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Age at Migration, Language Proficiency and Socio-economic Outcomes: Evidence from Australia

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Abstract

This paper seeks to estimate the causal effects of language proficiency on the earnings and social assimilation of Australian immigrants. Identifying the effects of languages on socio-economic outcomes is inherently difficult, due to the endogeneity of the language skills. This study exploits the phenomenon that younger children learn languages more easily than older children to construct an instrumental variable for language proficiency. To achieve this, we exploit the age at arrival of immigrants who came as children from Anglophone and non-Anglophone countries. We find English proficiency to have a significant positive effect on wages and promotions among adults who immigrated to Australia as children. English proficiency decreases the perceived risk of job loss, but leads to lower levels of health and life satisfaction. People with better English skills take more risks and drink more, and English proficiency increases the age at marriage. Partners of immigrants with better English skills drink more in general. Parents' proficiency in speaking English has a significant, positive effect on their children's English-speaking proficiency, high school achievements and occupational prestige. We show that IV estimates cannot be explained by alternative theories such as reverse causality and immigrants from English-speaking countries being a poor control group for non-language age-at-arrival effects.

JEL classification: J12, J13, J24, J31, J61, J62.
Key words: Economics of Immigration; English Proficiency; Socio-economic Outcomes; Instrumental Variable; Australia.

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1. Introduction

This paper seeks to estimate the causal effects of language proficiency on the labour market outcomes and social assimilation of immigrants in Australia. Language proficiency is a barrier which separates immigrants from natives in terms of both economic and social outcomes. Linguistic adjustment influences market outcomes (Chiswick and Miller, 1995). Immigrants who can speak English fluently often find it easier to assimilate into an English-speaking country. Strong language skills increase the range and quality of jobs that immigrants are considered for. Employees who are lacking English language skills are less capable of communicating with their colleagues, and hence are less productive. The language barrier may also limit the jobs which are available to these immigrants, either because employers are unwilling to hire the immigrants or by restricting the immigrants' access to applications for higher earning roles. In addition, language skills are necessary for immigrants to be able to adjust to cultural differences. A lack of English proficiency is also likely to make an immigrant appear less "Australian", and leave him or her prone to discrimination and social isolation.

Identifying the effects of languages on socio-economic outcomes is inherently difficult, due to the endogeneity of language skills. Language skills are often correlated with other attributes that cannot be measured, such as innate ability and the motivation to learn a new language. We use the instrumental variable (IV) strategy adopted by Bleakey and Chin (2004), which exploits the age at arrival of immigrants who came as children from Anglophone and non-Anglophone countries. Immigrants from English-speaking countries are used to control for other variables, to partial out the effect of age at arrival on immigrants' socio-economic outcomes.

According to Bleakley and Chin (2004), older immigrants are less likely to be accustomed to the local culture and tend to be less able to communicate with and understand their colleagues in the workplace, making them less productive. The findings from their study, using the 1990 US census, indicate that children who migrated when they were young have an advantage over their older counterparts in learning English, and that language acquisition influences immigrants' incomes. Their results suggest that, on average, those who speak English well earn 33% more than people who speaks English poorly, while those who speak English very

well earn 67% more than people who speak poorly. Bleakly and Chin (2008) follow the same strategy, using the 2000 US census to examine the intergenerational transmission of language ability and its effects on children's outcomes. In a later study (Bleakly and Chin, 2010), the authors apply the same IV to examine the effects of language on social outcomes. They find that immigrants with higher English skills are more likely to assimilate socially than those with lower language skills. The authors argue that, rather than social assimilation being a choice based on culture and preferences, language barriers may inhibit immigrants from assimilating socially as well as economically.

Bleakley and Chin's (BC hereafter) IV strategy was adopted from Lenneberg (1967), who demonstrated a reduction in the ability to acquire a second language later in life that was probably due to maturational changes in the brain at the onset of puberty, affecting the sensitivity to sounds and grammatical structures. Lenneberg proposed that there was a critical period for language acquisition. If a person was exposed to a language within that critical period, proficiency in that language up to native-like levels was almost certain. There have been a number of psychological papers since that have supported this finding (e.g., Newport 2002). Using the hypothesis of a critical period in language acquisition, BC develop their IV based on the age-at-arrival of children from non-English-speaking countries. Their results are consistent with psychological studies showing that younger children learn languages more easily than older children and adults.

The language skills hypothesis is supported by a number of papers. The results indicate that immigrants have an initial earnings disadvantage on arrival, but that this disadvantage decreases over time (Shultz, 1998; Borjas, 1990; Friedberg, 1993, 2000). However, these studies do not attempt to estimate the causal effects of language skills. A number of studies have attempted to measure differences in socioeconomic outcomes in immigrants as a result of language skills. Many of these studies attempted to determine the relationship between language skills and earnings, but failed to address the endogeneity in this relationship (e.g., Tanier, 1988; Chiswick and Miller, 2001). Dustmann and Van Soest (2002) argue that English proficiency is one of the key factors affecting the success of an immigrant in the US labor market. However, Jasso and Rosenzweig (1990) argue that the significance of English proficiency declines as the importance of other languages in the workplace rises. An improvement in an immigrant's ability to speak the host country language enables them to

communicate with their fellow colleagues and customers (Wang and Wang, 2011), thus increasing their productivity, as well as opening up new opportunities as their fluency improves (Borjas, 1990).

