Is the Labour Demand Curve Downward Sloping for Australia?

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Abstract

This paper estimates the effects of immigration on the labour market outcomes of Australian-born workers using data from the Household, Income and Labour Dynamics in Australia Survey. Using the national labour market approach, we find *positive* effects of immigration on native earnings. The analysis indicates, however, that not all education groups are positively affected. In fact, Australian workers with certificates or diplomas have been adversely affected by immigration. The findings are robust across different model specifications and migrant definitions. Finally, we find that immigrants originating from primarily non-English speaking countries have greater positive effects on native earnings than immigrants from English-speaking countries.

JEL classifications: J21; J31; F22.

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Introduction

Does an influx of immigrants depress the earnings and employment opportunities of native-born workers? This is one of the more contentious economic issues in the debate surrounding immigration. This is true for the traditional immigrant-receiving countries like the United States, Canada and Australia, as well as for some of the wealthier European countries which have been popular destinations for migrants in more recent times. The debate is particularly interesting for a country like Australia which has always been referred to as a "land of immigrants". Currently one quarter of the population is foreign-born and many others are the descendants of previous generations of immigrants.

The economic theory underlying this issue is surprisingly equivocal, with the answer varying according to the model. More specifically, when it comes to the labour market consequences of changes in immigration, there are conflicting predictions of standard labour models and trade models. Over-riding the academic concerns, popular belief has invariably been that immigrants harm the labour market prospects of native-born workers, seemingly consistent with the most basic tenets of supply and demand.

Extensive research – theoretical and empirical – has been conducted on this issue, with most attention paid to the potential wage and employment effects of immigrants. Most studies examine the U.S. labour market with several studies also exploring the European contexts. Although some of the literature provides conflicting results, the overwhelming majority of the empirical research finds little or no negative effects of immigration on the labour market outcomes of native workers (see Gaston and Nelson, 2000; 2002; Longhi *et al.*, 2005; Card and Lewis, 2007).

This paper investigates the effect that immigration has on the Australian labour market and, in particular, whether the labour market outcomes of Australian-born workers are adversely affected

by immigrants, as is so popularly believed. Moreover, we examine the potential for migrants of different ethnicities to have different effects on the labour market outcomes of native workers.

In our analysis, we use the educational attainment and work experience of workers to aggregate the national labour market into skill groups. We then estimate the effect that an increase in the proportion of migrants in a particular skill group has on the labour market outcomes of natives in that same skill group. Our analysis uses data drawn from the Household, Income and Labour Dynamics in Australia (HILDA) Survey for the years 2001 to 2005. Doing so provides an insight into the short-run dynamics of immigration and how the labour market is affected.

Measuring the Labour Market Impact of Immigration

Australia has experienced a steady population increase since the end of World War II, as a result of both high post-war fertility and rising levels of immigration. While only ten per cent of Australia's population was foreign-born in 1947, the post-war establishment of a national government immigration portfolio led to the gradual increase in migration levels over the following decades. Today, foreign-born Australians make up one quarter of the country's total population.[1]

As mentioned, despite the popular belief that immigrants lower the wage and employment level of native workers, the majority of overseas research in this area does not support this view. One of the more notable papers is LaLonde and Topel (1991) which uses a cross-section of 119 regions within the United States to examine the effect that different immigrant cohorts have on each other. Their results suggest that increasing the fraction of male immigrants who have been in the United States for five or fewer years by ten per cent reduces the wage of that same group by about 0.3 per cent. They also examine whether regions that experienced more rapid immigration over time also experienced a decline in relative wages. The results indicate that a sustained doubling in the rate of

[1] ABS (2009), table 7.39.

immigration lead to a three per cent reduction in the relative wage of new immigrants, however, this effect lessened over time as the immigrants assimilate into the economy.

Card (2001) focuses on the impact of immigrant inflows on occupation-specific labour market outcomes. Using a cross-section of 175 cities, his estimates indicate that a ten per cent increase in population share is associated with an up to 0.5 per cent reduction in the employment rate of that occupational group. However, he fails to find any robust effects on earnings.

More recently, Dustmann *et al*. (2005) use a variety of estimation techniques to determine the labour market effects of immigration over time. Using data from the British Labour Force Survey for the years 1983 to 2000, the authors estimate the effect of variation in immigration on a range of native labour market outcomes – employment, unemployment, participation and wages – across 17 local labour markets. Their initial OLS results suggest a positive impact of immigration on all four labour market outcomes. However, after correcting for endogeneity bias, their final and most robust estimates, while maintaining the positive sign, were statistically insignificant.

