Earnings and immigrants' age at arrival in Australia

Temesgen Kifle, Parvinder Kler and Christopher Fleming

Earnings and immigrants' age at arrival in Australia

Purpose

This paper studies the earnings based Australian labour market assimilation of immigrants. It explicitly measures the effect of immigrants' age at arrival on initial earnings and its earnings change over time. To provide useful insights into the issue of immigrants' earnings assimilation, a separate analysis was done for males and females and the non-English speaking background (NESB) immigrants were further broken down into three categories to capture the effect of 'cultural proximity'. Further, proxy measures for pre- and post-migration educational were used to account for a possible nonlinearity in the returns to education for immigrants.

Design/methodology/approach

Using a panel dataset, immigrant earnings assimilation is estimated using the random effects Generalised Least Squares method with Mundlak corrections to relax the assumption in the random-effects estimator that the individual specific effects are uncorrelated with the independent variables.

Findings

Aggregated results suggest that an earnings premium only accrues to male immigrants under 35 at arrival, whilst for females older arrivals suffer a penalty on arrival. Disaggregated findings show that European NESB immigrants of both gender perform best with respect to obtaining an earnings premium upon arrival, as do younger immigrants, intimating that younger arrivals obtain Australian human capital at a greater rate than older arrivals. Female ESB immigrants, contrary to a priori expectations, suffer an earnings penalty upon arrival

within all age groups, though their extremely strong returns to post-migration education result in this penalty dissipating relatively quickly.

Originality/value

This paper extends the literature on immigrant earnings assimilation by explicitly controlling for age at arrival, controlling for pre- and post-migration education and by further splitting up NESB immigrants based on 'cultural proximity' factors.

Keywords Earnings assimilation; Immigrants; Age at arrival; Panel data; Cultural proximity

Paper Type Research paper

1. Introduction and *Raison d'etre*

Australia is a nation of immigrants with almost a quarter of the nation's population were born overseas. While their contribution to Australian society, culture and prosperity has been an essential element in shaping the nation, they do, however, often face barriers to labour market success. This is most clearly illustrated by the fact that immigrants, particularly those emigrating from non-English speaking countries, often earn lower wages than Australian-born workers. This phenomenon has several possible causes, including a lack of international transferability of human capital (Chiswick and Miller, 2010), less recognition by employers of overseas qualifications and skills (Beggs and Chapman, 1991; Chapman and Iredale, 1993; Green et al., 2007), limited English language proficiency (Chiswick and Miller, 1995) and, taking from the sociology literature, non-human capital differences (noted in this study as 'cultural proximity') with the native population (Fox et al., 2012; Fox, 2013).

In his seminal work, Chiswick (1978), using data from the 1970 US census, shows that the significant earnings gap between natives and immigrants upon arrival tends to disappear over time as immigrants assimilate into the host society. The relative earnings disadvantage at entry is due to a lack host country specific human capital. This dissipates as host country specific human capital is acquired. Within the Australian context, immigrants in recent decades have been subject to increasingly stringent human capital requirements. This should theoretically lead not just to arrival cohort differences but also in an increase in the pace at which immigrants acquire more 'host country specific' human capital in favour of these more recent arrivals given that they already possess more 'skills-ready' characteristics compared to earlier arrival cohorts (Chiswick and Miller, 2008, 2009).

The finding that the earnings of immigrants converge to those of US-born workers over time has subsequently been confirmed by, among others, Borjas (1982), Borjas and Tienda (1985), Carliner (1980), DeFreitas (1980) and Long (1980). As noted by Borjas (1985) however,

estimates of the effect of time since arrival on earnings is potentially biased as it is difficult to distinguish age and cohort-effects in a cross-sectional research design. Another possible bias arises from a failure to control for age at arrival in the host country. The age at which an individual migrates to a host country is potentially an important factor in determining his/her success in the labour market. Host country-specific education and linguistic and cultural challenges are linked with age at arrival. For example, immigrants who arrived as youth are expected to assimilate better than those who arrived as adults (Bleakley and Chin, 2004; Friedberg, 1992; Guven and Islam, 2015; Schaafsma and Sweetman, 2001; van Ours and Veenman, 2006; Wilkins, 2003; Will, 1997). As noted by Friedberg (1992), to the extent that age at arrival negatively affects earnings, the failure to account for this variable will overstate the impact that years since arrival has on earnings due to the spurious negative correlation between age at arrival and years since arrival. Age at arrival is also related to various social outcomes, including marriage rate and number of children (Bleakley and Chin, 2010), obesity (Roshania, et al., 2008), mental health (Xu and McDonald, 2010), smoking (Wilkinson, et al., 2005), alcohol and drug use (Reingle, et al., 2014) and crime (Anderson and Skardhamar (2012).

Available evidence on earnings assimilation in Australia is mixed. A number of studies suggest that immigrants' earnings converge to those of natives over time (Breunig et al., 2013; Chiswick et al., 2005; Wilkins, 2003). These results are countered by findings that report no evidence of earnings assimilation (Antecol et al., 2006; Cobb-Clark et al., 2012; McDonald and Worswick, 1999). The studies by Breunig et al. (2013), Chiswick et al. (2005) and Cobb-Clark et al. (2012) all employ panel data estimates but fail to explicitly control for age at arrival.[1] McDonald and Worswick (1999) control for age at arrival by making distinctions between immigrants who arrived as adults and immigrants who arrived as children. However they, along with Antecol et al. (2006), do not use true panel data. Only

Wilkins (2003) explicitly examines the effect of age at arrival on earnings in Australia, though it is reliant on cross-sectional data. He finds initial wages to increase with age at arrival, while the rate of wage growth decreases with age at arrival.

This paper seeks to redress some of the limitations of earlier studies and fill in an important research gap by employing panel data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to provide evidence about the effect age at arrival has on initial earnings and earnings growth. This is done in three ways. First, this paper investigate gender differences in the assimilation of earnings. A separate analysis for each gender is important because there are significant variations between male and female immigrants as compared among themselves and to natives (Constant, et al. 2006). In their paper, Breunig et al. (2013) estimated wage equation by gender as returns to human capital and labour market outcomes vary between males and females. Second, we explicitly model age at arrival when estimating the potential native-immigrant earnings gap using a panel dataset. This improves upon the previously noted Australian studies that either exclude age at arrival explicitly or those that include it but use cross-sectional or quasi-panel datasets. Third, this paper attempts to deepen our understanding of immigrant heterogeneity in terms of 'cultural proximity'. Thus far, the bulk of research into Australian immigrant assimilation has largely concentrated on differences in human capital characteristics between the native-born and immigrants, which is then often extended into a further distinction between English-speaking background (ESB) and non-English speaking background (NESB) immigrants. The split is often justified on grounds of not just variations in language proficiency but also on differing characteristics between ESB and NESB immigrants. Nevertheless, the literature does not explicitly delve further into this delineation despite largely finding significant differences between these groups. It is not altogether clear whether such a broad split is an accurate gauge of immigrant heterogeneity, especially given that NESB immigrants tend to encompass a wide range of

people from clearly divergent backgrounds.