Dustmann and Fabbri (2003) find that those with a tertiary education actually have a better proficiency in English. Berman et al. (2003) argue that the effects of language proficiency on income may not be as high as one would think, as the time taken to match jobs to skills may be mistaken for the time taken to improve fluency. According to Tainer (1988), a highly educated immigrant may not speak the host country language as fluently, but still earn high wages. For example, she argues that Koreans in the US spoke relatively poor English, but because they had high levels of education, they worked in highly skilled jobs, and thus earned a large income. Chiswick and Miller (1995) find that proficiency in the destination language is an important determinant of immigrants' earnings in Australia, Canada, Israel, Germany and the United States. Dustmann and van Soest (2002) use panel data with parents' education level as the identifying instrument for language. They argue that measurement error in language proficiency is an important factor which needs to be taken into account. Their results suggest a moderate (5%) return to language proficiency in Germany in their OLS estimates. However, the IV estimate of the return to good German language ability is almost three times these OLS estimates. Angrist and Lavy (1997) used a change in policy in schools as an IV to estimate the return on learning French in Arab-speaking Morocco. Their estimates suggest that the elimination of compulsory French instruction led to a 50% reduction in the returns to schooling for Moroccans affected by the change. The OLS results from their study also appear to be biased downward, being roughly one third of the size of the IV estimates. In most of these studies, the exclusion restriction is highly questionable.

Various studies have also attempted to measure social and cultural assimilations based on language proficiency. BC (2010) examine English language proficiency and its effects on marriage, fertility, and residential location. Their results suggest that English proficiency is linked to social assimilation. They also find that higher English proficiency increases the likelihood of divorces among immigrants. Stevens and Swicegood (1987) study U.S census data and find that English proficiency increases the likelihood of intermarriage. Meng and Gregory (2005) find a positive correlation between intermarriage and increased earnings in immigrants in Australia. Swicegood et al. (1988) find that increased language proficiency

leads to lower fertility rates in Mexican Americans. Dustmann and Fabbri (2003) explain that not only may differences in social outcomes be the result of language proficiency, but there may also be reverse causality. Various social outcomes, such as the probability of being married, and the number and sex of children in the household, could affect the language proficiency.

Interestingly, Funkhouser and Ramos (1993) find that immigrants with language skills are more likely to live outside ethnic enclaves. Toussaint-Comeau and Rhine (2004) find that those with lower English proficiency are more likely to live inside enclaves, whilst Lazear (2007) finds that living in an ethnic enclave has a negative effect on language skills. According to Bleakley and Chin (2010), immigrants from both English and non-English-speaking countries were more likely to live in social enclaves as their age at arrival in the United States increased. Chiswick and Miller (2001) argue that if the immigrant chooses to work in an enclave where the language of their country of origin is the norm, low proficiency in the host country language may not result in lower earnings.

There are a few other studies which have looked at the relationship between parental characteristics and the child's language proficiency. The evidence suggests a positive effect of immigrant parental income, education level and language proficiency on the children's grades. According to Bleakley and Chin (2008), parents with poor English abilities appear to have a detrimental effect on their children, even though they may catch up later in middle or high school. BC find that parental English-speaking proficiency has a significant positive influence on their children's English-speaking ability and preschool attendance, and the attaining of an age-appropriate grade. Parental education, as an indirect channel, is regarded as an important mediator for children's English ability and further communication abilities in society. As a direct channel, parental education can affect their ability by assisting with school assignments and English skill teaching. The results suggest that English proficiency is closely linked to social assimilation.

The return to language proficiency could also differ over time and between countries. Chiswick et al. (2008) find a more significant effect of language proficiency on earnings using the 2000 US census data than the 1990 US census data. Berman et al. (2003) find that the immigration policies of the immigrant's country of origin also affect the results strongly.

For example, in the past, Russian immigrants into Israel consisted of very poor individuals who needed to work immediately upon arrival. However, this has changed, and immigrants now are more affluent. Affluence may also be another factor that contributes to immigrants' language proficiency and potential income (Bleakley and Chin, 2008).

Whilst Australia has a history of accepting immigrants from non-English-speaking countries, particularly those in Eastern Europe, recent years have seen an increased influx of immigrants from non-English-speaking countries in war torn regions of Africa and emerging economies in South and Eastern Asia. The last decade has seen a strong growth of immigration in Australia. Today, approximately one in four of the Australian population was born overseas. Thus, studies of the effects of language in the context of Australia are important, interesting and policy relevant, considering the numbers and proportion of immigrants coming from non-English-speaking countries in recent decades.

The paper uses data from the Household, Income and Labour Dynamics in Australia (HILDA) survey, which is a nationally representative household-based panel study. The HILDA data are collected annually, with panel members having been followed over time since 2001, and all adults (aged over 15) from the household being interviewed annually. We find a significant positive effect of English proficiency on wages and promotions among adults who immigrated to Australia as children. English proficiency decreases the perceived risk of job loss, but leads to worse health and life satisfaction levels; people with better English skills take more risks and drink more frequently. English proficiency decreases the importance of religion; increases spouse's drinking and decreases intermarriage. Estimates of the effect of parents' English-speaking proficiency on children outcomes using 2SLS show a significant, positive effect on children's English-speaking proficiency, high school achievements, occupational prestige, and importance of hobbies, sports and spare time activities, and a negative effect on children's satisfaction with partner and people in the neighbourhood.

To the best of our knowledge, this is the first paper to examine the causal effect of English skills on labour market and social outcomes in Australia. We also examine outcomes which have not been investigated by any previous studies in the context of any other countries. This is made possible because of the very rich information set provided by the HILDA survey data. The additional outcomes of interest in this paper are labor market outcomes such as promotion and perceived risk of job loss, as well as detailed health outcomes such as SF-36,

drinking behaviour and subjective risk-taking. In addition, individuals' overall life satisfaction and satisfaction with different areas of life are examined in detail. A younger sample survey also helps with looking at outcomes at younger ages. Our paper provides insights into the multicultural debate and the process of assimilation of first and second generation Australian immigrants into the Australian community.