Although not as voluminous as the research on the U.S. labour market, there are a few notable Australian studies that have investigated the impact of immigration on the Australian labour market. An early study is Harrison (1984). This paper examined the impact of immigration on the depressed South Australian labour market during the period 1976 to 1981, exploring whether immigrants take more jobs away from Australians than they create by boosting the demand side of local markets. His findings indicate that immigration provides a small short-term boost to the employment opportunities of Australians while at the same time those newly-arrived migrants are the ones that experience high levels of unemployment. He finds these results consistent with the view that migrants fail to take jobs away from Australians. One exception is made to this conclusion. In the case of manufacturing and trade occupations, where migrants are

disproportionately represented, there was a decline in employment over the six year period suggesting a reduced number of job opportunities for Australians.

Pope and Withers (1993) estimate a structural model consisting of four equations, with unemployment, net migration, real wage and capacity utilisation rates as the endogenous variables. Using data from 1861 to 1981, broken into sub-periods corresponding to the pre-Federation (1861-1901), post-Federation (1908-1945) and post-WWII (1946-1981) eras, they failed to find any statistically significant effects of immigration on net unemployment or real wages. Interestingly, they also conducted a counterfactual policy simulation for the 1980s, finding that the Australian government was justified in allowing greater immigration into the country during periods of high unemployment. In fact, unemployment levels were slightly better than they would have otherwise been. Such findings, *if correct*, have profound implications for policy-makers in today's difficult economic environment.

More recently, Addison and Worswick (2002) use cross-sectional analysis on 48 local labour markets during the period 1982 to 1996 to examine the impact of recent immigrants on the real wages of natives. Their overall results indicate no statistically significant effect, robust at an occupational or a local labour market level.

The empirical methodology used in most of these studies is often labelled the *local* labour markets approach. Researchers have attempted to relate differences in the relative earnings of different local labour markets to differences in the relative supply of immigrants. There are (at least) two potential problems associated with this method. First, immigrants are likely to be attracted to those labour markets that are currently enjoying economic success. This self-selection creates an endogeneity problem, which may upwardly bias the estimated effects of immigration. Secondly, local labour markets are not closed economies and native workers are free to leave. As a result, if

immigration does negatively impact the local earnings of a certain labour group, native workers in that labour group may move elsewhere. This phenomenon is referred to as the "skating rink" hypothesis (Card and DiNardo, 2000). Such labour mobility across regions would downwardly bias estimates as the effects of immigration are diffused throughout the entire national economy.

While the majority of research on the labour market effects of immigration focuses on the United States or Europe, much less has been performed on the Australian labour market. Given the differences Australia faces in migration patterns, sources and policies, it is obviously unreasonable to simply infer the possible effects of immigration on the Australian labour market from these other studies. As a result, the purpose of this paper is to fill the gap in recent evidence on the labour market impact of immigration in Australia.

The literature discussed above provides valuable lessons regarding the structure of this research. As a result, to avoid some of the problems associated with the local labour markets approach – particularly the bias caused by labour mobility and immigrant self-selection – this paper analyses labour market outcomes using what is termed the *national* labour market approach. The best known paper that advocates the use of this approach is Borjas (2003).[2] Borjas uses data from the 1960-1990 U.S. Decennial Censuses and the 1998-2001 Current Population Surveys to estimate the effects of immigration on the U.S. national labour market. His results represent some of the largest negative estimates generated in the immense literature to date. After aggregating workers into skill groups based on educational attainment and work experience, Borjas finds that a ten per cent increase in the number of immigrants in a particular skill group reduces the weekly earnings of natives in that skill group by about four per cent. Such estimates often form the basis for the

[2] See also, Borjas and Katz (2005) and Borjas (2006). Borjas' papers adopt an approach similar to that in Suen (2000), but where the latter aggregates on age cohort and immigrant source, Borjas aggregates on age cohort ("experience") and education.

negative view of greater immigration on labour market outcomes taken by some prominent academics (e.g., Freeman, 2004) as well as members of the public and anti-immigration lobbies.

This paper will use the national labour market approach to examine the effect of immigration on the employment and earnings outcomes of Australian-born workers, in order to provide what might potentially be considered the most negative set of estimates for Australia. That is, the estimates we produce here can be considered to be close to, or at, the lowest bound of the plausible range of estimates. Moreover, our paper will extend these findings by disaggregating the effects according to the ethnicity of immigrants. In addition, we provide an econometric extension of Borjas (2003), not only in terms of country and time frame examined, but also in terms of the data set. Data drawn from the HILDA Survey for years 2001 to 2005 are used, providing greater insight into the short-run dynamics of immigration and also allows us to partially overcome one of the main problems associated with Borjas' analysis, i.e. the adjustment of capital stock over a long period of time.