Thus, we further disaggregate the NESB group into those born in continental Europe, Asia (excluding the Middle East) and the remaining countries. We posit that the NESB category is a 'catch-all' that captures a wide and heterogeneous set of individuals with great variations in religion, ethnicity and social values (Fox et al., 2012; Fox, 2013). Given the Judeo-Christian characteristics of the founding of modern Australia based on British law, the similarities with the ESB countries is clear, but it also follows that the cultural relationship with continental Europe would also be closer relative to say the Middle East. Accordingly, we hypothesise that European NESB immigrants will differ in their assimilation into the labour market compared to Asian and Other NESB immigrants in the sense that their characteristics suggests a closer delineation to ESB immigrants.

Nevertheless, this investigation suffers from two limitations. First, it does not consider out-migration, given the belief that successful immigrants are more likely to remain in the host country. This implies that immigrants' re-migration decisions are non-random; studies that do not consider out-migration of unsuccessful immigrants, therefore, tend to overestimate the effect of years since arrival on earnings (Borjas, 1989, Lubotsky, 2007). In defence of this approach, in their study on immigrant wage gaps and assimilation in Australia, Breunig et al. (2013), also utilising the HILDA dataset state that selective out-migration does not appear to be a major issue in the Australian context, as Australia is a final destination for most immigrants and re-migration decisions seem to be random. Further, the Australian Bureau of Statistics (2012) reports various reasons for out-migration, including feelings of homesickness, retirement, family formation and dissolution, successful employment and increased wealth, and improvement in economic and/or political conditions in their home country.

Second, sample selection bias (SSB) can be an issue in estimating an earnings equation. With

immigrants, SSB may arise because immigrants are, usually, not randomly selected from within their countries of origin. There are two opposing views in this regard. Borjas (1987) argues that a negative self-selection can be expected if there is more unequal income distribution in immigrant sending countries. Chiswick (1978, 1999, 2000) argues the opposite, noting that immigrants are more ambitious, diligent and more likely to succeed in their host country. According to Borjas (1987), immigrants, especially from third world countries, are less productive and thus earn less than natives in advanced countries, and according to Chiswick, immigrants are relatively more productive and thus earn more than natives. Data limitations make it difficult to address SSB. The HILDA Survey does not contain information on entry visa type for immigrants, motives for migration and costs of migration. In addition, the survey has no information about immigrants' pre-migration earnings, type of occupation and other labour market characteristics. In the absence of such information, it is difficult to convincingly address the issue of self-selection even using proxy measures for political and economic conditions in the immigrants' countries of origin.

This paper proceeds as follows. The next section describes data and preliminary evidence, while Section 3 presents the econometric model and estimation strategy. Results are then reported and discussed in Section 4, before conclusions are drawn policy suggestions elucidated in Section 5.

2. Data and Preliminary Evidence

Data are obtained from the first thirteen waves (2001–2013) of the HILDA survey. It provides information about economic and subjective well-being, labour market dynamics and family dynamics. The survey provides a rich source of information on labour market outcomes and performance. There is information on occupation and industry type, qualification levels attained and, of particular interest to this paper, years since arrival, age at arrival and earnings.[2] We have restricted our sample to employees between 16 and 64 years of age, who

are not in full-time study, yielding 63,628 person-year observations. Of these, 12,113 (19.04%) are immigrants. Of the immigrants, 5,819 (48.04%) are from ESB countries and 6,294 (51.96%) are from NESB countries. The full set of variables utilised in this study is available in the Appendix.

As shown in Table 1, on average, immigrants (irrespective of gender) actually earn more than their Australian-born counterparts, with ESB immigrants earning the highest amount consistent with many previous studies. This does not, however, imply that immigrants necessarily earn more than Australian-born workers from the moment they arrive. Indeed, on average, immigrants in the sample have lived in Australia for roughly 23 years. Immigrants that arrived at a very young age are likely to have acquired their skills in Australia and, given the finding that immigrants earn more than Australian-born workers, there may be a negative correlation between age at arrival and earnings. A positive relationship, however, is expected to exist between years since arrival and earnings, as immigrants are able to assimilate over time by acquiring relevant labour market experience in the host country.

Table 1 also shows that immigrants are better educated irrespective of gender and background. However significant variation by background exist with respect to pre- and post-migration education. Males Asian and Other NESB immigrants only accrue approximately a quarter of their education post-migration, while for female Asian and Other NESB immigrants only about a sixth and a third, respectively. Female NESB European immigrants, on the other hand, obtain almost half of their total education in Australia. Information on tenure with occupation and years worked begin to suggest that ESB and European NESB immigrants share closer characteristics relative to the remaining NESB immigrants, and gives some indicative support for the 'cultural proximity' hypothesis. Overall ESB and European NESB immigrants clearly perform better than remaining immigrants, and also seemingly do as well as the ABRs.

[Place Table 1 here]

3. Econometric Method

To empirically examine the earnings effect of both years since arrival and age at arrival, we use a random effects generalised least squares (GLS) model with Mundlak (1978) corrections. The econometric model used in this study extends the Mincer-type earnings function (Mincer, 1974). The basic economic analysis of how immigrant earnings respond to the assimilation process can be modelled in the following form:

$$LHW_{it} = \alpha + \beta X_{it} + \gamma_1 Imm_i + \gamma_2 (Imm_i * YSA_{it}) + \gamma_3 (Imm * YSA_{it}^2) + \gamma_4 S_{it} + \varepsilon_{it} \quad (1)$$

where *i* denotes individuals (employees) and *t* time. The *i* subscript, therefore, denotes the cross-sectional dimension whereas *t* denotes the time-series dimension. The dependent variable, LHW_{it}, is the natural logarithm of the hourly wages of employee *i* at time *t*; α is a scalar, β is *K* x 1 and X_{it} is the *i*th observation on *K* explanatory variables containing individual and work-related characteristics. Imm_i is a dummy variable, equalling 1 if the individual is an immigrant and 0 otherwise, YSA_{it} captures the effect of number of years since arrival, and S_{it}, as a measure of education, refers to years of schooling completed.

