two terms

aging and assimilation leads to a decline in each cohort's relative position over time. The increasing dispersion of immigrants' earnings profiles, first suggested in figure 4, appears to be a dominant characteristic of the immigrant labor market experience over the past 15 years.

VI. A Reconciliation of the Results with the Literature

The preceding analysis reveals that the majority of immigrants enjoyed very little assimilation, by a variety of definitions, over the sample period. There is some evidence that earlier cohorts received moderate returns, but their measure is sensitive to the base group used to control for secular earnings growth and is imprecisely estimated. Also, there is substantial evidence that the labor market outcomes of successive immigrant cohorts are declining over time. In particular, there is a correlation between the magnitude of this decline and the changing composition and labor market characteristics of recent immigrants starting about 1970.

Previous studies of Canadian data have found modest returns to assimilation and a moderate decline in the fortunes of the post-1970 cohorts. Borjas (1993) and Bloom and Gunderson (1991) are the two studies most comparable to our work. Both examine data from the 1971 and 1981 censuses and measure the assimilation of immigrants relative to natives. Their method is different from the one used here in that they measure assimilation as the estimated coefficient on a variable that measures YSM in a regression that pools the native and immigrant samples from both censuses;[20] cohort effects are captured by allowing each cohort its own intercept. Among other things, this approach restricts the assimilation of each cohort to lie along a common profile. Therefore, the estimates will be an average of the experiences of the different cohorts.

Bloom and Gunderson report about a 4.0% return to the first 10 years in Canada, while Borjas's estimates imply about a 5.1% return. Since Borjas also enters the square of YSM in his analysis, the returns to other 10-year periods are smaller, but generally above 4%. These estimates can be compared to the within-cohort results in table 3. Certainly, our results for IM5660 and IM6670 are in the same range as these higher estimates, although their large standard errors imply that they are also indistinguishable from zero. Our estimate for IM6165, however, is negative. Therefore, the estimate of an average return may not characterize the experience of each particular cohort well.[21]

[20] Bloom and Gunderson pool only the immigrant samples but adjust the 1971 earnings variable to account for trends in natives' real earnings.

[21] Another explanation for differences in the results is the treatment of the self-employed. Bloom and Gunderson examine wage and salary income only, while Borjas excludes the self-employed. Our sample includes the self-employed and is kindred to the data examined by LaLonde and Topel (1992). We have replicated our analysis excluding this group (15% of our original sample). Estimates of assimilation from this new sample are marginally larger.

Our estimates of assimilation using other base groups are almost uniformly negative. Although they are not strictly comparable to the estimates in the cited studies, they reinforce our position that there are essentially no returns to assimilation over this period. Therefore, if anything, we would wish to argue that the modest returns reported in the literature are perhaps an overstatement. Clearly the restrictions implicit in the YSM approach provide gains in efficiency, but the estimate of an average return may not be suitable if the objective is to examine differences in cohorts over time.

VII. Conclusions

We have painted a fairly pessimistic picture of the immigrant experience in the Canadian labor market. Entry earnings are falling across successive immigrant cohorts, while their rates of assimilation are uniformly small. These results are robust to variations in specification, sample, definition of immigrant, and the choice of base group to normalize for secular earnings growth. They validate quasi-panel techniques and indicate that cross-section inference provides a distorted view of immigrant integration. In a less technical vein, they reveal that immigrant and native earnings profiles are becoming more disperse. Recent immigrants start with earnings up to 20% lower than their predecessors and have assimilated at a very modest pace in their first years in Canada. If their future assimilation matches that of earlier cohorts, convergence with natives may be unattainable. The resolution of this issue awaits analysis of future censuses.

While our results find some explanation in the changing composition of immigrant cohorts, and a relative decline in the returns to experience for immigrants educated outside Canada, they clearly deserve more investigation. In particular, while we have found relatively robust estimates of significant and, as far as our sample period goes, "permanent" differences across arrival cohorts to Canada, their identity is much less clear. Although some researchers have interpreted the cohort fixed effects as unobserved talent or ability, there are a variety of supply-and-demand-side explanations of their existence. For example, has the occupational composition of immigrant employment changed over time? Are they increasingly concentrated in a growing pool of "bad" jobs? Have trends from high-paying manufacturing jobs toward lower-paying service occupations disproportionately affected the immigrant population? Also, a growing proportion of recent immigrants are so called visible minorities, and we cannot rule out a role for discrimination. More research, such as Butcher's (1990) study of African Americans, may allow the separation of ethnicity from the across-cohort differentials. The larger sample sizes and increased detail of future censuses may provide a forum in which to address these issues.