Methodology

Data

Our analysis uses data drawn from the HILDA Survey from years 2001 to 2005. HILDA is an annual survey providing a wide range of longitudinal data on social and economic statistics and related topics such as family and household formation, income and work. It is the richness and detail of the information in HILDA, such as information on ethnicity, years of experience as well as years of education accumulated both in Australia and overseas that makes it such an attractive data source for this study. The main body of the analysis is restricted to males aged 15 to 65, with additional analysis performed for females aged 15 to 65 and a pooled male-female sample.

The earnings data used in the analysis are drawn from the sample of persons who reported at least 20 dollars in weekly earnings. Earnings are deflated using the 2006 Consumer Price Index. The hours worked data used in the analysis are drawn from the sample of persons who reported a positive number of hours usually worked each week in their main job.[3]

In the empirical analysis alternative definitions of migrant are used to test the sensitivity of the results. The broadest definition includes all those who are foreign-born (Migrant A), this is then narrowed to include only foreign-born individuals who obtained their last school year overseas (Migrant B) and those foreign-born individuals who also completed their highest qualification overseas (Migrant C). A summary of these definitions, as well as two further definitions used in the sensitivity analysis, is provided in Appendix Table A1.[4] All other persons are classified as natives. Additional analysis is performed distinguishing migrants from English-speaking and non-English speaking countries, these results are provided in Section 4.4.

Following Borjas (2003), individuals are classified into four distinct educational groups – high school dropouts (persons whose highest level of education was Year 11 or below), high school graduates (persons whose highest level of education was Year 12), Diploma graduates (persons who obtained either a Certificate, Diploma or Advanced Diploma) and University graduates (persons who obtained either an undergraduate or postgraduate degree or a graduate Certificate or Diploma).

Individuals are also classified into eight experience groups based on the number of years they have spent in paid employment. Each group pertains to a five year interval of experience, for example, workers in the first group have between 1 and 5 years of experience, workers in the second group

[3] Additionally, only those observations with reported education, experience and country of birth data are used.

[4] A drawback of using HILDA data for our study is that the stock of migrants included in each wave is limited to those that were interviewed in the first wave, i.e., 2001.

have between 6 and 10 years of experience and so on. The analysis is restricted to persons who have between 1 and 40 years of work experience. Once again, this practice follows Borjas (2003).[5] In addition, as firms may attach different values to foreign work experience than they do to domestic work experience, we also address the issue of "effective" labour market experience in Section 4.3.

Research design

Consider a group of workers with educational attainment i (i = 1,…, 4), experience level j (j = 1,…,8), who are observed in year t (t = 2001,…, 2005). An (i,j,t) cell therefore defines a particular skill group at a point in time. The immigrant supply shock for each skill group is measured as

$$p_{ijt} = M_{ijt} / (M_{ijt} + N_{ijt}), \quad (1)$$

where M_{ijt} represents the number of immigrants in cell (i,j,t), and N_{ijt} represents the corresponding number of natives.

To determine the effect that immigrant share has on the labour market outcomes of natives, the following specification is estimated

$$y_{ijt} = \theta p_{ijt} + s_i + x_j + \pi_t + (s_i \times x_j) + (s_i \times \pi_t) + (x_j \times \pi_t) + \varphi_{ijt}, \quad (2)$$

where y_{ijt} represents the mean value of a particular labour market outcome for native men in cell (i,j,t), s_i is a vector of fixed effects indicating educational attainment, x_j is a vector of fixed effects indicating work experience, π_t is a vector of time fixed effects and φ_{ijt} is a normally-distributed residual term.[6] The estimated coefficient θ is used to test whether immigrant supply shocks have significant effects on the labour market outcomes of native workers in Australia.

[5] See Appendix Table A2.

[6] The dependent variables are the mean of log weekly earnings of natives and the mean of log weekly hours worked by natives. Interactions $(s_i \times \pi_t)$ and $(x_j \times \pi_t)$ control for the possibility that education and

The Results

Two native labour market outcomes (y_{ijt}) are examined, the mean of log weekly earnings and the mean of log weekly hours worked. An ordinary least squares estimation procedure is used and endogeneity bias is addressed by using instrumental variables (IV). The IV analysis instruments p_{ijt} , using its lag, to provide a source of variation in the immigrant share that is independent of current labour market outcomes.[7] The standard errors are adjusted for heteroscedasticity and autocorrelation.