In this study, different returns to foreign and domestic years of schooling are estimated because education acquired by immigrants in their home and host countries is treated as heterogeneous. Thus, the years of schooling completed variable is categorised into years of schooling obtained in the country of origin and in Australia. The standard specification shown in equation (1) is relaxed by dropping S_{it} and instead including S_i^f, S_{it}^d and $Imm_1 * S_{it}^d$, where subscripts *f* and *d* stand for foreign- and domestically-acquired years of schooling.[3]

In our model, γ_1 measures the differential between immigrant and Australian-born earnings upon arrival in Australia γ_2 measures how immigrant earnings vary with the length of time spent in Australia. To explicitly model the impact that age at arrival has on earnings, we created a series of dummy variables indicating approximate age at arrival and substituted with the immigrant (and subsequent disaggregated immigrant categories). The expected sign for λ_2 is positive, because assimilation causes the earnings of immigrants to grow over time; whereas for the age at arrival dummies, it depends on the immigrant group. The coefficient on YSA can be biased if there are changes in the quality of immigrant cohort. Given that the focus of Australia's migration program has shifted towards skilled migration over the last decade it is possible that the effect of YSA on earning to be biased downward. To correct such bias dummies for different arrival cohorts of immigrants are included in the earnings equation. A positive sign is expected for all ESB immigrants and for those NESB immigrants who arrive at a young age, mainly because of English language proficiency and skill transferability due to cultural similarities. In this paper, interaction terms between years since arrival and each age at arrival category and between pre-migration and each age at arrival category are created to measure the age at arrival effect on the rate at which earnings grow with years since arrival and pre-migration education, respectively

In this paper, we use a one-way error component model for the disturbances with $\varepsilon_{it} = u_i + v_{it}$, where u_i represents the unobservable individual-specific effect and v_{it} denotes the remainder disturbance (i.e. the idiosyncratic error tem). In our model, u_i is time-invariant and accounts for any individual-specific effect that is not included in the regression. The rest error term, v_{it}, varies with individuals and time. The random effects model assumes that: the expected value of the unobserved individual-specific effect and the idiosyncratic error is zero

($E(u_i) = E(v_{it}) = 0$); both components are homoscedastic ($Var(u_i) = \sigma_u^2; Var(v_{it}) = \sigma_v^2$); the two components are independent ($E(u_i, v_{it}) = 0$); there is no serial correlation in the idiosyncratic errors ($E(v_{it} v_{js}) = 0 \ if \ t \neq s \ or \ i \neq j$); the u_i are independent of each other for all *i* and *t* ($E(u_i, u_j) = 0$); and the explanatory variables included in the model are independent of the u_i and v_{it}, for all *i* and *t*.

Random effects estimators are inconsistent if the assumption of independence between the explanatory variables and the unobservable individual-specific effect does not hold. Usually, this assumption is unlikely to hold and thus, to overcome the issue, we apply Mundlak (1978) corrections by including the individual means for each of the time-varying explanatory variables within the random effects model. One of the main assumptions for making inference using the random effects approach is the assumption of no serial correlation in the idiosyncratic errors. However, the inference cannot be robust if this assumption is arbitrarily violated. In this paper, we compute a cluster robust statistics after random effects estimation so as to acquire estimates that are inference robust to serial correlation and heteroscedasticity.

4. Results and Discussion

[Insert Table 2]

This section presents the gender-differentiated results of estimating a random effects GLS model with Mundlak correction. In column (1), a dummy variable for being an immigrant is entered along with years since arrival. Further controls for the previously discussed education levels are also imposed, as are English language proficiency, family and work-related variables. Gender differences are immediately evident. Male immigrants, upon arrival enjoy an earnings advantage of 15.5% over ABR males, which is not evident for their female peers. However, in both cases, years since arrival (YSA) is associated with further earnings gains

vs-a-vis the native-born, though for females this diminishes very slowly over time if no investment in education is undertaken in the host country[4] Education-wise, schooling attained by immigrants prior to their move does not result in an earnings-penalty irrespective of gender, whilst education attained in Australia does exhibit gender sensitivity, favouring female immigrants. We posit that the reason for this is due to female immigrants generally possessing lower levels of pre-migration education relative to their male counterparts.[5] Green et al. (2007) have shown that pre-migration education in Australia is discounted, and thus, female immigrants on average, suffer from a smaller discount on their education relative to male immigrants owing to their lower levels of pre-migration education.

Column 2 breaks up the immigrants by age at arrival and the results show that for males, the earnings premium at arrival does not accrue to those arriving after the age of 34; for females, the similarity in earnings with their native-born peers does not apply to the oldest arrival cohort, who instead suffer an earnings penalty upon arrival. Thus, we conclude that older female arrivals are significantly penalised, while their male counterparts do not enjoy an earnings advantage unlike younger arrivals, compared to the native-born. Column 3 introduces cohort effects as well as the interaction of age at arrival with YSA.[6] As expected, the latest cohort of males, carrying the greatest level of human capital due to an increasingly skill-biased immigration system, experience an earnings premium upon arrival relative to male ABRs. While this is not evident for the female sample, the two earliest arrival cohorts amongst them do suffer an initial earnings penalty; thus relatively speaking, newer arrival cohorts are performing better than earlier cohorts. Age at arrival and YSA interaction terms produce gender-sensitive outcomes. For males, an earnings growth over time is only significant for those who arrived aged 25 or greater. For females, 'catch-up' is evident for all age at arrival groups bar the 15-24 age at arrival group.

In sum, for males, when looking at age at arrival we note that the oldest age group is the only

group not to enjoy an earnings premium upon arrival. When arrival cohort is substituted for age at arrival, *a priori* expectations are not rejected; more recent skill-biased immigration policies do help newer male arrivals to possess an earnings advantage over their male native-born peers. For female immigrants, any earnings premium by age at arrival is absent, though an earnings 'catch-up' over time is largely present; cohort effects fail to provide an earnings advantage for the newer arrivals with greater levels of human capital, though relative to earlier cohorts who suffer an earnings penalty, they are in a 'better' position.

[Insert Table 3]

Table 3 replicates the models run in Table 2 by disaggregating immigrants as previously noted. Column 1 reports that the male immigrant earnings premium accruing at arrival is solely driven by European NESB male immigrants. While this matches our hypothesis that European NESBs will do better in the labour market vis-à-vis other groups of NESB immigrants, the finding that they, and not ESB immigrants experience the earnings premium is puzzling. Nevertheless we note that male ESB immigrants enjoy an earnings boost over time vis-à-vis male ABRs, which their European counterparts (and indeed also Asian and Other NESB immigrants) do not. For females, while European immigrants also possess an initial earnings advantage, their ESB counterparts actually face a penalty, though they experience a 'catch-up' over time, as do Other NESB immigrants. However, the finding that post-migration education has a significantly positive impact on the earnings of ESB females implies that initial earnings penalty disappears after around four years of investment in host-country education. Hence, the initial 'headline' figure that suggests female ESB immigrants suffer an earnings penalty, whilst correct does dissipate relatively quickly. Pre-migration educational attainment does not affect earnings relative to the native-born, irrespective of gender and immigrant sub-group, contrary to findings reported by Green et al. (2007).

