Immigrant Assimilation in a Regulated Labour Market: Unemployment of Immigrant Men in Australia

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ABSTRACT

This paper combines data from six Income Distribution Surveys of the Australian Bureau of Statistics for the years 1982, 1986, 1990, 1994, 1995 and 1996 to analyze the unemployment incidence of recent male labour market entrants in Australia. Immigrants from Asia are found to experience significantly higher unemployment rates on average compared with native-born men and immigrants from other regions. An immigrant's age at arrival in Australia is a key determinant of his unemployment incidence, and failing to differentiate between immigrants who arrived as children and those who arrived as adults leads to misleading inferences about the existence and magnitude of both assimilation and cohort effects. Immigrants who arrived in Australia as adults are found to experience significant assimilation in unemployment incidence towards lower native-born levels in the first years after arrival, although a significant gap in unemployment incidence persists for immigrants from Asia. The fact that there is unemployment assimilation contrasts with previous research by the authors that finds no evidence of earnings assimilation using the same dataset. This highlights the importance of unemployment as an adjustment mechanism for recent entrants into a regulated labour market.

1. Introduction

Immigrants face the daunting task of competing with the native-born for jobs in a new labour market where the native-born person's skills are likely to be more valued than those of the immigrant, and labour market institutions are likely to be designed to benefit the native-born more than the immigrant. Clearly, finding and keeping a job is an integral part of the labour market adjustment process, and an immigrant's ability to do so has direct implications for his or her current and future economic well being. More generally, unemployment incidence has implications for the success of immigration policy, since unemployment reduces immigrants' contribution to their new country's economy and may result in direct costs to taxpayers in the form of government income transfers.[1]

A significant amount of research has been conducted on the labour market experiences of immigrants to two of the main recipient countries, the United States and Canada, but the main focus of this work has been on the earnings of immigrants compared to native born persons. (See Borjas, 1995, for a review of the U.S. literature.) Both of these countries have very flexible labour markets with low minimum wages relative to Australia. Consequently, it is likely that immigrants are able to find employment (at least in good macroeconomic conditions) and therefore, the issue of how well immigrants adjust to the new labour market is likely well-measured in analyses of earnings of immigrants. In fact, there is no evidence of protracted labour market adjustment in terms of unemployment rates for immigrants to the U.S. Chiswick, Cohen and Zach (1997) find that while unemployment rates of U.S. immigrants are initially higher than for the native born, immigrant unemployment rates attain native-born levels one to three years after arrival.

[1] In countries where eligibility of unemployment insurance is subject to labour market testing, there is likely to be a strong correlation between receipt of such transfers and unemployment incidence. See for example Baker and Benjamin (1995) and Crossley, McDonald and Worswick (1998).

The role of labour market institutions in affecting labour market outcomes is likely to be an important issue in Australia, where a large per capita inflow of immigrants runs up against a highly centralized wage setting system. The base wages of most workers in Australia have until recently been determined within a centralized system of national, state or industry Awards. Under the Award system, minimum terms and conditions of employment are specified for most job classifications, in effect providing a series of minimum wage rates. While the centralized wage determination system provided by the Prices and Incomes Accord was abolished in 1996 and replaced by a system of enterprise bargaining, the Awards continue to provide minimum wages and conditions that enterprise bargains must meet.

One outcome of this system is a set of occupation specific minimum wage rates that are likely to limit the extent to which immigrants can offer their labour services at lower wages than the native-born in order to find employment. For example, employers may be unable to offer wages for a particular job that are commensurate with an individual's level of human capital. Recent immigrants are expected to have lower levels of human capital, ceteris paribus, due to issues with language proficiency and the transferability of experience and qualifications obtained overseas, but Award wages for a particular job might be too high to allow that person to be hired.[2]

McDonald and Worswick (1999) find no evidence that the earnings of immigrant men to Australia exhibit positive assimilation – i.e., the negative earnings gap relative to native born men that is experienced on arrival does not narrow as years in Australia

[2] A corollary to this is that recent immigrants may accept lower-skilled jobs rather than remain unemployed, in which case recent immigrants would be expected to have higher occupational mobility than comparable native born people. The employment and occupational mobility of immigrants to Australia is the subject of ongoing work by the authors. See Green (1999) for further discussion of the issues.

increase.[3] This is in contrast to Canadian and U.S. results on immigrant earnings, and suggests that an analysis of unemployment incidence of immigrants to Australia may be particularly relevant since labour market adjustment in Australia may be more in terms of unemployment than wages. Further, assessing the labour market experiences of only employed immigrants using earnings data may understate the difficulties that recent immigrants experience in the process of labour market adjustment.

2. Econometric Issues and Estimating Equations: Specification of Immigrant Effects

It is generally expected that immigrants' labour market experiences will improve as years in the new country increase, due to improved language proficiency, recognition of overseas skills or the acquisition of Australian skills, and better information about the operation of the local labour market. If there are differences in the unobservable characteristics of immigrants across different arrival periods, then the relationship between unemployment incidence and years in Australia may also differ across immigrant arrival periods. If these differences are invariant to the number of years spent in Australia[4] (and the impact of these differences on the dependent variable does not vary with years-since-migration) then the differences across these arrival cohorts can be modelled as a simple intercept shift. (See Borjas, 1985, for further discussion). Much of the existing literature on the labour market adjustment of immigrants makes this assumption, leading to estimation of what is typically referred to as a cohort fixed-effects specification.[5]

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[3] For comparison purposes, we have also extended the analysis of that paper to span the sample period of the current paper. Using the expanded data we come to the same conclusions as in our earlier work.