Appendix

Variable Definitions and Additional Coefficient Estimates

Base Specification for the Earnings Regressions

The dependent variable ($\ln Y$) is the log of annual earnings (the sum of wage and self-employment earnings). Earnings from the 1971 and 1986 censuses are expressed in 1980 Canadian dollars. We use the consumer price index to deflate earnings: multiply 1970 earnings by 2.17, and divide 1985 earnings by 1.43. The control variables are as follows:

a) years of schooling;
b) experience (age − schooling − 5) and experience squared;
c) indicators for usual hours worked (1–19, 20–29, 30–34, 35–39, 40–44, 45–49, 50+);
d) indicators for weeks worked (40–48 and 49–52);
e) marital status (indicator whether married); and
f) an indicator for black ethnic status.

A full report of the estimated coefficients on these variables is presented in table A2.

Region Definitions for the Composition Constant Regressions

The following regions are designed to be as comparable as possible among the censuses:

U.S.A. = U.S.A.;

U.K. = U.K., Ireland, and other commonwealth countries

Table A1
Cohort Sizes from Base (Working) Sample

	Census		
	1971	1981	1986
IM46P	1,505	1,026	575
IM4655	3,102	5,274	4,067
IM5660	1,666	3,605	3,133
IM6165	946	2,144	2,096
IM6670	1,613	3,848	3,921
IM7175		3,456	3,237
IM7680		1,806	2,282
IM8185			1,407
Total immigrants	8,832	21,159	20,718

NOTE.—IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e g, 1956–60, etc) The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings

Table A2
Estimates of Earnings Functions
Dependent Variable: Log Earnings in Previous Year (in 1980 Dollars)

	Census					
	1971		1981		1986	
	Immigrants	Natives	Immigrants	Natives	Immigrants	Natives
Intercept		8 084		8 151		7.836
		(.046)		(.031)		(.035)
Years of schooling	.048	.073	.044	.066	.049	.076
	(.002)	(.003)	(.001)	(.002)	(.001)	(.002)
Experience	.033	.046	.037	.052	.043	.059
	(.002)	(.003)	(.001)	(.002)	(.002)	(.002)
Experience squared	-.057	-.074	-.064	-.087	-.073	-.091
	(.004)	(.005)	(.003)	(.003)	(.003)	(.004)
Currently-married indicator	.228	.291	.219	.271	.281	.290
	(.018)	(.022)	(.012)	(.015)	(.014)	(.015)
Black-race indicator	-.125	-.281	-.095	-.018	-.146	-.143
	(.068)	(.115)	(.028)	(.087)	(.028)	(.072)
Weeks worked 40-48 indicator	-.107	-.109	-.120	-.093	-.156	-.152
	(.016)	(.023)	(.011)	(.015)	(.014)	(.017)
Weekly hours worked						
1-19	-.785	-1 030	-.409	-.704	-.540	-.690
	(.060)	(.066)	(.033)	(.040)	(.037)	(.040)
20-29	-.422	-.416	-.331	-.277	-.376	-.451
	(.068)	(.078)	(.036)	(.041)	(.039)	(.039)
30-34	-.099	-.187	-.023	-.118	-.259	-.134
	(.058)	(.065)	(.031)	(.035)	(.034)	(.037)
35-39	.089	.027	.080	.070	.074	.028
	(.019)	(.026)	(.013)	(.017)	(.016)	(.019)
45-49	.008	-.051	.057	.123	.078	.102
	(.020)	(.027)	(.016)	(.022)	(.018)	(.022)
50+	-.085	-.186	.023	-.027	-.016	-.071
	(.017)	(.022)	(.012)	(.015)	(.013)	(.015)

402

IM46P	8.594 (.043)	8.740 (.035)	8.450 (.045)
IM4655	8.610 (.038)	8.698 (.028)	8.478 (.033)
IM5660	8.553 (.038)	8.651 (.027)	8.475 (.033)
IM6165	8.553 (.039)	8.600 (.028)	8.414 (.033)
IM6670	8.499 (.036)	8.611 (.027)	8.376 (.031)
IM7175		8.513 (.026)	8.296 (.031)
IM7680		8.464 (.027)	8.245 (.031)
IM8185			8.043 (.033)
	8,832	21,159	20,718
R^2	.265	.246	.277
Sample size	5,634	14,071	14,092
Chow test	8.32	18.50	16.86