Column 2 shows that European male immigrants, bar the oldest arrivals enjoy an initial

earnings-premium, alongside Asian NESBs who arrived aged between 15-24 do. Thus, in the main age at arrival neither rewards nor punishes male immigrants, earnings-wise, unless the arrival hails from continental Europe. For females, the ESB immigrant initial earnings disadvantage occurs irrespective of age at arrival (notwithstanding their relatively quick improvements once we account for their strong returns to post-migration education), while, consistent with their male peers, the premium does not accrue to the oldest European arrivals. Outcomes are insignificant for the remaining NESB sub-groups. Looking at the interaction of age at arrival and YSA in column 3, we find an earnings growth for male ESBs who arrived aged over 24, suggesting that over time male ESBs do improve their earnings relative to the native-born, and potentially narrow the gap with their European peers, who experience no earnings growth over time for all age at arrival groups. Earnings growth over time is also somewhat evident mainly for the oldest Other NESB immigrant sub-group. For females, we note that ESBs who arrived prior to their 15^{th} birthday enjoy an earnings 'catch-up'; indeed this is true of their European peers as well, suggesting that perhaps enjoying some cultural assimilation before entering the workforce matters in their earnings performance over a period of time. Europeans continue to perform better than other sub-groups. Looking at cohort effects, we find no evidence of cohort effects on initial earnings for Asian and Other NESB male immigrants; indeed, the premium we expect from the newest cohort only accrues to arrivals from Europe. The picture is similar for females except for the ESB group; here female ESB immigrants suffer an initial earnings penalty across all cohorts though the penalty is much greater in magnitude for the earlier cohorts. Nevertheless, considering the positive impact of post-migration education on their earnings, the initial earnings penalty disappears once a four-year investment in the host-country education is undertaken.

In brief, we find that Asian and Other NESB immigrants of both gender generally perform similarly to their native-born peers; given past findings and a priori expectations, this is a

positive outcome. Nevertheless, we note (see Table 1) that they do enjoy a significant education advantage over the native-born, though this is primarily obtained in their home country. Given that education is often used as proxies for skills, this suggests that the skills of these particular immigrants may be 'discounted' in the Australian labour market, though not to the extent that we would have expected. European NESB immigrants earn more than ABRs upon arrival across gender and age groups, even if the oldest age at arrival group 'only' earns a similar amount as the native-born. The surprising outcome pertains to ESB immigrants; while at the time of arrival males do as well as their ABR peers, the females have a relatively poor labour market performance measured by earnings. However, we note that this finding quickly dissipates once we account for post-migration education investment.

To check the robustness of our key estimated coefficients we used maximum likelihood (ML) random effects and population-averaged models with Mundlak correction. Results from the two alternative estimation techniques show no variability in terms of the magnitude and significance of the core coefficients.[7]

5. Summary and Policy Suggestions

This research has studied the effect of immigrants' age at arrival on their initial earnings and subsequent earnings growth. It has done so by 'value-adding' to the existing literature in a tripartite manner. First, it investigated this phenomenon by looking at potential gender differences. Second, it modelled age at arrival using a panel dataset and finally, it posited that 'cultural proximity' may matter to the extent that using aggregated (or basic disaggregated) immigrant data would hide significant heterogeneity between various immigrant sub-groups. Results-wise, this paper reports that looking at immigrants as an aggregated group and find that male immigrants enjoy a wage-premium upon arrival, accentuated by further growth over time, though the age at arrival results note that no premium accrues to older age immigrants. This initial premium is not evident for females (with penalties for the oldest age

group), though earnings-growth does occur as well. Cohort effects are largely consistent with age at arrival controls.

'Cultural proximity' findings report that European NESB immigrants, irrespective of gender are significantly different from Asian and Other NESB immigrants, and lends credence to the argument that looking at the simple ESB/NESB split does potentially hide heterogeneity between immigrant sub-groups. Interestingly, for either gender the ESB immigrant result does seemingly differ from that of European NESBs, contrary to the 'cultural proximity' thesis noted earlier. Age at arrival does not seem to negatively impact on earnings at arrival across all four male sub-groups; indeed, bar European arrivals where results are as expected, age at arrival does not seem to matter to both initial earnings and earnings growth. For females, on the other hand, results for ESBs (generally significantly negative) are different relative to their male peers. Cohort differences once again largely mirror age at arrival results.

Age at arrival does, in general suggest that young immigrants obtain a certain amount of additional Australian human capital that escape older arrivals. This points to a need for a system that favours immigrants with young children (no points are currently available for having dependent children in a migration application), as well as a strengthening of the current system that favours younger skilled immigrants.[8] A similar suggestion is made by Guven and Islam (2015), who find that age at arrival is critical for immigrant integration. A policy encouraging immigrants with low levels of pre-migration education to partake in post-migration education is also recommended, as evinced by the outcome of female immigrants in this study. After all, despite a bias towards skilled migration not all immigrants come via this route, and also encompass family reunions, refugees and tied-movers of skilled immigrants. This runs counter to the usual declarations that more educational support should be given to immigrants in general, as our results intimate that post-migration education is not well-rewarded for those who already possess significant pre-migration education. Nevertheless, we do still recommend

that further labour market friendly assistance be made available in the form of remedial English language classes, training on assimilating into Australian workplaces and assistance in undertaking bridging courses to improve the chance of employers recognising home country qualifications and experiences. This does of course impact upon the budgetary purse in a time of fiscal restraint, but the gains in long-term greater productivity and earnings that potentially accrue suggests that the short-term financial cost should be viewed as an investment in human capital rather than as a financial impost with no returns.

References

Andersen, S.N. and Skardhamar, T. (2012), "Age at immigration and crime: Findings for male immigrants in Norway," *Discussion Papers, Statistics Norway Research Department*, No. 728.

Antecol, H., Kuhn, P. and Trejo, S. (2006), "Assimilation via prices or quantities? Sources of immigrant earnings growth in Australia, Canada, and the United States," *Journal of Human Resources*, Vol. 41, pp. 821-840.

Australian Bureau of Statistics, (2012), *Australian social trends*, No. 4102.0, Canberra.

Beggs, J. and Chapman, B. (1991), "Male immigrant wage and unemployment experience in Australia," in *NBER chapters in immigration, trade and the labour market*, J.M. Abowd and R. B. Freemans (eds.). University of Chicago Press: Chicago.

Betts, J. and Lofstorm, M. (1998), "The educational attainment of immigrants: Trends and implications," *NBER Working Papers 6757, National Bureau of Economic Research, Inc.*

Bleakley, H. and Chin, A. (2004), "Language Skills and Earnings: Evidence from Childhood Immigrants," *The Review of Economics and Statistics*, Vol. 86, pp. 481-496.

Bleakley, H. and Chin, A. (2010), "Age at arrival, English proficiency and social assimilation among US immigrants," *American Economic Journal: Applied Economics* Vol. 2, pp. 165-192.

Borjas, G. (1982), "The earnings of male Hispanic immigrants in the United States," *Industrial and Labor Relations Review*, Vol. 35, pp. 343-353.

Borjas, G. (1985), "Assimilation, changes in cohort quality, and the earnings of immigrants," *Journal of Labor Economics*, Vol. 3, pp. 463-489.

Borjas, G. (1987), "Self-selection and the earnings of immigrants," *American Economic Review*, Vol. 77 (4), pp. 531- 553.

Borjas, G. (1989), "Immigrant and emigrant earnings: A longitudinal study," *Economic Inquiry*, Vol. 27, pp. 21-37.

Borjas, G. and Tienda, M. (1985), *Hispanics in the U.S. economy*. Academic Press: New York.

Breunig, R., Hasan, S. and Salehin, M. (2013), "The immigrant wage gap and assimilation in Australia: Does unobserved heterogeneity matter?," *Economic Record*, Vol. ***89***, pp. 490-507.