[4] One example would be if immigration policy changed leading to immigrants with lower ability or lower human capital being admitted in more recent cohorts than in earlier cohorts and the controls in the estimation were not sufficiently rich to capture the difference.

[5] Previous Australian studies of immigrant unemployment incidence find evidence that recent arrivals face higher unemployment rates relative to comparable native-born persons but this gap narrows over time. (See Miller, 1986, Inglis and Stromback, 1986, and Beggs and Chapman, 1990). However these studies are limited by the fact

Recently researchers have begun to question the restrictions implied by the fixed effects model, specifically that the differences in labour market outcomes between immigrants from different arrival cohorts, for the same values of years-since-migration and observable characteristics, do not vary with years-since-migration. Duleep and Regets, (1996, 1997) and McDonald and Worswick (1998) find that the rate of assimilation of earnings depends on year of arrival in the new country.[6] Such a result could arise, for example, if a smaller fraction of immigrants from recent arrival cohorts are fluent in English at time of arrival relative to earlier cohorts. This would lead to higher unemployment and lower earnings at time of arrival compared with the earlier arrival cohorts, ceteris paribus (and assuming there are no explicit controls for language fluency). However, if English language proficiency improves with years of residence for immigrants whose first language is not English, then the difference in labour market outcomes across cohorts at zero years-since-migration may diminish with more years in the new country.

This discussion leads us to specify a functional form for the determinants of unemployment incidence that allows for a flexible assimilation profile for each immigrant arrival cohort. Equation (1) will be estimated over the pooled sample of immigrant and native-born men.

$$Y_i = Z_i\, d + f_0 FB_i + \sum_{p=1}^{3}[f_p (YSM_i)^p] + \sum_{k=1}^{K-1}[f_{0k} C_{ik} + \sum_{p=1}^{3} f_{kp} C_{ik} (YSM_i)^p] + u_i \quad (1)$$

Y_i is an index function used in Logit estimation of unemployment incidence. The vector Z_i includes controls for the person's education[7], state of residence, marital status, and a flexible

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that each is based on a single cross-section of data, which precludes the separation of assimilation and cohort fixed effects.

[6] Crossley, McDonald and Worswick (1998) examine the takeup of unemployment insurance and social assistance payments by immigrants to Canada and find that the cohort fixed effects model is misspecified.

[7] The education information in the data set is limited. Dummy variables for 1) post-secondary education but not university and 2) university education are included.

specification for age to allow birth cohort effects, as discussed in Beaudry and Green (1997). The dummy variable FB identifies men born outside of Australia, and the third term on the right of equation (1) defines a cubic YSM (years-since-migration) profile.[8] The dummy variables, C_{ik} for k=1,...,K-1, identify individuals from K –1 of the arrival cohorts. These cohort dummy variables appear on their own and as interactions with the YSM terms, so that a cubic YSM profile is specified for each arrival cohort.[9] Equation (1) also includes controls for region of birth for persons born outside of Australia, and we investigate separate assimilation profiles by region later in the paper.[10]

If differences across arrival cohorts are invariant to the number of years spent in Australia, then equation (1) can be collapsed to the cohort fixed effects specification given by equation (2). It can be seen from (2) that all immigrants are constrained to share a common unemployment assimilation profile.

$$Y_i = Z_i\, l + a_0 FB_i + \sum_{p=1}^{3}[a_p (YSM_i)^p] + \sum_{k=1}^{K-1}[a_{0k} C_{ik}] + v_i \qquad (2)$$

A related issue is the possibility that changing macroeconomic conditions affect the unemployment incidence of immigrants and the native born differently. McDonald and Worswick (1997) find that recent immigrants to Canada are relatively more likely than native born males to be unemployed in recessions, but not in expansionary periods.[11] The specification of arrival cohort effects and years-since-migration effects in (1) and (2) do not specifically allow for identification of period effects. However, it is not possible to include year dummy variables

[8] Immigrant arrival variables and the years-since-migration variables equal zero for Australian-born men.
[9] Assimilation and cohort effects for these cohorts are measured with respect to the K^{th} immigrant arrival cohort. Thus, the other cohorts' years-since-migration profiles can be derived by adding the interaction terms to the years-since-migration profile of the default cohort.
[10] The sample is not sufficiently large to allow separate assimilation profiles by arrival cohort for each region of origin.
[11] In a similar vein, Chiswick, Cohen and Zach (1997) examine the unemployment incidence of immigrants to the U.S. but find no significant role for either current or past macroeconomic conditions to affect the relative unemployment incidence of immigrants.

and interactions with immigrant cohort variables and still have the cohort and assimilation effects identified. One alternative that we explore in the paper is to parameterize the effects of changing macroeconomic conditions by including in (1) and (2) the state unemployment rate as well as interactions with the immigrant variables.

3. The Data and Estimation Sample

The data used in the estimation come from the unit record files titled *Income Distribution Survey of Australia* of the Australian Bureau of Statistics. Data on labour market status are available for the survey week. The six surveys were conducted in 1982, 1986, 1990, 1994, 1995 and 1996. Changes in the definition of arrival periods across the surveys mean that we are able to identify only four separate arrival cohorts that are consistent across the six survey years: prior to 1976, 1976-80, 1986-90 and 1991-94. Since some immigrant arrival cohorts are only present in some survey years (for example, immigrants arriving between 1991 and 1994 are only present in the 1994, 1995, and 1996 Surveys), in practice it is not possible to estimate a cubic specification for each immigrant arrival cohort. In these cases, we estimate as flexible an assimilation profile as possible.