2. Data and Descriptive Statistics

The paper uses data from the Household, Income and Labour Dynamics in Australia (HILDA) survey, which is a nationally representative household-based panel study. The HILDA data are collected annually, with panel members having been followed over the period 2001–2010 and all adults (aged over 15) from each of the households being interviewed annually. In each wave, extensive amounts of information are collected regarding economic factors on both the individual and household levels, relating to economic wellbeing, health status, labour market dynamics and family dynamics. For the purpose of this study, we begin by using the sample of people who were born overseas and migrated to Australia before the age of 18.

The data provide the exact year of arrival for each immigrant, in addition to year of birth and country of birth. HILDA includes information on whether or not English was the first language learnt as a child, in addition to whether English is the main spoken language in the country of birth. English language proficiency is asked about for all members in the household (regardless of their country of birth) where a language other than English is also spoken at home. In each round, from 1 to 10, all people who speak a language other than English at home are asked, "Would you say you speak English…?", and the answer is coded as: 0 "not at all," 1 "not well," 2 "well," and 3 "very well." In the survey, people are first asked, "Do you speak a language other than English in this home?" and the answer is coded as: 1 "English is the only language spoken at home" and 0 "English is not the only language spoken at home." Then, all people in each round, from 1 to 10, who were born overseas are asked, "Is English the first language you learned to speak as a child?", and the answer is coded as: 1 "English was the first language learned" and 0 "English was not the first language learned." Unique identifiers for the respondents and their fathers, mothers and partners are provided in each round. Country of birth information is provided in each round, first as the

specific country of birth[2] and second as a brief measure (1 "Australia," 2 "Main English-speaking," 3 "Other."). Age at arrival is calculated as the year of arrival minus the year of birth.

Table 1 presents the descriptive statistics. 55% of Australian immigrants were born in a country where English is not the main spoken language. 70% of immigrants who arrived before the age of 18 came to Australia when they were less than 12 years old. The average age at migration is 6.7 for immigrants who came to Australia when they were less than 1 years old. English was not the first language spoken as a child for around 48% of all immigrants.

Next, the means are reported for both the child immigrants who arrived young (0–11) and those who arrived older (12–18), for non-English-speaking and English-speaking countries of births separately. Reported English ability is higher for the younger arrivals. However, the years of education does not appear to differ across these groups. Labour market outcomes for the immigrants from non-English-speaking and English-speaking countries are similar, while for those from non-English-speaking countries, younger arrivers are better off. Life satisfaction and health in general appear to be higher for immigrants who arrived younger; however, immigrants who arrive at younger ages subsequently earn more and drink more, have higher BMI levels, are less satisfied with their partners, and are more likely to take risks. The likelihood of receiving promotions at work is higher for the younger arrivals. Levels of satisfaction with various different areas of life are also lower for the immigrants who came from non-English-speaking countries and when they were younger, while older arrivers place more importance on religion in their daily life.

3. Empirical Strategy

To identify the causal effect of English language skills on economic and social outcomes, we adopt the same empirical strategy as Bleakly and Chin (2004, 2008, 2010). Consider the following regression model, for individual *i* born in country *j* arriving in Australia at age *a*:

$$Y_{ija} = \alpha + \beta Eng_{ija} + \theta X_{ija} + \delta A_a + \gamma N_j + \varepsilon_{ija} \qquad (1)$$

[2] 128 countries of origin are classified according to the Standard Australian Classification of Countries (SACC), 1998 (ABS Cat. No. 1269.0), and the summary statistics for each of these categories are presented in Table A.3 of the Appendix.

where y_{ija} is the outcome of interest, such as the log of wages; Eng_{ija} is a measure of English language skills; N_j is a dummy variable for being born in a non-English-speaking country; A_a is a dummy variable for having arrived young (in line with Bleakley and Chin, 2004, this age is chosen to be eleven years or younger); X_{ija} is a vector of controls for individuals (age, male, schooling, country of birth dummies); and *Eng* is a categorical variable on a scale of 0–3, with 3 indicating the highest English proficiency (native).

The error term ε_{ija} captures the effects on wages of any omitted or unobservable variables. There are various unobservable characteristics, such as intelligence, ability and motivation, that could influence an individual's language ability and wages (and other outcomes). The endogeneity problem arises because these characteristics are correlated not only with outcomes of interest, but also with language skills. It is reasonable to assume that individuals' levels of intelligence and motivation will have a significant impact on their acquisition of a second language. This causes correlations between the explanatory variable language skills, *Eng*, and the error term ε_{ija}. In this situation, OLS estimates are biased, and any inferences made regarding the impact of language skills are inaccurate.

To overcome this problem, we adopt a 2SLS procedure, as did Bleakley and Chin (2004). Specifically, we argue that younger children acquire language skills more easily than older children and adults. Those who arrive in Australia at an early age are exposed to the English language at an earlier stage of their life, and hence they have an advantage in learning English better. However, younger child immigrants probably differ from their older counterparts in many ways other than English proficiency. It is likely that younger immigrants will be able to adjust to Australian culture, values and institutions better, which would lead to differences in outcomes between younger and older immigrants that have nothing to do with English proficiency. Therefore, comparing young arrivers with their older counterparts could simply reflect the age-of-arrival effect. To control for these non-language-related age-at-arrival effects, we take advantage of the fact that, for those arriving from non-English-speaking countries, this is also their first exposure to native English speakers. For immigrants arriving from English-speaking countries, they have been exposed to English earlier, and hence their English proficiency is not sensitive to the age at which they arrived in the country. As such, by using the immigrants from English-speaking nations as a control, we can control for the other factors faced by immigrants upon arrival. We consider both younger and older child

immigrants from non-English-speaking countries and compare them with their counterparts from English-speaking countries, to control for all other determinants affecting language proficiency, earnings and assimilation.