Carliner, G. (1980), "Wages, earnings and hours of first, second and third generation American males," *Economic Inquiry*, Vol. 18, pp. 87-102.

Chapman, B. and Iredale, R. (1993), "Immigrant qualifications: Recognition and relative wage outcomes," *International Migration Review*, Vol. 27, pp. 359-387.

Chiswick, B. (1978), "The effect of Americanization on the earnings of foreign-born men," *The Journal of Political Economy*, Vol. 86, pp. 897-921.

Chiswick, B. (1999), "Are immigrants favorably self-selected?" *American Economic Review*, Vol. 89 (2), pp. 181-185.

Chiswick, B. (2000), "Are immigrants favorably self-selected? An economic analysis," in *Migration theory: Talking across disciplines*, C. Brettell and J. Hollifield (eds.). Routledge: New York.

Chiswick, B., Lee, Y. and Miller, P. (2005), "Immigrant earnings: A longitudinal analysis," *Review of Income and Wealth*, Vol. 51, pp. 485-503.

Chiswick, B. and Miller, P. (1995), "The endogeneity between language and earnings: International analysis," *Journal of Labor Economics*, Vol. 13, pp. 246-288.

Chiswick B and Miller P (2008) Occupational attainment and immigrant economic progress in Australia. *Economic Record* 84 (S1): S45-S56.

Chiswick B and Miller P (2009) Educational mismatch: Are high-skilled immigrants really at high-skilled jobs and the price they pay if they aren't? *IZA Discussion Paper*, No. 4280.

Chiswick, B. and Miller, P. (2010), "The effects of educational occupational mismatch on immigrant earnings in Australia, with international comparisons," *International Migration Review*, Vol. 44, pp. 869-898.

Cobb-Clark, D., Hanel, B. and McVicar, D. (2012), "Immigrant wage and employment assimilation: A comparison of methods," *IZA Discussion Paper*, No. 7062.

Constant, A., Gataullina, L. and Zimmermann, K. (2006), "Gender, ethnic identity and work," *IZA Discussion Paper*, No. 2420.

DeFreitas, G. (1980), "The Earnings of Immigrants in the American Labor Market," PhD. Thesis. Columbia University.

Friedberg, R. (1992), "The labour market assimilation of immigrants in the United States: The role of age at arrival," Brown University.

Fox, J., Morosanu, L. and Szilassy, E. (2012), "The racialization of the new European migration to the UK", *Sociology*, Vol. 46, pp. 680-695.

Fox, J. (2013), "The uses of racism: Whitewashing new Europeans in the UK", *Ethnic and Racial Studies*, Vol. 36, pp. 1871-1889.

Hashimi-Khan, A. (1997), "Post-migration investment in education by immigrants in the United States," *The Quarterly Review of Economics and Finance*, Vol. 37, pp. 285-313.

Green, C., Kler, P. and Leeves, G. (2007), "Immigrant overeducation: Evidence from recent arrivals to Australia," *Economics of Education Review*, Vol. 26, pp. 420-432.

Guven, C. and Islam, A. (2015) "Age at migration, language proficiency, and socioeconomic outcomes: Evidence from Australia", Demography, Vol. 52, pp. 513–542

Long, J. (1980), "The effect of Americanization on earnings: Some evidence for women," *Journal of Political Economy*, Vol. 88, pp. 620-629.

Lubotsky, D. (2007), "Chutes or ladders? A longitudinal analysis of immigrant earnings," *Journal of Political Economy*, Vol. 115, pp. 820-967.

McDonald, J. and Worswick, C. (1999), "The earnings of immigrant men in Australia: Assimilation, cohort effects, and macroeconomic conditions," *Economic Record*, Vol. 75, pp. 49-62.

Mincer, J. (1974), *Schooling, experience, and earnings*, Columbia University Press, New York.

Mundlak, Y. (1978), "On the pooling of time series and cross section data," *Econometrica*, Vol. 46, pp. 69-85.

Reingle, J.M., Caetano, R., Mills, B. A. and Vaeth, P.A. (2014), "The role of immigration age on alcohol and drug use among border and non-border Mexican Americans," *Alcoholism Clinical and Experimental Research*, Vol. 38, pp. 2080-2086.

Roshania, R., Narayan, K., and Oza-Frank, O. (2008), "Age at arrival and risk of obesity among US immigrants," *Obesity*, Vol. 16, pp. 2669-2675.

Schaafsma, J. and Sweetman, A. (2001), "Immigrant earnings: age at immigration matters," *Canadian Journal of Economics*, Vol. 34, pp. 1066-1099.

Van Ours, J.C. and Veenman, J. (2006), "Age at immigration and educational attainment of young immigrants," *Economics Letters*, Vol. 90, pp. 310–316.

Wilkins, R. (2003), "Immigrant earnings adjustment: The impact of age at migration," *Australian Economic Papers*, Vol. 42, pp. 292-315.

Wilkinson, A.V., Spitz, M.R., Strom, S.S., Prokhorov, A.V., Barcenas, C.H, Cao, Y., Saunders, K.C. and Bondy, M.L (2005), "Effects of nativity, age at migration, and acculturation on smoking among adults Houston residents of Mexican descent," *American Journal of Public Health*, Vol. 95, pp. 1043-1049.

Will, L. (1997), "Immigrant income change and intercohort variation in unobserved ability: Australia," La Trobe University.

Xu, M. A. and McDonald, J. T. (2010), "The mental health of immigrants and minorities in Canada: The social and economic effects," Canadian Issues, 29-32. Retrieved from http://www.metropolis.net/pdfs/immi_health/Immigrant%20Mental%20Health%20-%20pgs29-32.pdf.

Table 1. Summary Statistics – Selected Variables

Male Sample						
Variables	ABRs	Imm	ESB	NESB-Europe	NESB-Asia	NESB-Other
Hourly wage	22.53	24.69***	25.71***	24.59***	23.38***	23.25*
YSA		22.57	24.26	28.16	18.08	18.24
Proportion arriving aged < 15		0.37	0.41	0.46	0.25	0.30
Proportion arriving aged 15-24		0.25	0.23	0.18	0.30	0.31
Proportion arriving aged 25-34		0.27	0.25	0.28	0.32	0.27
Proportion arriving aged > 34		0.11	0.10	0.08	0.13	0.12
Proportion arriving before 1980		0.33	0.39	0.48	0.16	0.24
Proportion arriving between 1980-89		0.29	0.30	0.23	0.33	0.23
Proportion arriving between 1990-99		0.24	0.17	0.23	0.34	0.32
Proportion arriving between 2000-13		0.15	0.14	0.06	0.17	0.21
Pre-migration education (in years)		9.34	8.54	8.17	11.19	10.35
Post-migration education (in years)		4.46	4.89	5.22	3.45	3.81
Education in Australia (in years)	13.02	4.46***	4.89***	5.22***	3.45***	3.81***
Tenure: occupation	9.35	10.36***	11.01***	14.44***	7.92***	7.94***
Tenure: employer	7.28	6.57***	6.99*	7.84*	5.78***	5.06***
Years worked	19.30	22.25***	23.83***	26.08***	18.83***	18.32**
Years unemployed	0.57	0.59	0.54	0.55	0.59	0.79***
Years out of labour force	0.70	1.36***	1.07***	1.52***	1.79***	1.53***
Observations	26240	6309	3152	863	1458	836
Female Sample						
Variables	ABRs	Imm	ESB	NESB-Europe	NESB-Asia	NESB-Other
Hourly wage	19.53	21.22***	22.01***	19.99*	20.75***	20.86***
YSA		23.66	26.16	30.29	16.48	21.37
Mean age at arrival		19.23	17.97	15.27	23.46	19.65
Proportion arriving aged < 15		0.37	0.44	0.53	0.15	0.36
Proportion arriving aged 15-24		0.27	0.24	0.17	0.38	0.27
Proportion arriving aged 25-34		0.26	0.23	0.25	0.33	0.25