Changes in the definition of region of origin in the data mean that four broad regions can be consistently identified across the six survey years: Asia, Europe, Americas, and Other (Oceania and Africa). Within-region changes in immigrant composition by country will be captured by the arrival cohort variables. For example, analysis of the IDS dataset from 1990 indicates that recent cohorts of immigrants from Europe are more likely to have come from the U.K. than continental Europe, but the regional variables will not reflect these changes. Also, the IDS data do not include information on language fluency,

so that both arrival cohorts and region controls will capture differences in immigrants' ability to speak and understand English.

The sample is restricted to men between the ages of 19 and 64 in each of the surveys. Women are excluded from the sample due to difficulties associated with controlling for years of experience and labour force participation decisions. Also, only labour force participants are included in the sample. This has been the standard approach adopted in a number of previous papers. For example, Chiswick, Cohen and Zach (1997) model the unemployment incidence of labour force participants and the employment incidence of all men in the sample; Cobb-Clark (1999) models the unemployment incidence of labour force participants and the participation decision of all adults.[12] We briefly consider labour force participation of immigrant men later in the paper, and investigate the sensitivity of our results to the use of a multinomial logit model across the states of 1) out of the labour force, 2) unemployed, and 3) employed. However, we leave a more detailed analysis of the determinants of labour force participation for future work.

Table 1
Sample means (proportion of total sample)

	Australian-Born Men	Immigrant Men
Not in the Labour Force	**.0972**	**.1257**
	(.296)	(.331)
Unemployment Rate	**.0721**	**.0950**
(Labour Force Participants)	(.259)	(.293)
	[30 731]	[11 522]
Age (years)	**37.5**	**42.0**
	(12.5)	(11.9)

[12] Cobb-Clark (1999) analyzes the Longitudinal Survey of Immigrants to Australia. She finds that unemployment incidence is lower for native English speakers, and that improvements in language proficiency after arrival are associated with lower unemployment incidence. While her results point to the importance of English fluency in labour market success, the LSIA covers only the first 18 months in Australia so that longer tern trends cannot be studied.

State		
New South Wales	**.3381**	**.3520**
	(.473)	(.478)
Victoria	**.2459**	**.2739**
	(.431)	(.446)
Queensland	**.1924**	**.1231**
	(.394)	(.329)
South Australia	**.0828**	**.0840**
	(.276)	(.277)
Western Australia	**.0839**	**.1270**
	(.277)	(.333)
Tasmania	**.0313**	**.0126**
	(.174)	(.111)
Northern Territory and	**.0257**	**.0275**
Australian Capital Territory	(.158)	(.163)
Not in a Capital City	**.4393**	**.2090**
	(.496)	(.407)
Country of Origin		
Americas	n.a.	**.0354**
		(.185)
Asia	n.a.	**.1631**
		(.370)
Europe	n.a.	**.6612**
		(.473)
Other	n.a.	**.1402**
		(.347)
Education		
Post Secondary	**.3990**	**.4074**
	(.490)	(.491)
University	**.1021**	**.1305**
	(.303)	(.337)
Sample Size	34 039	13 178

Note:

1. Standard deviations are presented in round brackets.
2. Sample size, when it differs from the bottom row values, is presented in square brackets.

In Table 1, sample means are presented by immigrant status. The unemployment rate for immigrants is about 2.3% higher on average than for non-immigrants, and the mean age of immigrants is also higher than for non-immigrants. The distribution of immigrants across different states of Australia is similar to that of the Australian-born, with a much higher percentage of immigrant men residing in capital cities than is the case for the Australian-born men. Interestingly, immigrant men are more likely to have post-secondary

education than are Australian-born men. Immigrant men are also more likely to be out of the labour force than native-born men. This is due in part to the higher average age of immigrants, and decomposing the sample by age group reveals only minor differences in labour force participation for all men except those aged less than 24. For men aged 18-24, participation rates of immigrants are between 4 and 7 percentage points lower than for the native-born, and this is apparently not due to differences in the number of individuals in full-time study. Thus, an interesting question concerns the activity of these men. However, the data are not sufficiently rich to allow a more detailed examination.

In Table 2, the proportion of immigrants originating from different regions of the world is presented by arrival cohort. The main feature is the growth in immigrants from Asia. The low proportion of immigrants from Asia prior to 1976 is due largely to the 'White Australia Policy' that characterized Australia's postwar immigration policy up to 1973, in which Caucasian immigrants from the U.K. and continental Europe were specifically targeted. With the abandonment of this policy, the proportion of immigrants from Asia rose from around 7% prior to 1976 to 30% – 41% in the post-1976 cohorts. The proportion that originated from European countries declined from 81% in the pre-1976 cohort to 30%-40% in the post 1976 cohorts. Also, the proportion of immigrants who originated from countries outside of the American continents, Asia and Europe has risen from 9% before 1976 to 23%-28% after 1976.

Table 2
Distribution of Immigrants by Source Country and Arrival Cohort

Arrival Cohort	Sample Size	Americas	Asia	Europe	Other
Before 1976	9 310	.0285	.0756	.8102	.0856
		(.166)	(.264)	(.392)	(.280)
1976-85	2 370	.0467	.3100	.4148	.2284
		(.211)	(.463)	(.493)	(.420)
1986-90	1 157	.0518	.3705	.2955	.2821
		(.222)	(.483)	(.456)	(.450)

1991-94	341	.0516	.3507	.3554	.2424
		(.222)	(.478)	(.479)	(.429)

Note:
Standard deviations are presented in round brackets.