In equation (1), age at arrival is a binary variable which is equal to one if the individual arrived at the age of 11 years or younger.[3] The key assumption is that, from the age of twelve, immigrants from English-speaking and non-English-speaking countries have significantly different language outcomes.[4] Under this assumption, the instrument $k_{ija} = A_a * N_j$ is used in the first stage regression but is excluded from the second stage.

We adopt an IV strategy which is akin to the difference-in-difference (DD) methodology. Our instrument is an interaction between age at arrival and country of birth. Any difference in outcomes between the young and old cohorts of child immigrants in non-English-speaking countries that is over and above the differences in immigrants from English-speaking countries can plausibly be attributed to language. Incorporating immigrants from English-speaking countries into the analysis enables us to partial out the non-language effects of age at arrival. This is because, upon arrival in Australia, immigrants from English-speaking countries encounter everything that immigrants from non-English-speaking countries encounter, except a new language.

The first stage regression relates the endogenous regressor English language skill, Eng_{ija}, to the instrument k_{ija}.

$$Eng_{ija} = \alpha + \sigma(A_a \times N_j) + A_a + n_j + \theta X_{ija} + \upsilon_{ija} \qquad (2)$$

[3] When this assumption is removed (in unreported regressions) and age at arrival is used as a continuous variable in order to capture second language acquisition more effectively, the IV coefficient becomes statistically more significant, in most cases.

[4] For the sake of robustness, we also estimated (unreported) regressions using a sample of those who were less than 15 when they arrived; in this case, the group of those who arrived young was defined as those who arrived at ages 0–9 years.

Here, A_a is the "arrived young" dummy.[5] n_j is a full set of country of birth dummies that control for cross-country differences more precisely than the use of a dummy for non-English-speaking origin.

We focus on immigrants who arrived at ages 1–17 and currently live in Australia. For these child immigrants, their age at arrival is not determined by them, but rather is decided by their parents or relatives.[6] Age at arrival is a key factor in determining their subsequent English proficiency. Our dataset includes information on the exact year when each immigrant arrived in Australia. We use this to calculate the age at arrival. An additional sample restriction is that we consider immigrants who have been living in Australia for at least 16 years but no more than 30 years.[7]

We also adopt the same methodology to identify the effects of immigrant parents' level of proficiency in English on the English proficiency of their Australian-born children. Consider the regression model

$$Y_{ija} = \alpha + \beta\, Parent\_Eng_{ija} + A_a + n_j + \theta X_{ija} + \tau_{ija} \qquad (3)$$

Where Y is the outcome of interest for the children such as their English proficiency and schooling outcome, $Parent\_Eng_{ija}$ is a measure of parental English language skills (the endogenous regressor). The first-stage corresponds to the following regression:

$$Parent\_Eng_{ija} = \alpha + \beta\,(A_a \times N_j) + A_a + n_j + \theta X_{ija} + \varsigma_{ija} \qquad (4)$$

where the excluded instrument is the interaction term of two variables: (i) whether the parents migrated to Australia at or before age 11 (A_a), and (ii) whether parents come from non-English-speaking countries (N_j).

[5] In the unreported robustness regressions, we also experimented with the use of a full set of age at arrival fixed effects, to control for non-language age-at-arrival effects, rather than using an arrived-young dummy. The results remain robust with this alternative specification.

[6] Appendix Table A.4 shows information on for some recent immigrants which supports this claim. For immigrants who arrived Australia at the age of 18 and below, the primary visa applicant was not them but rather someone else.

[7] We consider the same sample restriction as in the study by BC (2004). This restriction means that we focus on immigrants who are not newcomers, but still have not fully assimilated into the society.

5. Empirical Results

5.1 Age-at-Arrival and English Proficiency

The association between age-at-arrival and English proficiency is presented graphically in Figure 1. Panel A shows the simple averages for each age at arrival. In panel B, we plot the simple averages for three-year windows of age at arrival: 0–2, 3–5, 6–8, 9–11, 12–14, and 15–17. The solid lines in Panels A and B refer to the average English-speaking ability of immigrants from non-English-speaking countries. The dashed lines in Panels A and B show the average English-speaking ability of immigrants from English-speaking countries. In line with the previous findings on language acquisition, immigrants who start to learn English at an earlier age end up with higher levels of English ability than those who start later. English-language skills are lower for immigrants with later ages of arrival (12–18). Most immigrants from English-speaking countries speak English very well,[8] which fits the language-acquisition theory, as their first experience with English did not depend on their age at arrival in Australia.

Figure 2 presents the differences in average English-speaking ability between immigrants from English- and non-English-speaking countries. Immigrants who arrived at older ages generally have lower English-speaking abilities. A younger age at arrival from a non-English-speaking country is positively related with each point in the cumulative distribution function (CDF) of English-speaking ability.

Figure 3 presents the association between age at arrival and wages for the full-time employed sample. We show the average log hourly wages as a function of age at arrival for immigrants from both non-English-speaking and English-speaking countries. The average levels of English ability for the two groups are similar at younger arrival ages and diverge at older arrival ages. Coming from a non-English-speaking country does not affect wages for the early arrivers, but the average wages appear to be lower for immigrants who arrived from non-English-speaking countries at older ages. The line for immigrants from English-speaking countries is nearly flat before the age of 8 and falls sharply until age 11, with the line staying relatively flat thereafter. The co-movement of the two lines at some periods could suggest that immigrants from English-speaking countries are a poor control group, since they do not

[8] HILDA also includes information on the English-speaking abilities of some immigrants from English-speaking countries because a language other than English was spoken in the family.

capture all of the non-language age-at-arrival effects immigrants from non-English-speaking countries. Therefore, Section 5.6 will present empirical strategies which will increase the comparability between English- and non-English-speaking countries in a variety of ways. We will control for the schooling quality and GDP per capita in the country of birth in the year of birth in the regressions, and compare the mean and the distribution of age at arrival for migrants from English-speaking and non-English-speaking countries.