Proportion arriving aged > 34		0.09	0.08	0.04	0.13	0.11
Proportion arriving before 1980		0.35	0.46	0.56	0.08	0.27
Proportion arriving between 1980-89		0.28	0.29	0.20	0.30	0.33
Proportion arriving between 1990-99		0.23	0.13	0.19	0.43	0.22
Proportion arriving between 2000-13		0.13	0.11	0.06	0.20	0.18
Pre-migration education (in years)		9.28	8.52	6.99	11.94	9.11
Post-migration education (in years)		4.56	5.09	6.45	2.50	4.77
Education in Australia (in years)	13.26	4.56***	5.09***	6.45***	2.50***	4.77***
Tenure: occupation	8.48	9.03***	9.71***	10.39***	7.62***	7.61***
Tenure: employer	6.42	6.33	6.66*	6.64	5.83***	5.75***
Years worked	17.15	20.05***	22.21***	22.12***	16.30***	17.21
Years unemployed	0.44	0.57***	0.39**	0.73***	0.72***	0.71**
Years out of labour force	3.80	4.39***	4.21***	4.80***	4.29***	4.88***
Observations	24915	5804	2667	938	1607	592

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively. This significance refers to statistical difference between immigrant, ESB immigrant and NESB immigrant groups relative to Australian-born.

Table 2. Native-born v. Aggregated Immigrants by Gender

Male Sample			
Variables	**(1)**	**(2)**	**(3)**
Imm	0.155*** (0.057)		
YSA	0.010*** (0.004)	0.010*** (0.004)	
$YSA^2/100$	-0.000 (0.006)	-0.000 (0.006)	
Pre-mig. education	0.005 (0.019)	0.005 (0.019)	0.003 (0.019)
Edu. in Australia (inc. ABR)	0.043*** (0.005)	0.043*** (0.005)	0.043*** (0.005)
Post-mig. education	-0.035*** (0.013)	-0.035*** (0.013)	-0.038*** (0.014)
Pre-1980			-0.029 (0.093)
1980-89			0.030 (0.081)
1990-99			0.079 (0.069)
2000-13			0.162*** (0.061)
<15		0.152** (0.063)	
15-24		0.181*** (0.061)	
25-34		0.185*** (0.065)	
>34		0.099 (0.068)	
YSA*<15			0.011 (0.009)
(YSA^2*<15)/100			0.000 (0.013)
YSA*15-24			0.004 (0.008)
(YSA^2*15-24)/100			0.003 (0.015)
YSA*25-34			0.018** (0.007)
(YSA^2*25-34)/100			-0.018 (0.018)
YSA*>34			0.021** (0.010)
(YSA^2*>34)/100			-0.048 (0.037)
Observations	32,549		
Female Sample			
Variables	**(1)**	**(2)**	**(3)**
Imm	-0.058 (0.052)		
YSA	0.012*** (0.003)	0.012*** (0.003)	
$YSA^2/100$	-0.015*** (0.005)	-0.015*** (0.005)	
Pre-mig. education	-0.010 (0.012)	-0.010 (0.012)	-0.011 (0.012)
Edu. in Australia (inc. ABR)	0.027*** (0.003)	0.027*** (0.003)	0.027*** (0.003)
Post-mig. education	0.026** (0.012)	0.026*** (0.012)	0.025** (0.012)
Pre-1980			-0.162** (0.078)
1980-89			-0.160** (0.067)
1990-99			-0.090 (0.058)
2000-13			-0.020 (0.055)
<15		-0.067 (0.056)	
15-24		-0.007 (0.055)	
25-34		-0.006 (0.057)	
>34		-0.101* (0.059)	
YSA*<15			0.019*** (0.007)
(YSA^2*<15)/100			-0.024*** (0.009)
YSA*15-24			-0.007 (0.008)
(YSA^2*15-24)/100			0.025 (0.016)
YSA*25-34			0.023*** (0.006)

$(YSA^2$*25-34)/100			-0.045** (0.019)
YSA*>34			0.023*** (0.008)
$(YSA^2$*>34)/100			-0.065* (0.035)
Observations	30,719		

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively. Robust standard errors are in brackets

Table 3. Native-born v. Disaggregated Immigrants by Gender

Male Sample			
Variables	**(1)**	**(2)**	**(3)**
ESB	0.019 (0.078)		
Europe	0.416** (0.177)		
Asia	0.161 (0.120)		
Other	0.072 (0.115)		
YSA*ESB	0.019*** (0.005)	0.019*** (0.005)	
(YSA^2*ESB)/100	-0.015* (0.009)	-0.015* (0.009)	
YSA*Europe	0.004 (0.009)	0.004 (0.009)	
(YSA^2*Europe)/100	0.013 (0.013)	0.012 (0.013)	
YSA*Asia	-0.000 (0.008)	-0.000 (0.007)	
(YSA^2*Asia)/100	0.017 (0.014)	0.018 (0.014)	
YSA*Other	0.006 (0.008)	0.006 (0.008)	
(YSA^2*Other)/100	0.007 (0.014)	0.006 (0.014)	
Pre-mig. education - ESB	-0.002 (0.028)	-0.002 (0.028)	0.000 (0.027)
Pre-mig. education - Eur	-0.055 (0.071)	-0.056 (0.071)	-0.070 (0.064)
Pre-mig. education - Asia	0.039 (0.031)	0.036 (0.030)	0.024 (0.034)
Pre-mig. education - Other	-0.006 (0.047)	-0.004 (0.047)	0.008 (0.049)
Edu. in Australia (inc. ABR)	0.043*** (0.005)	0.043*** (0.005)	0.043*** (0.005)
Post-mig. education - ESB	-0.043** (0.018)	-0.043** (0.018)	-0.044** (0.018)
Post-mig. education - Eur	0.002 (0.037)	0.004 (0.037)	0.007 (0.038)
Post-mig. education -Asia	-0.018 (0.018)	-0.016 (0.017)	-0.028 (0.021)
Post-mig. education - Other	-0.081* (0.044)	-0.083* (0.046)	-0.076 (0.051)
ESB*1980			-0.242* 0.145)
ESB*1980-89			-0.150 (0.124)
ESB*1990-99			-0.100 (0.101)
ESB*2000-13			-0.010 (0.087)
Europe*1980			0.074 (0.272)
Europe*1980-89			0.141 (0.240)
Europe*1990-99			0.215 (0.207)
Europe*2000-13			0.509** (0.197)
Asia*1980			0.044 (0.164)
Asia*1980-89			-0.011 (0.147)
Asia*1990-99			0.103 (0.136)
Asia*2000-13			0.158 (0.128)
Other*1980			0.026 (0.215)
Other*1980-89			0.113 (0.193)
Other*1990-99			0.020 (0.156)
Other*2000-13			0.095 (0.127)
ESB*<15		0.037 (0.089)	
ESB*15-24		0.029 (0.091)	
ESB*25-34		0.064 (0.096)	
ESB*>34		-0.012 (0.099)	
Europe*<15		0.462** (0.179)	
Europe*15-24		0.323* (0.184)	
Europe*25-34		0.380** (0.191)	
Europe*>34		0.256 (0.227)	