The Main Results

Table 1 presents a series of different estimates of the effects of immigrant share on native labour market outcomes. The first row presents the basic estimates of the coefficient θ, for the three migrant classifications.

- Table 1 here -

When log of weekly earnings is the dependent variable the coefficient is positive for all migrants and statistically significant for each migrant classification.

The coefficient estimates can be converted to elasticities for ease of interpretation. Specifically, let the percentage change in the labour supply of group (*i,j,t*) attributable to immigration be defined by $m_{ijt} = M_{ijt}/N_{ijt}$, then the wage elasticity is calculated as $\theta/(1+m_{ijt})^2$.

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experience effects change over time, while interaction ($s_i \times x_j$) controls for the possibility that experience effects differ across educational groups.

[7] Sargan tests fail to invalidate this instrument for every model estimated. (The Sargan test statistic follows a chi-square distribution with (*J-k*) degrees of freedom, where *J* represents the number of instruments and *k* is the number of endogenous variables. In our case, *p* is instrumented using its lag and every other variable is instrumented by itself so we have seven instruments (i.e., the same as the number of independent variables). There are two endogenous variables (*y* and *p*), so that *J-k* = 5.)

The mean immigrant supply increase when the labour force includes male participants only and migrants are defined as being foreign-born (Migrant A) is 28 per cent. In this case, the coefficient is 0.673 (it is statistically significant at the one per cent level). Converting to an elasticity, an immigrant inflow that increases the number of workers in a particular skill group by one per cent *increases* the weekly earnings of natives in that same skill group by about 0.4 per cent. This positive wage response increases as the definition of migrant is narrowed to include only those completing recent education or qualifications overseas.

Although the migrant share is statistically significant in only the third migrant category when log of weekly hours worked is the dependent variable, most importantly, θ remains positive. More specifically, a one per cent increase in the number of workers in a particular skill group, *increases* log weekly hours worked by 1.64 per cent.

The remaining rows conduct a variety of other specification tests to determine the sensitivity of the results. In addition to exploring alternative definitions of migrant, we examine different measures of the labour force. The second row reports the results when only female labour force participants are examined and the third row includes both male and female labour force participants in the analysis. When log of weekly earnings is the dependent variable, the coefficient estimates remain positive in all cases and are significant for each migrant classification.

The last row in the table addresses the concern that an increase in p_{ijt} can represent either an increase in the number of immigrants or a decrease in the number of native workers in a particular skill group. As a result, the fourth row presents the estimates when the model adds the log of the size of the native workforce in cell (*i,j,t*) as a regressor. Consistent with the other estimates the coefficient estimates remain positive for each migrant definition as well as significant for the

second and third classifications. The same is found when the log of weekly hours worked is the dependent variable.[8]

To examine the sensitivity of the main results we estimate some alternative models and use alternative definitions of migrant. We concentrate on the results for earnings, as this is where the greater part of the debate surrounding the labour market effects of immigration has centred. First, we introduce two additional definitions of migrant in the last two columns of Appendix Table A3. Migrant D (E) is for migrants who arrived in Australia after 1995 (1985). These definitions are introduced in order to examine whether more recent cohorts of migrants have a greater adverse impact on native workers than do older cohorts of immigrants (a finding common in the U.S. literature, e.g.). In the first three columns of row *a* of Appendix Table A3, the baseline results are transcribed from Table 1. Comparing the findings for Migrant A to those for Migrant D and E reveal slightly stronger positive earnings effects. Row *b* pools native and migrant workers, to examine the often made claim that migrants tend to affect other migrants more than natives. Based on our findings, there is no evidence for this view. Finally, in row *c* we use the population weights included in the HILDA Survey to examine the potential bias created by sample attrition.[9] Once again, our results are reassuringly robust.

Within Education Groups

We next estimate the regression model within education groups to determine whether the results are being driven by particular groups. Borjas performed this analysis to determine whether his

[8] When equation (2) is estimated separately for each year (t = 2001,…, 2005), the analysis provides similarly positive and significant results.

[9] As the sample is subject to attrition, which may not be random, weights are used to test the robustness of our results for the pooled data sample. The cross-sectional responding person weight provided by HILDA is used to calculate the log weighted average wage for male native workers. The weighted data are used to re-estimate equation (2) for the different migrant definitions.

large negative results were being driven by an increase in the supply of foreign-born high-school dropouts. The results appear in Table 2.