In Table 3, unemployment rates of immigrant men are presented by arrival cohort and survey year. Unemployment rates are generally higher for more recent immigrants than earlier immigrants, but all arrival groups experience higher unemployment rates than the native born. This is consistent with the idea that immigrants are unable to find employment in the first years after migration due to minimum wages set for different occupations under the Awards System. It may be that the skills of the new immigrants are not sufficiently valued by employers to allow the immigrants to find jobs suited to their skills. This would leave the immigrants the choice of: 1) remaining unemployed allowing time for intensive job search and possibly retraining or 2) taking a job that they are over-qualified for in the hope of finding a more suitable job while employed.

There appears to be little change in the average unemployment rates for earlier cohorts (e.g. the Before 1976 cohort) across survey years. This suggests that the gap in unemployment incidence experienced by recent immigrants does not appear to narrow over time. However, it is unclear whether unemployment rates are higher for more recent arrival cohorts than earlier arrival cohorts at the same years-since-migration.

Table 3
Unemployment Incidence of Male Labour Force Participants
by Immigrant Status, Arrival Cohort and Survey Year

	1982	1986	1990	1994	1995	1996
Australian-Born	**.0634**	**.0615**	**.0748**	**.0777**	**.0763**	**.0761**
Men	(.244)	(.244)	(.263)	(.268)	(.265)	(.265)
	[8 018]	[4 530]	[7 791}	[3 428]	[3 419]	[3 545]
Immigrant Men						
Before 1976	**.0716**	**.0815**	**.0885**	**.0838**	**.0855**	**.0821**
	(.258)	(.258)	(.284)	(.277)	(.280)	(.275)
	[2 593]	[1 444]	[1 907]	[728]	[635]	[697]

1976-85	**.1081**	**.1349**	**.1049**	**.1201**	**.1236**	**.1213**
	(.311)	(.342)	(.307)	(.326)	(.330)	(.327)
	[529]	[266]	[591]	[263]	[258]	[255]
1986-90	n.a.	n.a.	**.1346**	**.1185**	**.1233**	**.0477**
			(.342)	(.324)	(.330)	(.214)
			[591]	[189]	[192]	[205]
1991-94	n.a.	n.a.	n.a.	**.1818**	**.1203**	**.1696**
				(.388)	(.327)	(.377)
				[**92**]	[101]	[100]

Note:
1. Standard deviations are presented in round brackets.
2. Sample size is presented in square brackets.
3. Sample sizes of less than 100 are presented in bold.
4. See Appendix 1 for a definition of the cohorts in each survey year.

One curious result is the low unemployment rate of immigrants in the 1996 IDS who arrived between 1986 and 1990. Given the high unemployment rates for this cohort in 1994 and 1995 and the high unemployment rates for immigrants from the other cohorts in 1996, the low unemployment rate for this group is surprising and may be due to sampling variation. In the econometric results to follow, we explicitly allow for the possibility that some of these observations may be outliers.

4. Econometric Results

Unemployment Incidence: All Labour Force Participants

Our approach to estimation is to begin with a very flexible specification and test down to a more parsimonious specification as dictated by a series of Wald significance tests. The most flexible specification allows for separate assimilation profiles and parametric macroeconomic effects by arrival cohort and region of arrival. We also allow for separate returns to post-secondary education by region of origin. For brevity we report only a subset of these regression results and hypothesis tests in the main body of the paper;

additional results are available from the authors on request and are summarized in Appendix II.

The sample on which the first set of results is based includes the native born and all immigrant men, so that no distinction is made between immigrants who arrived as children and immigrants who arrived as adults. In no case could we find evidence that the slopes of the assimilation profiles differed across immigrant arrival cohorts or across regions of origin. That is, we could not reject the cohort fixed effects model. In addition, while higher aggregate unemployment rates increase the probability that an individual is unemployed, there is no evidence that this effect differs by immigrant status. Thus, Table 4 presents selected results from Logit estimation of the incidence of unemployment for the standard fixed effects equation (2).

Table 4

Results from Logit estimation of unemployment for labour force participants: Arrival Cohort Fixed Effects Specification

Variables	(1)	(2)	(3)	(4)
Foreign born	.7713**	.5173**	.5949**	.3398**
	(.278)	(.135)	(.135)	(.071)
Years since migration (YSM)	-.1107	-.0075	-.0106**	
	(.069)	(.005)	(.005)	
$YSM^2/100$	.8082			
	(.518)			
$YSM^3/1000$	-.1525			
	(.097)			
Arrived before 1976	-.2583			
	(.286)			
Arrived 1986-90	.0406			
	(.178)			
Arrived 1991-94	.2722	.2955		.3981**
	(.240)	(.208)		(.202)
Arrived from Africa/Oceania	.2758	.2694	.2619	.2997
	(.201)	(.200)	(.200)	(.200)
Arrived from Americas	.1564	.1490	.1453	.1974
	(.132)	(.130)	(.130)	(.123)
Arrived from Asia	.6748**	.6645**	.6474**	.7632**
	(.147)	(.141)	(.142)	(.124)
(Arrived before 1976)*(Arrived from Asia)	-.4336**	-.4072**	-.3897*	-.5260**
	(.213)	(.209)	(.209)	(.189)
State Unemployment Rate	.1307**	.1275**	.1294**	.1255**
	(.027)	(.027)	(.027)	(.027)
Test of Cohort Equality (p-value)	.1378	.0542	.0623	.0015
Test of no YSM effect and Cohort Equality (p-value)	.0115	.0015	.0009	Na
Pseudo R2	.0633	0.0631	.0629	.0630
Wald Chi2	1148.73 (37 d.f.)	1139.03 (33 d.f.)	1141.01 (32 d.f.)	1129.48 (32 d.f.)
Sample Size	42 253	42 253	42 253	42 253

Note:

1. Robust standard errors are presented in round brackets.
2. ** denotes significance at the five percent level; * denotes significance at the ten percent level.
3. Controls are also included for age, state of residence, whether have post-secondary education below university level or at university level, and marital status.