Asia*<15		0.089 (0.120)	
Asia*15-24		0.231** (0.117)	
Asia*25-34		0.125 (0.125)	
Asia*>34		0.043 (0.132)	
Other*<15		0.143 (0.136)	
Other*15-24		0.066 (0.122)	
Other*25-34		0.073 (0.141)	
Other*>34		-0.018 (0.146)	
YSA*ESB*<15			0.020 (0.013)
(YSA^2*ESB*<15)/100			-0.015 (0.017)
YSA*ESB*15-24			0.011 (0.015)
(YSA^2*ESB*15-24)/100			-0.004 (0.027)
YSA*ESB*25-34			0.027*** (0.010)
(YSA^2*ESB*25-34)/100			-0.035 (0.025)
YSA*ESB*>34			0.025* (0.014)
(YSA^2*ESB*>34)/100			-0.045 (0.048)
YSA*Europe*<15			-0.016 (0.016)
(YSA^2*Europe*<15)/100			0.038* (0.020)
YSA*Europe*15-24			0.014 (0.015)
(YSA^2*Europe*15-24)/100			-0.023 (0.033)
YSA*Europe*25-34			0.027 (0.020)
(YSA^2*Europe*25-34)/100			-0.032 (0.052)
YSA*Europe*>34			-0.007 (0.029)
(YSA^2*Europe*>34)/100			0.051 (0.094)
YSA*Asia*<15			-0.003 (0.023)
(YSA^2*Asia*<15)/100			0.033 (0.032)
YSA*Asia*15-24			0.004 (0.015)
(YSA^2*Asia*15-24)/100			0.005 (0.028)
YSA*Asia*25-34			0.016 (0.012)
(YSA^2*Asia*25-34)/100			-0.044 (0.031)
YSA*Asia*>34			0.013 (0.024)
(YSA^2*Asia*>34)/100			-0.026 (0.084)
YSA*Other*<15			0.039* (0.022)
(YSA^2*Other*<15)/100			-0.041 (0.030)
YSA*Other*15-24			-0.011 (0.016)
(YSA^2*Other*15-24)/100			0.025 (0.028)
YSA*Other*25-34			-0.002 (0.014)
(YSA^2*Other*25-34)/100			0.048 (0.035)
YSA*Other*>34			0.053*** (0.019)
(YSA^2*Other*>34)/100			0.220** (0.093)
Observations	32,549		
Female Sample			
Variables	**(1)**	**(2)**	**(3)**
ESB	-0.201*** (0.073)		
Europe	0.238** (0.106)		
Asia	-0.030 (0.096)		
Other	0.014 (0.176)		
YSA*ESB	0.013*** (0.004)	0.013*** (0.004)	

(YSA^2*ESB)/100	-0.014** (0.007)	-0.014** (0.007)	
YSA*Europe	0.023*** (0.007)	0.024*** (0.007)	
(YSA^2*Europe)/100	-0.032*** (0.009)	-0.032*** (0.009)	
YSA*Asia	0.004 (0.007)	0.004 (0.007)	
(YSA^2*Asia)/100	0.002 (0.018)	0.001 (0.018)	
YSA*Other	0.023*** (0.009)	0.023*** (0.009)	
(YSA^2*Other)/100	-0.038** (0.017)	-0.037** (0.017)	
Pre-mig. education - ESB	-0.000 (0.014)	-0.000 (0.014)	-0.006 (0.015)
Pre-mig. education - Eur	-0.022 (0.025)	-0.020 (0.026)	-0.027 (0.031)
Pre-mig. education - Asia	-0.041 (0.050)	-0.041 (0.050)	-0.035 (0.049)
Pre-mig. education - Other	-0.041 (0.028)	-0.039 (0.028)	-0.044 (0.027)
Edu. in Australia (inc. ABR)	0.027*** (0.003)	0.028*** (0.003)	0.028*** (0.003)
Post-mig. education - ESB	0.037*** (0.013)	0.037*** (0.013)	0.040*** (0.014)
Post-mig. education - Eur	-0.035 (0.024)	-0.033 (0.024)	-0.038 (0.025)
Post-mig. education -Asia	0.029 (0.023)	0.031 (0.023)	0.021 (0.021)
Post-mig. education - Other	0.029 (0.037)	0.028 (0.038)	0.017 (0.035)
ESB*1980			-0.409*** (0.128)
ESB*1980-89			-0.418*** (0.111)
ESB*1990-99			-0.281*** (0.090)
ESB*2000-13			-0.247*** (0.079)
Europe*1980			0.047 (0.178)
Europe*1980-89			0.170 (0.148)
Europe*1990-99			0.184 (0.124)
Europe*2000-13			0.242** (0.117)
Asia*1980			-0.020 (0.148)
Asia*1980-89			-0.164 (0.116)
Asia*1990-99			-0.085 (0.105)
Asia*2000-13			-0.013 (0.101)
Other*1980			0.117 (0.238)
Other*1980-89			0.074 (0.198)
Other*1990-99			0.020 (0.180)
Other*2000-13			0.247 (0.200)
ESB*<15		-0.168** (0.076)	
ESB*15-24		-0.189** (0.079)	
ESB*25-34		-0.179** (0.080)	
ESB*>34		-0.272*** (0.087)	
Europe*<15		0.270** (0.114)	
Europe*15-24		0.203* (0.121)	
Europe*25-34		0.206** (0.136)	
Europe*>34		0.185 (0.135)	
Asia*<15		-0.136 (0.119)	
Asia*15-24		0.037 (0.098)	
Asia*25-34		0.049 (0.104)	
Asia*>34		-0.063 (0.102)	
Other*<15		-0.131 (0.185)	
Other*15-24		0.170 (0.188)	
Other*25-34		0.061 (0.191)	
Other*>34		0.017 (0.181)	
YSA*ESB*<15			0.018** (0.008)