- Table 2 here -

The results show that the effect of immigration on the log of weekly earnings of each educational group is generally positive and significant, with one exception. The exception is the third educational group, those with a certificate or a diploma, where the estimated coefficient is consistently negative for each classification of migrant. Similar results are found for log of weekly hours worked as the dependent variable. This contrasts with Borjas' (2003) results for the U.S. labour market which indicated that it was the least educated workers who were the most susceptible to immigrant inflows. Moreover, when this specification is estimated on those workers with at least a high school education, the coefficients are positive and significant, indicating that the negative effects on diploma holders are being offset by the positive effects on high school and university graduates.

Further analysis was performed on this category of worker in an attempt to identify the cause of the negative effect. Using data for this educational group only, workers were segmented according to occupation, industry, union status, state and section of state to determine whether any of these characteristics were driving the negative result. Overall, we found that the negative significant results were most prominently for union members and for workers located in the natural resource states (Queensland, Western Australia and the Northern Territory).[10]

[10] There are a number of different "stories" which might explain these correlations. For example, the following explanation has been suggested by a number of colleagues. The Temporary Business (Long Stay) Subclass 457 visa allows businesses to bring in skilled migrant workers at the award wage, rather than the market wage. During the height of the mining boom there were chronic "skill shortages", particularly in the mining states. Many businesses and recruitment companies brought in overseas workers (e.g., tradespeople) willing to work at award wages. The minimum skills of workers in the affected category relate to ASCO 1-4, with the most common occupational groups being managers and administrators, professionals and associate professionals and tradespeople. If the migrant workers on 457 visas, entering at

The Role of 'Effective Experience'

The model was re-estimated using "effective experience" to classify workers into education-experience groups, where effective experience measures the years of work experience as they are most valued in the host labour market. Effective experience is measured as

$$X = \begin{cases} \alpha(A_M - A_L) + \beta(A - A_M) & if\ (A_M > A_L) \\ \gamma(A - A_L) & if\ (A_M \leq A_L), \end{cases} \tag{3}$$

where A is age, A_M the age of entry into Australia and A_L the age of entry into the labour market. The parameter α translates a year of source country experience obtained by immigrants who migrated as adults into the equivalent value of experience obtained by a native worker, β rescales the value of a year of host country experience obtained by these adult immigrants and γ rescales the experience acquired by immigrants who migrated as children. To calculate the parameters α, β and γ, the following model is estimated

$$\begin{aligned} \ln W = {} & s_i + \phi_C I^C + \phi_D I^D + \lambda_N N(A - A_L) + \lambda_C I^C (A - A_L) \\ & + \lambda_{D0} I^D (A_M - A_L) + \lambda_{D1} I^D (A - A_M) + \kappa Y + \rho\pi + \varphi, \end{aligned} \tag{4}$$

where

W is the average weekly earnings of a worker;

s_i is a vector of education fixed effects;

I^C indicates whether an immigrant entered the host country as a child ($A_M \leq A_L$);

I^D indicates whether an immigrant entered the host country as an adult $(A_M > A_L)$;

N indicates whether the worker is a native $(1 - I^C - I^D)$;

Y *is* a vector of dummy variables indicating year of arrival (= 0, for natives);[11]

π indicates from which year the observation is drawn;

λ_N is the value of a year of experience obtained by a native worker;

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a lower than market wage, are substitutable for the workers in this educational group, they could contribute to the negative effect observed in the earnings of natives in this particular skill group.

[11] Equals 1 if year of arrival > 1999; 2 if 1995-99, 3 if 1990-94; 4 if 1985-89; 5 if 1980-84; 6 if 1975-79; 7 if 1970-74; 8 if 1965-69; 9 if 1960-64; 10 if 1950-59 and 11 if year of arrival < 1950.

λ_C is the value of a year of experience obtained in the host country by a child immigrant;

λ_{D0} is the value of a year of source country experience obtained by an adult immigrant;

λ_{D1} is the value of a year of host country experience obtained by an adult immigrant.

The weights that determine an immigrant's effective experience are given by

$$\alpha = \frac{\lambda_{D0}}{\lambda_N}, \quad \beta = \frac{\lambda_{D1}}{\lambda_N} \text{ and } \quad \gamma = \frac{\lambda_C}{\lambda_N}. \tag{5}$$

These weights are used to reclassify observations into education-experience cells in order to re-estimate equation (2). For example, under the first migrant classification the weights are calculated as, α = 0.45, β = 0.51 and γ = 1.09. Table 3 reports the relevant coefficients from this estimation.