Column (1) presents results from a specification with a set of arrival cohort dummy variables and a set of region-of-birth dummy variables, while Columns (2), (3) and (4) present more parsimonious specifications. Separate returns to post-secondary education for immigrants are allowed for in all specifications, but are always insignificant and so are not reported.[13] Looking first at Column (1), the cohort fixed effects variables are poorly determined and the coefficients on the YSM terms are not individually significant. However, a joint test of cohort and assimilation effects strongly rejects the null hypothesis that these effects are not significant determinants of immigrant unemployment incidence. Immigrants from Asia are found to experience significantly higher unemployment incidence than comparable native born males or immigrants from other regions. Interestingly, this effect is significantly smaller for immigrants from Asia who arrived prior to 1976.[14]

Dropping insignificant variables has little effect on the main results: arrivals from Asia have relatively higher unemployment incidence, there is little evidence of cohort effects except for pre-1976 arrivals from Asia, and there is little evidence of unemployment assimilation. The higher unemployment incidence of the most recently arrived immigrants (arrived 1991-94) is only significant when all assimilation terms are omitted (column (4)), while significant assimilation is found only when a dummy variable for recently arrived immigrants is omitted (column 3)). This suggests that both the YSM profile and the cohort variable are reflecting the same thing – namely the higher unemployment incidence of recent arrivals.

In Figure 1, predicted differences in unemployment probabilities between immigrant men and Australian-born men are presented by arrival cohort and years-since-migration,

[13] Interactions of the education variables with the set of region-of-origin dummy variables also are not significant.

using estimated results from column (2) of Table 4. Predictions are plotted only over values of years-since-migration for which members of the arrival cohort appear in the data, and are based on the individuals with the default set of characteristics (aged 25 on arrival, married, living in NSW, and no post-secondary education).

*****Figure 1 about here*****

Consistent with the Australian literature on the earnings of immigrants to Australia (e.g., Wills, 1997, McDonald and Worswick, 1999), region of origin is an important determinant of unemployment status. Immigrants from Asia are between 11 and 15 percentage points more likely to be unemployed soon after arrival in Australia relative to similar native born men, while immigrants from other regions are between 3 and 6 percentage points more likely to be unemployed soon after arrival. These differences narrow only slowly over time, so that even after 16 years in Australia, immigrants from Asia are still around 9 percentage points more likely to be unemployed. However, for immigrants from Asia who arrived prior to 1976, the gap is narrower and relatively constant at around 5 percentage points. The difference may reflect better acquisition of English by the earliest arrival cohort, but may also reflect the changing composition of immigrants from regions other than Asia and/or changing composition of immigrants by age at arrival. For example, earlier immigrants are more likely to have come from continental Europe than the U.K., so that the gap with Asian immigrants that is due to language differences would be less. Also, those who arrived prior to 1976 are more likely to have arrived as children. Child immigrants would be expected to face fewer labour

[14] Specifications also include a dummy variable for immigrants arriving between 1986 and 1990 who are part of the 1996 IDS. This dummy variable was significant and negatively signed. The model was also re-estimated after omitting data from the 1996 IDS, but Table 3 results were not substantially affected.

market difficulties owing to Australian education credentials and fewer language difficulties. (This issue is taken up in more detail later in this section.)

Using the Delta method, we compute asymptotic standard errors for the predicted differences illustrated in Figure 1. For each arrival cohort, the immigrant unemployment differential is significantly different from zero at the five percent level. However, the predicted difference between the unemployment incidence of immigrants arriving in the period 1976-90 and the period 1991-94 is not significantly different from zero at the 5% level, regardless of region of origin. Thus, there is no strong evidence of significant cohort differences for immigrants arriving after 1975, within different regions of origin.

Figure 2 shows a similar set of predictions but the reference set of demographic characteristics includes a university degree rather than no post-secondary training. Not surprisingly, predicted differences are quantitatively smaller than in Figure 1. For example, immigrants with university degrees who arrived in Australia from Asia after 1975 are 3 to 5 percentage points more likely to be unemployed than comparable native born men. All of the predicted unemployment differentials are still significantly different from zero at the 5% level except for those immigrants who arrived prior to 1976.

*****Figure 2 about here*****

Unemployment Incidence: The Importance of Age at Arrival

The analysis to this point has not distinguished between immigrants who arrived as adults and immigrants who arrived as children, yet this distinction is potentially very important.[15] Child immigrants raised in Australia are unlikely to face the same obstacles – in terms of language difficulties, lack of information about the local labour market, or

recognition of qualifications – as immigrants who arrived as adults, so it is reasonable to expect that unemployment experiences will also differ. As well, recent arrival cohorts are more likely to have arrived as adults in order for them to be present in the sample of adult labour force participants. Thus, estimates of cohort effects estimated across the full sample of immigrants will reflect the changing composition of immigrant cohorts by age at arrival. This is particularly true of the broadly defined arrival cohort of immigrants who arrived prior to 1976.