(YSA^2*ESB*<15)/100			-0.024** (0.011)
YSA*ESB*15-24			0.007 (0.008)
(YSA^2*ESB*15-24)/100			0.007 (0.017)
YSA*ESB*25-34			0.015 (0.010)
(YSA^2*ESB*25-34)/100			-0.010 (0.027)
YSA*ESB*>34			0.006 (0.012)
(YSA^2*ESB*>34)/100			-0.033 (0.046)
YSA*Europe*<15			0.025* (0.013)
(YSA^2*Europe*<15)/100			-0.033** (0.015)
YSA*Europe*15-24			0.026* (0.014)
(YSA^2*Europe*15-24)/100			-0.028 (0.023)
YSA*Europe*25-34			0.060*** (0.017)
(YSA^2*Europe*25-34)/100			-0.148*** (0.045)
YSA*Europe*>34			0.008 (0.020)
(YSA^2*Europe*>34)/100			0.009 (0.075)
YSA*Asia*<15			0.034** (0.014)
(YSA^2*Asia*<15)/100			-0.030 (0.019)
YSA*Asia*15-24			-0.029 (0.019)
(YSA^2*Asia*15-24)/100			0.027 (0.053)
YSA*Asia*25-34			0.038*** (0.012)
(YSA^2*Asia*25-34)/100			-0.105*** (0.038)
YSA*Asia*>34			0.032** (0.014)
(YSA^2*Asia*>34)/100			-0.074 (0.065)
YSA*Other*<15			0.040* (0.021)
(YSA^2*Other*<15)/100			-0.057* (0.033)
YSA*Other*15-24			-0.002 (0.046)
(YSA^2*Other*15-24)/100			-0.002 (0.079)
YSA*Other*25-34			0.024* (0.014)
(YSA^2*Other*25-34)/100			-0.039 (0.045)
YSA*Other*>34			0.035** (0.015)
(YSA^2*Other*>34)/100			-0.076 (0.099)
Observations	30,719		

Note: ***, ** and * denote 1%, 5% and 10% level of significance respectively. Robust standard errors are in brackets

Appendix Table A1. Model variables

Variable Names	Description
Personal characteristics	
ABR	Australian-born resident
Imm	Immigrant
ESB	English Speaking Background immigrant
NESB	Non-English Speaking Background immigrant
Europe	NESB immigrant from Europe
Asia	NESB immigrant from Asia
Other	NESB immigrant neither from Europe nor Asia
YSA	Years since first entry into Australia (immigrant only)
Pre-1980	Immigrant arrived to Australia in 1979 or earlier
1980-89	Immigrant arrived to Australia between 1980-89
1990-99	Immigrant arrived to Australia between 1990-99
2000-13	Immigrant arrived to Australia between 2000-11
<15	Immigrant arrived aged less than 15 years
15-24	immigrant arrived aged 15-24 years
25-34	Immigrant arrived aged 25-34 years
>34	Immigrant arrived aged over 34 years of age
Female	Gender dummy
Couple	Married or in a *de facto* relationship
Kids	Have (a) child(ren) living at home
Tenure: Occupation	Tenure (in years) in current occupation
Tenure: Employer	Tenure (in years) with current employer
Years worked	Years worked
Years unemployed	Years spent looking for work
Years out of labour force	Years out of the labour force
Wage and hours of work	
Log of Hourly Wage	The log of hourly wage in real terms in 2001 dollars
*Education**	See footnote below
English-Excellent	Either a native speaker or speaks English very well
English-OK	NESB category only: speaks English well
English-Poor	NESB category only: does not speak English well
Workplace characteristics	
Union	Union member
Supervisor	Has a supervisory role at work
Small	Employed in firm with <20 employees
Mid	Employed in firm with 20-99 employees
Big	Employed in firm with 100 or more employees
Geographical location	
City	Lives in an urban area
Regional	Lives in a regional area
Remote Area	Lives in a remote area
Industry	
Agriculture	Agriculture, forestry and fishing industry
Mining	Mining industry
Manufacturing	Manufacturing industry
Power	Electricity, gas, water and waste industry

Construction	Construction industry
Wholesale trade	Wholesale trade industry
Retail trade	Retail trade industry
Hospitality	Accommodation and foodservices industry
Transport	Transport, postal and warehousing industry
Communication services	Information media and telecommunications industry
Finance	Finance and insurance industry
Property	Rental, hiring and real estate industry
Technical	Professional, technical and scientific services
Administration	Administrative and support services
Public services	Public administration and safety industry
Education	Education and training industry
Health	Health care and social assistance industry
Arts	Arts and recreation services
Other services	Other services
Occupation	
Managerial	Manager
Professional	Professional
Technical trade	Technical or trade work
Personal services	Community or personal service work
Clerical	Clerical or administrative work
Sales	Sales work
Machinery	Machinery operater or driver
Labour work	Labour work

*Education is the number of years of formal education which corresponds to the maximum educational attainment. The education variable is constructed using the responses given to two survey questions regarding highest education level achieved and highest year of schooling completed. We assume the maximum educational attainment to be 18 for masters or doctorate, 17 for post graduate diploma, 16 for degree, 14 for diploma, 13 for certificate, 12 for year 12 or equivalent, ……. , and 6 for those who did not attend secondary school but finished primary school. Educational attainment is assumed to be 5 for those who attended primary school but did not finish

[1] However, by controlling for explanatory variables such as experience and years since arrival, age at arrival can be indirectly, if rather crudely controlled. In this paper, we assume that the period effects are the same for immigrants and natives.

[2] A common problem with panel data is attrition. For the data employed in this study, Breunig et al. (2013) compare education levels between those who stay in the survey and those who drop out of the survey, and find that the differences are fairly small with likely minor implications.

[3] HILDA does not ask immigrants to report their pre-and post-migration educational attainment. Thus we computed proxies for these variables following the approach used by Betts and Lofstorm (1998). We assume that all schooling occurs in Australia if an immigrant was under the age of 7 at the time of arrival. For immigrants whose age at arrival was between 6 and the total number of years of schooling plus 6, pre-migration education is set at age at arrival minus 6 and the remainder is assumed to be post-migration education. For immigrants whose age at arrival was greater than 6 plus years of schooling it is assumed that all schooling was taken place in their home countries. We also assume that Australian-born individuals have made all of their educational attainment in Australia.

[4] As can be seen from Table 2, post-migration education has a significantly positive impact on females' earnings, and this implies that the return to post-migration education is enough to offset the diminishing returns to each additional YSA.

[5] Indeed, this is largely consistent with Borjas (1982) and Hashmi-Khan (1997) who report a strong negative relationship between pre- and post-migration education.
[6] Dummies for age at arrival and arrival cohorts cannot be used together in conjunction when predicting log hourly earnings. In this study, immigrants are either categorised by the four age at arrival dummies or the four arrival cohort dummies. This implies that both parameters cannot be used as controls in a single regression. However, in the final column of the table, when we interact age at arrival with YSA, we are then able to control for arrival cohort dummies.
[7] Results available on request.
[8] A sliding scale of points is currently applicable by age when applying for migration to Australia in favour of younger immigrants.