Table 2 presents the first stage results, namely the effect of age at migration on English-speaking abilities. Each column corresponds to a different regression, and the standard errors are clustered at the person and country of birth level. Column 1 finds that the interaction term is significant and positive, indicating that immigrants who arrived from a non-English-speaking country of birth at or before age 11 have better English skills than their older counterparts who came between the ages of 11 and 18. The coefficient of the interaction term of the variables 'arrived young' and 'non-English-speaking country of birth' is 0.2292 units (where English is on a scale of 0–3 units). This is the DD estimate which estimates the difference in English ability between immigrants who arrived at younger and older ages from non-English-speaking countries that is over and above the difference between younger and older arrivers from English-speaking countries. Column 2 replicates this using interaction between young arrivals and migrants whose first language was not English. The coefficient on the interaction term is smaller but it remains statistically significant. The DD estimate suggests that younger immigrants whose first language was not English have 0.1074 units of advantages over older arrivals. Columns 3 and 4 estimate the same regressions as in columns 1 and 2, with the exception that the sample is now immigrants who arrived before the age of 15. We find statistically significant coefficients in both cases, but the magnitude of the coefficients becomes smaller. Columns 5–8 present the estimates where age-at-arrival is entered as a continuous variable. The results confirm the hypothesis that older children from non-English-speaking countries of origin (or whose first language is not English) who migrate with their parents are likely to learn English less well than their younger counterparts. The binary instrument is also significantly and positively related to all levels of English-language proficiency as can be seen in Table 2 where English is a binary variable in columns 9–10 and is on a scale 0-3 in columns 1-8 and 11. Overall, the estimates suggest that the first stage results are strong and that age at migration is a strong predictor of subsequent English abilities for Australian immigrants.

5.2 English Proficiency and Labour Market Outcomes

2SLS results are presented in Table 3. The coefficients reflect the effect of English skills on labour market outcomes. Column 1 shows that increased English ability increases wages. A one-unit increase in English language ability increases the log of wages by 0.536. This means, for example, that a person who speaks English well will earn 53% more (Eng_{ija} = 1) than a person who speaks English poorly (Eng_{ija} = 0). We obtain similar results when the sample is restricted to individuals who are employed full-time, when we control for job tenure, and when we consider only wages from the main job. These results are robust to adding years of schooling as a control: the coefficient estimates become slightly smaller when we add years of schooling as an additional control, but the difference in magnitude of the coefficients with and without controlling for schooling is not statistically significant. We do not find any effect of English ability on the probability of being employed or full-time employed. However, increased English language ability increases the probability of promotion and decreases an individual's perceived likelihood of losing his/her job in the next year. Overall, our results show that English language skills do not have a significant effect on labour market outcomes at the extensive margin when the years of schooling are controlled for while English skills have significant influences on labor market outcomes at the intensive margin. In Table A.3, we also show that English language ability does not have any effects on education, when we consider years of schooling and the degree earned as our outcomes of interest.

In Table 4, we report the results for the effect of English language ability on wages, using various sub-samples, defined by education, occupation and industry categories. English skills have a significant effect on wages among immigrants with either a post-school qualification or a high school degree, while language is insignificant for immigrants who have either more than a bachelor's degree or less than a high school education. This is probably due to the fact that more highly educated people tend to have better English proficiency, while those at the bottom in their schooling attainments have the lowest level of English proficiency. Thus, English proficiency is an important indicator of subsequent success in the labour market for immigrants who have a high school or equivalent qualification. English proficiency increases wage levels among immigrants working in the following 1-digit industries: "wholesale trade", "information, media and communications," "financial and insurance services," "professional,

scientific and technical services," and "other services."[9] Considering 1-digit occupation categories, English proficiency is only significant in explaining wages among "Machinery Operators, Drivers and Labourers."

5.3 English skills and health and social outcomes

We examine the impact of English skills on health and related outcomes in Panel A of Table 5. The results reported (from here on) use the years of schooling as a control in addition to other sets of controls, as the results without controlling for years of schooling are not significantly different. The results show no effect of English ability on self-reported health. However, we find evidence of an adverse effect on measured health outcomes both for the full sample and for men.[10] Improved English skills decrease vitality both for the full sample and for females. We also find that people with better English language abilities are more likely to be drinkers in the full sample and for females. Among females, improved English skills also increase the BMI. Finally, migrants with better English skills tend to be more risk-loving and to report lower levels of life satisfaction.

The previous literature has also found English skills to be important for social outcomes, and this is investigated in Panel B of Table 5. The results show that migrants with better English skills tend to marry at older ages, especially for men. However, there is a very significant and negative effect of English skills on the importance of religion in daily life for men when controlling for religion dummies, while there is no relationship for women. Following the social and health outcomes, Panel C of Table 5 also examines the effect of English ability on individuals' satisfaction with different aspects of their life. Overall, English ability has a

[9]19 1-digit industries are defined as follows: Agriculture, Forestry and fishing, Mining, Manufacturing, Electricity, gas, water and waste services, Construction, Wholesale trade, Retail trade, Accommodation and food services, Transport, postal and warehousing, Information media and telecommunications, Financial and insurance services, Rental, hiring and real estate services, Professional, scientific and technology, Administrative and support service, Public administration and safety, Education and training, Health care and social assistance, Arts and recreation services, Other services. Occupational prestige for the respondent is coded as white collar for Managers and Professionals, while blue collar is divided in to three subgroups for (i) Technicians and trades workers, community and personal service workers; (ii) Clerical and administrative workers, sales workers; and (iii) Machinery operators and drivers and labourers.