To investigate the impact of age at migration on immigrants' subsequent unemployment incidence, age at arrival for each immigrant is imputed by subtracting years since migration from current age for each immigrant in the sample.[16] The model is then re-estimated for each of two sub-samples: native-born plus immigrants who arrived as adults, and native-born plus immigrants who arrived as children. As with the full sample, in each case we begin with a very flexible specification and test down to more parsimonious specifications. It should be noted that not all arrival cohorts are present in both sub-samples. For example, all immigrants who arrived between 1991 and 1994 and who are of working age necessarily arrived as adults. Associated test values for the flexible specifications are reported in Appendix II.

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[15] Kossoudji (1989) finds evidence that estimates of earnings assimilation of immigrants to the U.S. reflects in part the impact of pre-market social assimilation of immigrants who arrived as children. See also Schaafsma and Sweetman (1999).

[16] Because of the blocked nature of the age and year of arrival information, computed age at arrival is only an approximation of the actual but unknown figure. Immigrants who arrived as adults are defined to be those whose age at arrival was at least 24 years, while immigrants who arrived as children are defined to be those whose age at arrival was at most 13 years. Since these definitions are somewhat arbitrary, we investigate the sensitivity of the results to a range of alternative threshold levels.

Table 5

Results from Logit estimation of unemployment for labour force participants: Native born and immigrants aged at least 24 years at arrival

Variables	(1)	(2)	(3)
Foreign born	1.244**	1.131**	1.076**
	(.359)	(.278)	(.280)
Years since migration (YSM)	-.2016**	-.1554**	-.1375*
	(.098)	(.076)	(.076)
$YSM^2/100$	1.371*	.9476*	.8326
	(.779)	(.528)	(.530)
$YSM^3/1000$	-.2548*	-.1763*	-.1560
	(.149)	(.102)	(.102)
Arrived before 1976	-.3519		
	(.453)		
Arrived 1986-90	-.1605		
	(.219)		
Arrived 1991-94	.0617		
	(.281)		
Arrived from Africa/Oceania	.2620	.2438	.2374
	(.193)	(.189)	(.189)
Arrived from Americas	.3137	.2875	.2800
	(.324)	(.321)	(.320)
Arrived from Asia	.6852**	.6200**	2.192**
	(.192)	(.166)	(.938)
(Arrived before 1976)*(Arrived from Asia)	-.4039		
	(.389)		
State UE Rate	.1246**	.1263**	.1361**
	(.030)	(.030)	(.030)
State UE Rate*(Arrived from Asia)			-.1955
			(.118)
Test of Cohort Equality (p-value)	.5691	Na	Na
Test of no YSM effect and Cohort Equality (p-value)	.0755	.0241	.0391
Test of no YSM effect and no macro effect (p-value)	Na	Na	.0973
Pseudo R2	.0640	.0637	.0639
Wald Chi2	934.41 (37 d.f.)	999.27 (33 d.f.)	927.59 (34 d.f.)
Sample Size	35704	35704	35074

Note:

1. Robust standard errors are presented in round brackets.
2. ** denotes significance at the five percent level; * denotes significance at the ten percent level.
3. Controls were also included for age, state of residence, whether have post-secondary education below university level or at university level, plus interactions with a foreign-born dummy variable, and marital status.

Table 5 presents results after excluding from the sample immigrants who were younger than 24 years at arrival. Column (1) presents results from a specification with cohort effects, while column (2) presents results from a restricted specification in which the cohort effects are omitted.[17] Looking first at (1), the coefficients on the cohort dummy variables are individually and jointly insignificant, while each YSM term is individually significant at least at the 10% level. Omitting the cohort variables has little qualitative effect on the other results, except that the YSM terms are now jointly significant at the 5% level. In addition, including men out of the labour force in the sample and estimating a multinomial logit model (with employed as the default category) yields coefficient estimates for the unemployment alternative that are almost identical to those reported for the logit model.

The results suggest that while all immigrants experience higher unemployment incidence on arrival, the gap is greatest for immigrants from Asia. The effect on unemployment incidence of additional years in Australia is significant but non-linear. Column (3) adds an interaction of the state unemployment rate with the dummy variable for immigrants from Asia, but this term is just outside significance at the 10% level.[18] The fact that earlier arrivals from Asia do not do significantly better than more recent arrivals is in contrast to what was found from results based on all immigrants. However, the point estimate is similar to what is reported in Table 3 and the loss of significance may be due to the smaller number of immigrants from this cohort in the subsample used for estimation.

[17] Separate assimilation profiles by arrival cohort and region of origin were not significantly different from zero, nor were interactions of cohort and region variables with the state unemployment rate. See Appendix II.

[18] The model was re-estimated for different sub-samples defined by age-at-arrival cutoff points over the range 21 to 28 years inclusive. Results were consistent with those reported in Table 4 except that the coefficient on the state unemployment rate-Asia interaction becomes significant at the 10% level when the cutoff is higher than 26 years.

To get a better sense of the unemployment assimilation profile, Figure 3 plots predicted unemployment differentials for a person with the default set of characteristics using estimated results from column (2). Immigrants from Asia experience over 16 percentage points higher unemployment rates than native born men on arrival, but this gap is narrowed to less than 7 percentage points after around 11 years. A similar pattern appears for non-Asian immigrants. The presence of very high unemployment rates at arrival followed by sharp declines in unemployment with years-since-migration is consistent with the idea that the Awards system of minimum wages makes it difficult for immigrants to find jobs soon after arrival. It may be that with retraining, longer job search and perhaps movement into occupations for which they are over-qualified, immigrants are able to find jobs which would explain the decrease in unemployment rates with years-since-migration.