- Table 3 here -

Table 4 presents the estimates when log of weekly earnings is the dependent variable. Notably, all coefficients remain positive and statistically significant.

- Table 4 here -

The Effects of Ethnicity

An important issue in Australia (and elsewhere, of course) has been the role that migrants of different ethnicities may have on native workers. As a result, further analysis is conducted using the following specification

$$y_{ijt} = \gamma_1 p^1_{ijt} + \gamma_2 p^2_{ijt} + s_i + x_j + \pi_t + (s_i \times x_j) + (s_i \times \pi_t) + (x_j \times \pi_t) + \varphi_{ijt}, \tag{6}$$

where p^1_{ijt} measures the English-speaking migrant share and p^2_{ijt} measures the non-English speaking migrant share of a particular skill group.

The estimated coefficients γ_1 and γ_2 are used to test whether non-English speaking migrants have the same effect on the labour market outcomes of native workers as English-speaking migrants.

Table 5 presents the results for each migrant classification using the log of weekly earnings as the dependent variable.

- Table 5 here -

For the first classification of migrants, the effects of migrants originating from primarily English and non-English speaking countries are positive and not statistically different from one another. When the definition of migrant is narrowed in the next two cases, not only do the coefficients remain positive but migrants received from primarily non-English speaking countries have a significantly greater positive effect on the weekly earnings of natives than migrants from English speaking countries. We speculate that the foreign-born workers captured by these narrower definitions of migrant are more likely to be complements for native-born workers.

Concluding Comments

The concern over whether immigrants adversely affect the labour market outcomes of native workers has always been a key issue in the debate on immigration in Australia. The contentious nature of the subject will continue to stimulate research to measure these labour market effects. Despite the popular belief that immigrants harm wage and employment opportunities of natives, the overwhelming majority of the overseas literature does not support this conclusion.

This paper adopted the national labour market approach for estimating the effect of immigration on the Australian labour market. The analysis aggregated workers into skill groups according to educational attainment and work experience, making the assumption that similarly educated workers with differing levels of experience are imperfect substitutes in production.

Consistent with the modal position taken in the existing literature, the evidence presented in this paper indicates that although some educational groups may be negatively affected by immigration, at an aggregate level there are no negative effects. In fact, we find significantly positive effects on

the earnings outcomes of native-born workers in Australia at a national level. In part, this result makes sense from a macroeconomic perspective, i.e., immigration boosts the domestic labour supply and increases aggregate demand, consumption spending, investment and (possibly) government expenditure. These factors increase the demand for labour. The wage elasticity estimates suggest that an immigrant inflow increasing the number of workers in a particular skill group by one per cent *increases* the weekly earnings of natives in that same skill group by about 0.4 per cent. This indicates a complementarity in production between domestic workers and migrant workers in Australia.

Moreover, the evidence indicates that immigrants originating from primarily non-English speaking countries have greater positive effects on native earnings than immigrants from primarily English-speaking countries. Once again, this speaks to the importance of complementarities in labour demand.

When interpreting these results there are a few caveats which must be borne in mind. The large negative estimates generated by the national labour market approach are, according to Ottaviano and Peri (2008), a result of the parameter restrictions that are imposed.[12] As we have argued, we view our estimates as representing the lowest bound or the "most negative" set of estimates.

In addition, Borjas (2003) used decadal data and his analysis (rather implausibly, in the opinion of many researchers) ignored any capital adjustments induced by immigration, the effect of any capital-skill complementarities and the potential for endogenous technological change as a result

[12] Additionally, the national labour market approach assumes that workers and natives in the same skill group are perfect substitutes, while workers with the same level of experience but different levels of education are imperfect substitutes in production. Ottaviano and Peri (2008) argue that these parameter restrictions also contribute to the large negative effects produced. In particular, they argue that the elasticity of substitution between high school drop-outs and high school graduates is so large that it is inappropriate to consider them as two distinct educational groups. They also argue that the elasticity of substitution between native and immigrant workers with the same skill group is low and as a result cannot be considered perfect substitutes.