[10] The measured health outcomes are calculated from seven health summary indices from the Short-Form General Health Survey (SF-36). The SF-36 is a widely used 36-item questionnaire from which health indices can be constructed, relating to physical functioning, role limitations due to physical health problems, social functioning, bodily pain, general mental health, role limitations due to emotional problems, and vitality. Many prior researchers have used the SF-36 to capture individuals' objective health states (e.g., Boden & Galizzi, 2003; Cai & Kalb, 2006), and its reliability and validity are documented in the SF-36 user's manual (Ware et al., 1993).

negative influence on individuals' satisfaction with different areas of life. There are gender differences: levels of satisfaction with job decreases with English skills for males only, while levels of satisfaction with family indicators decrease with language ability for females only.

5.4 English skills and partner outcomes

Compared to immigrants from English-speaking countries of origin, immigrants from non-English-speaking countries show substantial age-at-arrival effects for the social outcomes we consider below. This is evident in Figure 4, where, for two different outcomes, we graph the mean by age at arrival and English/non-English origin. In Panel A, earlier arrivers appear essentially similar, and have a lower likelihood of marrying someone from the same country of birth. Such likelihoods tend to diverge for immigrants from English- and non-English-speaking countries of birth as the age-at-arrival increases beyond the age of 9. In Panel B, we relate one's spouse's drinking behaviour with one's age at arrival. The figure shows that spouse's drinking does not depend on one's age at arrival for individuals with English-speaking origins. However, a partner's drinking behaviour tends to decline as individuals' age-at-arrival increases, for people from non-English-speaking countries of birth.

We examine this relationship between English language skills and social assimilation in a regression framework using our methodology outlined above. The results reported in Table 5 Panel D confirm the descriptive evidence above. We find that immigrants with better English skills are less likely to marry someone from the same country of origin, with this being more evident for males. Partners of people with better English are more likely to be drinkers, to drink more often and also to drink in larger quantities, both in the full sample and for females. These outcomes are in line with the hypothesis that immigrants who arrived young assimilated into their host society easily, due to their better English skills.

5.5 Comparing OLS and IV

We would like to provide some insights into the coefficients obtained using OLS, which are reported in Panel A of Table 3, and to compare them with the IV coefficients reported in Panel B of Table 3. English skills are significantly related to wages, promotions and the perceived risk of job-loss (with the expected signs). The OLS estimates in Table 3, column 1,

row 1, indicate a 14.8% increase in wages for a one unit increase in English language skills. The corresponding estimates using the IV regression indicate an increase of 53.6%. Thus, the IV coefficients are significantly larger; in fact, in this case they are about three times higher the OLS estimates, which are indeed biased downwards. Though we do not report the entire set of OLS results, we find that, in general, the OLS estimates are smaller than the IV estimates. The IV estimations predict higher wages, higher likelihoods of promotions, and lower perceived risks of job-loss. There could be two potential explanations for this finding: differences in the weighting functions underlying the OLS and IV estimates, and measurement error in the language skills measure, which were also discussed by BC (2004).

First, in general, IV estimates capture the local average treatment effect (LATE): migrants whose English-speaking abilities are influenced by an instrument (being early arrivers in Australia). Thus, the variation in the IV estimate comes from the instrument, whereas the OLS estimate uses all of the variation. If the marginal return to language proficiency affected by the instrument differs systematically from that of the population, then the coefficients estimated using OLS and IV will be different. It could be that the returns from lower and higher English categories are different from each other. As can be seen in columns 9–11 of Table 2, the binary instrument is significantly and positively related to all levels of English-language proficiency. However, the highest coefficient is attained when moving to "spoken very well" English skills. Thus, IV will give a higher estimate than OLS if the greatest gains from language proficiency come from later steps towards proficiency. However, in our sample, the OLS estimates do not suggest nonlinearities in the returns to language skills, which tells us that the higher IV estimates are not due to a simple reweighting of heterogeneous effects.

Second, measurement error in the language proficiency measure may affect OLS and IV differently. The language measure used in this paper is an ordinal measure with four categories (0 to 3), which is based on respondents' self-assessments of their own English-speaking abilities, and is measured in only a few discrete categories. Therefore, it is likely that our language measure will contain measurement error. In the case of classical measurement error, we get the standard result of an attenuation bias in the OLS estimate. The greater the variation in the error term, the greater the bias towards zero. On the other hand, when we use an instrument for the language measure, we eliminate the attenuation bias, thus leading to a

higher IV estimate. Thus, the classical measurement error can explain why our IV estimate of the returns to language is higher than our OLS estimate.

5.6 Ruling out reverse causality and other alternative explanations

There are a number of reasons why the results reported above might not reflect the effects of English language skills. The first one is that immigrants from non-English-speaking countries could exhibit a stronger age-at-arrival effect simply because immigrants from poorer countries face additional barriers to adaptation, with these barriers increasing in severity as a function of age at arrival. To check for this possibility, we estimate the first stage and second stage regressions including interactions of the following indicators (one by one) with the age at arrival, including country of birth dummies. These indicators are the infant mortality rate and the per-capita GDP in their country of birth in their year of birth for each immigrant.[11] Measures of schooling quality (school expenditures and teacher to pupil ratios) are available in 5-year intervals, and are used for each immigrant in the country of birth during the appropriate year of birth interval.[12] As is presented in Appendix Table A.4, the significance of the first stage remains, and the English skills are significant in the IV estimations in some cases. However, English skills are statistically less significant (though the sign remains the same) in some other cases, probably due to the small number of observations, since these variables are missing for some countries.