*****Figure 3 about here*****

Even with pronounced assimilation, it is clear from the figure that the higher unemployment rates of immigrants from Asia will persist into the long term. Immigrants from regions other than Asia experience a gap of around 7% on arrival relative to the native born but this narrows to less than 2% over the same time period.[19] Interestingly, immigrants who arrived prior to 1976 (YSM >22) exhibit generally higher unemployment incidence than more recent arrivals (YSM < 17) after around 5 years in Australia, although this difference is not significant at the 5% level based on standard errors computed using the Delta method.

Table 6 presents results from a range of specifications based on the native-born and those immigrants who arrived in Australia as children. Given the age at arrival restriction,

[19] Computation of standard errors using the Delta method confirms that the predicted differences are significantly different from zero at the 5% level for all immigrant groups except for non-Asian immigrants at YSM values around 11-15 years and 31-33 years.

only immigrants from the earliest two arrival cohorts are represented in the sample. In all cases cohort effects and interactions with region dummy variables are insignificant and so are omitted from the estimated specifications. It is notable that immigrants still experience higher unemployment incidence on entry into the Australian labour market even though they presumably have obtained at least some Australian schooling. The effects of additional years in Australia are markedly different from earlier results, and evidence of a significant unemployment assimilation profile is found only for immigrants from Asia. Further, the positive and significant coefficient on the interaction of the state unemployment rate and the Asia dummy variable indicates that the unemployment incidence of Asian immigrants is more cyclical. That is, increases in the aggregate unemployment rate increase the probability of unemployment for immigrants from Asia by more than for other immigrants and the native born.

As can be seen in Columns (3) and (4) of Table 6, using a younger cut-off age to define immigrants that arrived as children yields some different results. There is no longer any significant unemployment assimilation, although other estimated results are similar. In particular, immigrants from Asia still experience significantly higher unemployment incidence than native born men and immigrants from other regions, even though they arrived in Australia as relatively young children. Also, these immigrants are more likely to be unemployed when the aggregate unemployment rate is higher.[20]

[20] These results are largely unaffected if the cut-off year is reduced further to less than 6 years.

Table 6

Results from Logit estimation of unemployment for labour force participants: Native born and immigrants arriving as children

Variables	(1) ≤13 years on arrival	(2) ≤13 years on arrival	(3) ≤10 years on arrival	(4) ≤10 years on arrival
Foreign born	4.504**	.3289**	.2431**	.2429**
	(2.088)	(.093)	(.099)	(.099)
Years Since Migration	-.6764*			
	(.350)			
$YSM^2/100$	3.352*			
	(1.764)			
$YSM^3/1000$	-.5166*			
	(.276)			
YSM* Arrived from Asia	2.191**	1.530**	.8202	
	(.844)	(.771)	(1.192)	
$YSM^2/100$* Arrived from Asia	-10.61**	-7.336*	-3.366	
	(4.331)	(3.967)	(5.929)	
$YSM^3/1000$* Arrived from Asia	1.574**	1.071*	.4242	
	(.686)	(.630)	(.919)	
Arrived from Asia	-16.77**	-12.71**	-10.99	-4.431**
	(5.135)	(4.716)	(6.784)	(2.074)
Arrived from Americas	.2359	.2891	.6377*	.6374*
	(.339)	(.330)	(.345)	(.345)
Arrived from Africa/Oceania	-.2466	-.2322	-.3180	-.3176
	(.264)	(.256)	(.315)	(.315)
State UE Rate	.1357**	.1330**	.1362**	.1371**
	(.031)	(.031)	(.032)	(.031)
State UE Rate*(Arrived from Asia)	.4305*	.4330*	.6228**	.5588**
	(.225)	(.225)	(.302)	(.249)
Test of no YSM effect (p-value)#	.1104	.1008	.6032	Na
Test of no YSM effect/no macro effect (p-value)	.0385	.0325	.0998	.0247
Pseudo R2	.0682	.0679	.0680	.0679
Wald Chi2	957.49	945.25	922.31	922.12
	(34 d.f.)	(31 d.f.)	(31 d.f.)	(28 d.f.)
Sample Size	33695	33695	33098	33098

Note:

1. Robust Standard errors are presented in round brackets.
2. ** denotes significance at the five percent level; * denotes significance at the ten percent level.
3. Controls were also included for state of residence, whether have post-secondary education below university level or at university level, and marital status.

#. An hypothesis test that the coefficients on YSM, YSM^2, and YSM^3 are jointly equal to zero has a p-value of only 0.24, despite their weak significance individually. As well, if the threshold age is reduced to 12 years from 13 years, each of the coefficients on these terms is highly insignificant while the other estimates are largely unchanged. An LR test confirmed that these YSM terms could be omitted.

Figures 4 and 5 plot predicted unemployment differentials based on results from columns (2) and (4) respectively. One set of predictions are calculated based on an assumed unemployment rate of 8%, which is close to the overall average state unemployment rate of the sample. For comparison, another set of predictions are calculated based on an assumed unemployment rate of 8.5%, which is close to the average state unemployment rate for individuals in the 1994, 1995, and 1996 Income Distribution Surveys. A 0.5 percentage point increase in the unemployment rate has a substantial effect on the unemployment differential, leading to a four percentage point increase in the probability of unemployment for this group.