NOTE.—Standard errors are in parentheses. IM5660, IM6165, IM6670, IM7175, and IM7680 refer to immigrant arrival cohorts between the indicated years (e.g., 1956–1960, etc.). The sample is the basic working sample of all males between 16 and 64 years old who worked more than 40 weeks in the previous year and reported positive earnings. The Chow tests evaluate the equality of the coefficients for natives and immigrants for the above specifications (without cohort effects). Under the null hypothesis of no differences, the tests are distributed as $F(13, n)$ and are overwhelmingly rejected. The immigrant regressions do not have an intercept, so the R^2 is not defined.

not otherwise categorized (e.g., Australia and New
Zealand);
Europe = all of Europe except the British Isles;
Asia = Asia;
Africa = Africa (including South Africa and Zimbabwe);
and
South America = the Caribbean and Latin America (South America,
Central America, and Mexico).

References

Abbott, Michael, and Beach, Charles. "Immigrant Earnings Differentials
and Birth-Year Effects for Men in Canada: Post War–1972." *Canadian
Journal of Economics* 26 (August 1993): 505–24.
Baker, Michael, and Benjamin, Dwayne. "The Performance of Immi-
grants in the Canadian Labor Market." Working Paper no. 9213. To-
ronto: University of Toronto, Department of Economics, September
1992.
Blackburn, McKinley L., and Bloom, David E. "The Distribution of Family
Income: Measuring and Explaining Changes in the 1980's for Canada
and the United States." In *Small Differences That Matter: Labor Markets
and Income Maintenance in Canada and the United States,* edited by David
Card and Richard B. Freeman. Chicago: University of Chicago Press,
1993.
Bloom, David E., and Gunderson, Morley. "An Analysis of the Earnings
of Canadian Immigrants." In *Immigration, Trade, and the Labor Market,*
edited by John M. Abowd and Richard B. Freeman. Chicago: University
of Chicago Press, 1991.
Borjas, George J. "Assimilation, Changes in Cohort Quality, and the
Earnings of Immigrants." *Journal of Labor Economics* 3 (July 1985):
463–89.
———. "Immigration Policy, National Origin and Immigrant Skills: A
Comparison of Canada and the United States." In *Small Differences That
Matter: Labor Markets and Income Maintenance in Canada and the United
States,* edited by David Card and Richard B. Freeman. Chicago: Uni-
versity of Chicago Press, 1993.
Bound, John, and Johnson, George. "Changes in the Structure of Wages
during the 1980's: An Evaluation of Alternative Explanations." *American
Economic Review* 82 (June 1992): 371–92.
Butcher, Kristin. "Black Immigrants to the United States: A Comparison
with Native Blacks and Other Immigrants." Working Paper no. 268.
Princeton, NJ: Princeton University, Industrial Relations Section, August
1990.
Chiswick, Barry R. "The Effect of Americanization on the Earnings of
Foreign Born Men." *Journal of Political Economy* 86 (October 1978):
897–921.
Friedberg, Rachel M. "The Labor Market Assimilation of Immigrants in

the United States." Unpublished manuscript. Cambridge: Massachusetts Institute of Technology, December 1991.

Green, Alan, and Green, David A. "Canadian Immigration Policy: The Effectiveness of Key Regulatory Instruments." Unpublished manuscript. Vancouver: University of British Columbia, Department of Economics, 1992.

Katz, Lawrence F., and Murphy, Kevin M. "Changes in Relative Wages, 1963–1987: Supply and Demand Factors." *Quarterly Journal of Economics* 107 (February 1992): 35–78.

LaLonde, Robert J., and Topel, Robert H. "The Assimilation of Immigrants in the U.S. Labor Market." In *Immigration and the Work Force,* edited by George J. Borjas and Richard B. Freeman. Chicago: University of Chicago Press, 1992.

Tandon, Bankey B. "Earnings Differentials among Native Born and Foreign Born Residents of Toronto." *International Migration Review* 12 (Fall 1978): 405–10.