Another concern that might bias our estimates is that parents from non-English-speaking countries may factor their children's age into the migration decision in a different way to parents from English-speaking countries. In that case, the age at migration will not be exogenous to the immigrant's characteristics, and various omitted variables, such as parental preferences, will bias our estimates. To assess this, we compare the age-at-arrival distributions of the English-speaking and non-English-speaking immigrants. Figure 5 displays these distributions. Each point on the solid line (dashed line) gives the proportion of the immigrants who arrived in Australia at that particular age who were from non-English-speaking countries (English-speaking countries). We find that it is not the case that parents from non-English-speaking countries are more likely to migrate when their children are very young than parents

[11] IMR is downloaded from http://www.gapminder.org/documentation/documentation/gapdoc002.pdf, and GDP per capita comes from Maddison (2012), and is downloaded from http://www.ggdc.net/MADDISON/Historical_Statistics/horizontal-file_02-2010.xls

[12] The schooling quality variables are from Barro and Lee (2001), and are downloaded from the World Bank website.

from English-speaking countries, understanding that older children have a language-learning disadvantage. Had this been the case, there would have been more mass in the younger ages for immigrants from non-English-speaking countries. Figure 4 shows that, in actual fact, the reverse is true in our sample. We also perform simple *t*-tests for the mean age at arrival for the immigrant categories, as follows.

Mean Age at arrival for:	Age at arrival ≤ 18	Age at arrival ≤ 14
Non-English-speaking country	8.85	6.73
English-speaking country	7.83	6.58
Simple *t*-test statistic	10.3	1.86

The simple *t*-test results show that the age at arrival is indeed higher for immigrants from non-English-speaking countries, for people who arrived before the age of 18. There is not even a significant gap in age at migration for those who came before the age of 14. Overall, the results show that the neither of these alternative stories can explain our findings.

5.7 Intergenerational transmission

An important avenue of research is the intergenerational transmission of English skills, and therefore, parents' English abilities could influence Australian-born children's life outcomes. Using HILDA data, we match each child to his/her parents using unique mother and father identification numbers. Figure 6 shows the relationship between fathers' age at arrival and their children's English-speaking abilities. Children speak better English if their fathers, who came from non-English speaking countries, arrived Australia at younger ages. For people from English-speaking countries, the dotted line is flat, suggesting that the English skills of Australian-born children do not depend on their fathers' age at migration for these migrants.

The OLS estimates reported in Table 6 show that there is a very significant positive relationship between parents' and children's English skills. However, the relationship between a child's English ability and his/her mother's English ability is higher than that with the father's. Again, this is only pure correlation, and does not say much about the causation which will be examined next. Table 7 estimates the relationship (first stage regression) between parental English language ability and parental age at arrival. The results also confirm our earlier findings: age at migration is a very significant predictor of the English ability of Australian-born children's immigrant parents. A higher level of parental English ability is

associated with a younger age at arrival. In Table 8, we examine the causal effect of parents' English skills on their children's outcomes. Panel A of Table 8 shows that the better a father's English skills, the greater the children's English abilities and high school GPA (self-reported). Children whose father's English skills are good place less importance on long-term relationships, but place more importance on hobbies and sports. Moreover, immigrant fathers' English skills increase Australian born children's satisfaction with their own children. Better English skills in fathers also increase their children's occupational prestige and likelihood of living in a rural area. On the other hand, a mother's having better English skills increases the probability of the children leaving their jobs voluntarily (Panel B of Table 8). In addition, it also increases the children's life satisfaction levels, social functioning (an item of SF-36 health outcomes) and drinking quantities.

6. Further Discussions and Robustness

Our IV estimates using English/non-English speaking country of birth and English/non-English being the first language to learn give somewhat similar results. In most specifications, the sign of the coefficients are the same while significance of the DD estimates could differ. This could be due to i) different samples and number of observations as these two questions are not available for the same respondents, or ii) there could be immigrants who were born in an English speaking country but their parents had moved there from a non-English speaking country hence they still could lack perfect English. For instance, a family from Italy or Cyprus move to UK and some kids are born there and later these kids become adults and move to Australia. For these people, even though their first language is English, it may not be perfect.

Table 5 finds that English proficiency increases the extent of risk-loving. It has been found that risk-taking is related to smoking and drinking, early marriages, and even job choices, which could show up as bad matches and eventually lead to poorer mental health and life satisfaction, as was found in Table 5. However, no significant causal relationship is found between self-reported health and English skills. In a study of the causal impact of income on health, Apouey and Clark (2010) consider lottery winners in the UK. The authors find no impact of income on subjective health, but a negative impact on objective health and a positive impact on mental health, which cancel each other out.

Bleakley and Chin (2010) find that English language proficiency is positively related to the likelihood of divorce. In the unreported regressions, we did not find any such relationship, though this could potentially be due to the small number of divorces in our sample. However, a negative and significant effect of English proficiency on satisfaction with one's partner is found. Indeed, satisfaction with partner is a very good predictor of overall marriage quality (Chapman and Guven, 2011), and also strongly predicts divorces and separations (Frijters, 2000).