of high skilled immigration. One advantage of the short time span we consider is that the bias imparted by the national labour markets approach is likely to be far less severe. On the other hand, we are cognisant of the fact that this time period does represent a period of robust economic growth for Australia. (The unemployment was 6.2 per cent in January 2001 and 5.1 per cent in December 2005.) Interestingly, Harrison's (1984) estimates were obtained during a period of economic slowdown and stagnation and his conclusions are qualitatively similar to ours. Overall, we feel disposed to agree with Ottaviano and Peri (2008, p.3) who argue that "… *[t]he labor demand curve is downward sloping", as Borjas (2003) puts it, but one should not forget that the demand for each factor (type of workers) shifts when the supplies of other factors change*".[13]

As to some possible extensions, further research is needed on the separate educational category of diploma graduates to determine the precise cause of the negative effects. Greater disaggregation can also be made according to ethnicity. While the literature examining the labour market effects of immigration is immense, in order to provide an accurate picture of the policy implications associated with these findings, more work on the Australian context is clearly desirable.

[13] Of course, the results what we have presented are also consistent with a perfectly elastic labour demand curve, an implication of what Ed Leamer refers to as *factor price insensitivity* (see Gaston and Nelson, 2002).

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Appendices and Tables

TABLE 1

IMPACT OF IMMIGRANT SHARE ON LABOUR MARKET OUTCOMES OF NATIVE EDUCATION-EXPERIENCE GROUPS

	Dependent variable					
	Log weekly earnings			Log weekly hours worked		
Specification:	Migrant A	Migrant B	Migrant C	Migrant A	Migrant B	Migrant C
1. Basic estimates	0.673***	1.599***	2.792***	-0.065	0.102	1.879***
	(0.206)	(0.316)	(0.596)	(0.129)	(0.157)	(0.290)
2. Estimates on female labour force participants only	0.483**	0.736***	1.404***	0.128	0.313**	-0.406*
	(0.205)	(0.160)	(0.287)	(0.120)	(0.138)	(0.231)
3. Estimates including males and females as labour force participants	0.745***	0.994***	0.353*	-0.143	0.088	1.238***
	(0.135)	(0.129)	(0.201)	(0.110)	(0.117)	(0.452)
4. Includes log native labour force as a regressor	0.512	1.962***	3.381***	0.363	0.541***	1.746***
	(0.324)	(0.451)	(0.628)	(0.190)	(0.156)	(0.336)

***,**, * indicates significance at the 1%, 5% and 10% levels, respectively.

TABLE 2

IMPACT OF IMMIGRANT SHARE ON NATIVE LABOUR MARKET OUTCOMES, BY EDUCATION GROUP

Dependent variable:		High school dropouts	High school graduates	Tafe or Diploma	University degree	At least high school graduates
Log weekly earnings						
	Migrant A	0.098	1.197**	-1.869**	0.367	1.487***
		(0.47)	(0.491)	(0.706)	(0.580)	(0.266)
	Migrant B	-0.726	1.238*	-1.667*	1.827***	2.043***
		(0.571)	(0.711)	(0.887)	(0.509)	(0.300)
	Migrant C	1.109	2.892***	0.253	2.349***	2.587***
		(1.748)	(0.999)	(1.445)	(0.610)	(0.303)
Log weekly hours worked						
	Migrant A	-0.16	0.527	-0.600*	0.671	0.113
		(0.201)	(0.335)	(0.312)	(0.463)	(0.143)
	Migrant B	-0.21	0.212	-0.905***	1.437***	0.330*
		(0.231)	(0.474)	(0.322)	(0.322)	(0.171)
	Migrant C	1.327	2.418***	-1.223*	1.879***	0.577***
		(0.894)	(0.746)	(0.634)	(0.307)	(0.169)

***,**, * indicates significance at the 1%, 5% and 10% levels, respectively.

TABLE 3

IMPACT OF DIFFERENT TYPES OF LABOUR MARKET EXPERIENCE ON THE LOG WEEKLY EARNINGS OF NATIVES AND IMMIGRANTS

Coefficient of:		Natives	Child Immigrants	Adult Immigrants
Source country experience				
	Migrant A	-	-	0.027***
				(0.006)
	Migrant B	-	-	0.024***
				(0.006)
	Migrant C	-	-	0.035***
				(0.009)
Host country experience				
	Migrant A	0.061***	0.067***	0.031***
		(0.002)	(0.006)	(0.008)
	Migrant B	0.061***	0.051***	0.034***
		(0.002)	(0.015)	(0.009)
	Migrant C	0.060	0.060	0.040***
		(0.002)	(0.047)	(0.012)