*****Figure 4 about here*****

There is little to distinguish the unemployment incidence of immigrants from regions other than Asia and native-born men. However, Figure 4 shows that those immigrants from Asia who have been in Australia around 13-16 years experience unemployment rates around 8-10% higher than comparable native born men, while Asian immigrants in Australia at least 22 years experience unemployment rates that converge to native-born levels after about 4 more years.

*****Figure 5 about here*****

Comparing these results to Figure 5, it appears that the relatively high unemployment incidence experienced by immigrants in Australia 13-16 years is being driven by those who arrived when aged 11 to 13 years. Once these men are omitted from the sample, unemployment differentials are low and relatively constant. The average age of this group of men is around 24 years, and they are observed only in the 1994-96 IDS datasets when Australia was just emerging from recession. Thus, they are fairly recent entrants to the Australian labour market in a period of substantial economic restructuring,

and this appears to have given rise to relatively high unemployment rates. While they would have had a number of years of pre-labour market education and social assimilation, this does not appear to have insulated them from the poorer unemployment outcomes experienced on joining the labour market.

5. Conclusion

Our results highlight the importance of both age at arrival and region of origin as determinants of the unemployment incidence of immigrants to Australia. Immigrants from Asia experience significantly higher unemployment rates on arrival compared with similar native born men. Asian immigrants who arrived as adults narrow this gap by about 10 percentage points after around 10 years in Australia, but will continue to experience unemployment rates over the long term that are significantly higher than for native born men. Immigrant men from regions other than Asia also experience higher unemployment rates on arrival but achieve levels that are within two percentage points of native born levels after around 9 years in Australia.

The importance of age at arrival is most pronounced for immigrants from Asia who have been in Australia more than 22 years. In this group, immigrants who arrived as adults experience unemployment rate differentials of around 9 percentage points, compared with immigrants who arrived as children that experience unemployment rate differentials of around 3 percentage points. The results in general highlight the importance of controlling for age at arrival in analyzing immigrants' labour market experiences. Failing to take account of this distinction gives rise to misleading inferences about the existence and magnitude of both unemployment assimilation and cohort effects.

It is likely that the region of origin variables are reflecting differences in English language fluency across immigrant groups, indicating the importance of English to labour

market success. However, the persistence of unemployment differentials for Asian immigrants who arrived as adults after even more than 20 years in Australia suggests that either English language acquisition is incomplete or that initial language difficulties lead to permanent labour market scarring. Whatever the cause, these results suggest that the difficulties experienced by immigrants from Asia in adjusting to the Australian labour market may need specific government policy intervention if Australia is to get the best possible returns from its immigration program. In addition, the fact that immigrants do assimilate in terms of employment outcomes suggests that the recent Australian policy restricting immigrant access to unemployment benefits in the first two years after arrival may hamper their labour market adjustment when temporary income support is most needed.[21]

The existence of significant assimilation in the incidence of unemployment of immigrants is broadly consistent with the North American literature, but is in contrast with Australian evidence on earnings assimilation of immigrants. In the context of Australia's centralized wage determination system, immigrants' labour market adjustment appears to be more in terms of unemployment than earnings. This implies that a focus on earnings in Australia understates the difficulties that recent immigrants face in adjusting to their new labour market, and a more detailed exploration of the links between labour market institutions and immigrant labour market adjustment is a promising avenue for future work.

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Appendix 1: Defining Immigrant Arrival Cohorts

The year of arrival information in each IDS unit record file can be aggregated into the following four arrival cohorts which can be identified in each of the years: 1982, 1990, 1994, 1995 and 1996: 1) before 1976, 2) 1976-85, 3) 1986-90 and 4) 1991-94.[22] For 1986, cohorts are reported as before 1950, 1950-59, 1960-69, 1970-79, and 1980-86. The first four of these cohorts are assigned to the pre 1976 cohort, while the fifth cohort is grouped into the 1976-85 cohort. The results are qualitatively unchanged if immigrants from the 1970-79 cohort in the 1986 survey are reclassified as being part of the 1976-85 cohort, or if observations from the 1986 IDS are omitted from the analysis.

[22] The second cohort is defined as the 1976-82 arrival group in the 1982 survey.

Appendix 2: Hypothesis testing of the baseline flexible specification

The baseline flexible specification includes a full set of interactions: cohort dummy variables interacted with the Asia dummy variable, cohort and Asia dummy variables interacted with the state unemployment rate, and state unemployment rate, cohort and Asia dummy variables interacted with the YSM terms.

(p-values that the set of variables listed is not significantly different from zero)

Specification	Full Sample	Exclude child immigrants	Exclude adult immigrants
Cohorts interacted with Asia	.91	.49	.82
State UE Rate interacted with Cohorts and Asia	.51	.80	.69
YSM terms interacted with Cohorts and Asia	.20	.16[#]	.60
YSM terms interacted with (State UE Rate*Asia)	.21	.08[#]	.67
All interactions	.64	.14	.90
Variables excluded from hypothesis tests	(arrived pre-76)*Asia	(arrived pre-76)*Asia (State UE)*Asia	(State UE)*Asia YSM terms interacted with Asia

Note:

1. The significance of different sets of regressors was also tested after omitting other sets of insignificant variables, with no qualitative change in the test outcomes.

#. Testing the significance of a separate assimilation profile for Asian immigrants alone yields a p-value of .07. However, the joint significance of interactions of the State unemployment rate and Asia with the YSM terms is marginal at most. A test of the significance of these six coefficients yields a p-value of only .29, so these variables were excluded from the results reported in Table 5.