*** indicates statistical significance at the 1% level.

TABLE 4

IMPACT OF IMMIGRANT SHARE ON EARNINGS OUTCOMES OF NATIVE SKILL GROUPS, USING EFFECTIVE EXPERIENCE

Specification:	Migrant A	Migrant B	Migrant C
1. Basic estimates	0.804***	1.03***	1.905***
	(0.162)	(0.173)	(0.334)
4. Includes log native labour force as regressor	0.751***	0.008***	2.094***
	(0.167)	(0.182)	(0.305)

*** indicates statiatical significance at the 1% level.

TABLE 5

IMPACT OF IMMIGRANT SHARE ON EARNINGS OUTCOMES OF NATIVE SKILL GROUPS, BY ETHNICITY*

Coefficient of:	Migrant A	Migrant B	Migrant C
English speaking migrant share	0.847**	0.748*	0.448*
	(0.353)	(0.463)	(0.407)
Non-English speaking migrant share	1.187**	1.914***	5.100***
	(0.235)	(0.317)	(0.545)

***,**, * indicates significance at the 1%, 5% and 10% levels, respectively.

TABLE A1
DEFINITIONS OF MIGRANT

Migrant A	Foreign born
Migrant B	Foreign-born and obtained last school year overseas
Migrant C	Foreign-born and completed highest qualification overseas
Migrant D	Foreign-born and arrived in Australia after 1995
Migrant E	Foreign-born and arrived in Australia after 1985

TABLE A2

PERCENT OF MALE LABOUR FORCE THAT IS FOREIGN-BORN, BY EDUCATION AND EXPERIENCE, 2001-2005

Education	Years of Experience	2001	2002	2003	2004	2005
High School Dropouts	1-5	0.14	0.13	0.08	0.11	0.08
	6-10	0.34	0.33	0.32	0.18	0.20
	11-15	0.29	0.37	0.31	0.38	0.38
	16-20	0.28	0.30	0.31	0.23	0.26
	21-25	0.07	0.08	0.09	0.07	0.07
	26-30	0.10	0.08	0.09	0.11	0.09
	31-35	0.08	0.05	0.05	0.02	0.06
	36-40	0.13	0.09	0.06	0.07	0.06
High School Graduates	1-5	0.12	0.16	0.13	0.12	0.14
	6-10	0.31	0.19	0.16	0.18	0.19
	11-15	0.36	0.39	0.36	0.31	0.24
	16-20	0.39	0.35	0.38	0.38	0.38
	21-25	0.18	0.14	0.25	0.22	0.25
	26-30	0.07	0.14	0.16	0.17	0.14
	31-35	0.14	0.08	0.05	0.00	0.00
	36-40	0.05	0.09	0.11	0.17	0.13
Certificate/Diploma	1-5	0.22	0.17	0.16	0.17	0.11
	6-10	0.30	0.24	0.25	0.24	0.22
	11-15	0.30	0.26	0.25	0.27	0.27
	16-20	0.26	0.22	0.28	0.27	0.25
	21-25	0.10	0.06	0.04	0.07	0.07
	26-30	0.12	0.12	0.12	0.13	0.12
	31-35	0.14	0.11	0.09	0.08	0.10
	36-40	0.13	0.13	0.16	0.11	0.09
University	1-5	0.47	0.40	0.37	0.33	0.28
	6-10	0.48	0.46	0.42	0.46	0.42
	11-15	0.43	0.45	0.46	0.44	0.40
	16-20	0.32	0.27	0.33	0.28	0.30
	21-25	0.12	0.09	0.11	0.14	0.14
	26-30	0.13	0.12	0.11	0.11	0.08
	31-35	0.20	0.17	0.11	0.13	0.14
	36-40	0.13	0.17	0.18	0.13	0.21

TABLE A3

IMPACT OF IMMIGRANT SHARE ON EARNINGS OUTCOMES OF POOLED (ALTERNATIVE SPECIFICATIONS)

Specification:	Migrant A	Migrant B	Migrant C	Migrant D	Migrant E
a. Natives only	0.673***	1.599***	2.792***	1.753***	2.761***
	(0.206)	(0.316)	(0.596)	(0.578)	(0.385)
b. Natives and immigrants (pooled)	0.772***	1.533***	3.066***	1.714***	2.743***
	(0.151)	(0.291)	(0.516)	(0.561)	(0.372)
c. Natives (weighted data)	0.811***	1.669***	2.777***	1.685***	2.636***
	(0.169)	(0.362)	(0.616)	(0.606)	(0.412)

*** indicates statistical significance at the 1% level.