The results in Panel C of Table 5 have implications for our understanding of how much immigrants contribute to their host society. English skills affect satisfaction with the neighbourhood and feeling part of the community, which could partly proxy for social capital. In addition, satisfaction with one's job and working hours could have implications for labor market policies which are aimed at increasing the well-being of Australian workers, especially those from ethnic backgrounds. English skills are found to be positively related to wages; however, contrary to expectations, English skills have a negative effect on life satisfaction and satisfaction with different areas of life, which could be due to increase in aspiration caused by income (Stutzer, 2004).

English skills do affect assimilation, and, to an even extent, parents' English proficiency could affect the assimilation of second-generation immigrants. Table 8 finds that a father's English proficiency could predict less of a focus on long-term relationships and more of a focus on sports and hobbies, which are hallmarks of the Australian lifestyle. This suggests that an investment in immigrants' English skills would affect not only their own assimilation, but also their children's lifestyle in Australia.

7. Conclusion

We find a significant positive effect of English-language skills on wages and promotions among individuals who immigrated to Australia as children. The effect of English-language skills is very strong, and does not appear to be mediated by years of schooling. Since the effect of English-language skills does not work through increased numbers of years of schooling, adult English-language classes may be important in helping these immigrants' wages to converge to those of the general population. English-language skills have a detrimental effect on health outcomes and life satisfaction, probably due to increased risk-

loving and drinking behaviours, involvement with partners from a different culture and marital discord. The lower social capital levels and poorer mental health levels that are linked with greater English skills also support these findings.

Children whose parents have lower levels of proficiency in English have significantly worse English language skills themselves for at least the first 11 years of their lives, and poor parental English-language skills do appear to have permanent detrimental effects. Such children have lower GPAs during high school and lower levels of occupational prestige at work. English is the language of instruction in Australian schools, and a good level of English is required to enable the child to learn and follow the lectures. English skills could be an important factor for immigrant children's performance at school due to problems related to discrimination, communication with friends and teachers or lack of motivation.

These results indicate that English-language skills play an important role in the process of social assimilation. Children whose parents have higher levels of proficiency in English place significantly more importance on enjoyment and less on long-term relationships and job status. On the other hand, the respondent's own English proficiency increases both the probability of them being unmarried and their drinking frequency, and decreases the importance of religion in their life. In addition, a greater proficiency in English increases the probability of marrying a person who is from a different ethnic background and drinks.

These results suggest that immigrants' English proficiency and integration do not depend fully on outcomes related to their country of origin but also on predetermined barriers. Even immigrants who are willing to fully integrate into Australian society may be constrained from doing so because they may have arrived after the critical period of language acquisition, meaning that their English-language skills are worse, which leads them to act less Australian than they wish.

Our findings suggest that the timing of migration and its effect on English-language skills are critical to a range of important outcomes which are policy-relevant. Findings could have implications for the planning and implementation of immigration policies. If age at arrival is such critical for immigrant's integration, this could be taken into account for points system for

those with children. A system that favours migration when one's children are younger might improve the welfare of potential first and second generation immigrants.[13]

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[13] See http://www.immi.gov.au/skilled/general-skilled-migration/pdf/points-test.pdf for the current Australian points system for migration.

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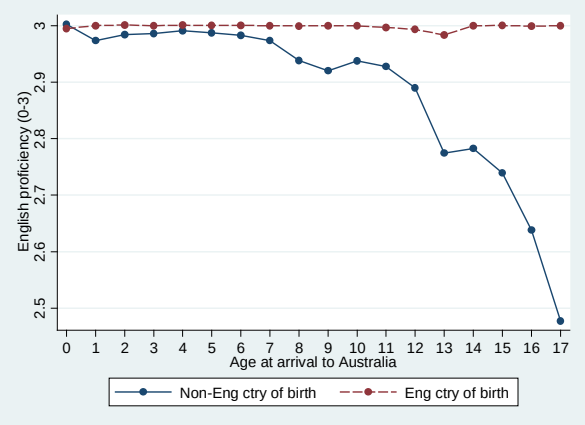
Figure 1: English-Speaking Ability by Age at Arrival.

Panel A: Age at arrival, 0–17



Panel B: Age at arrival in 3-year groups

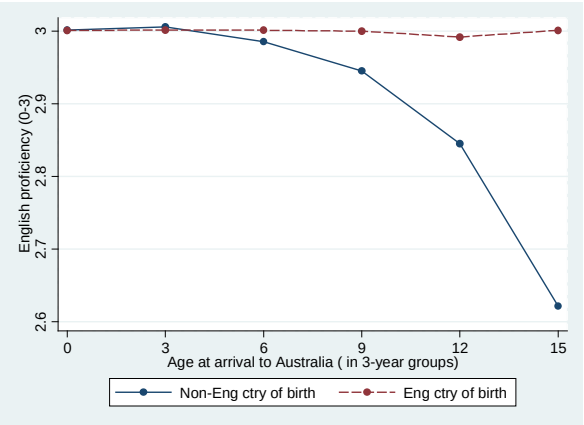
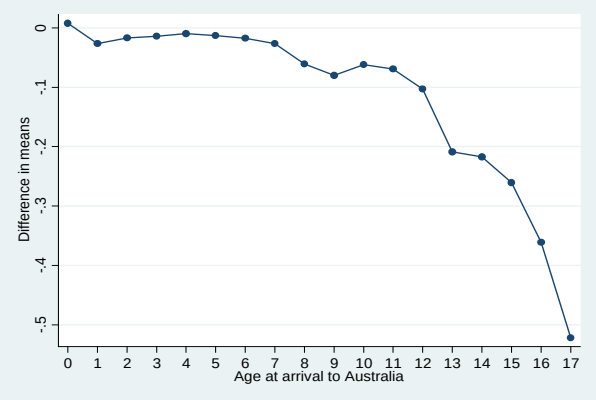
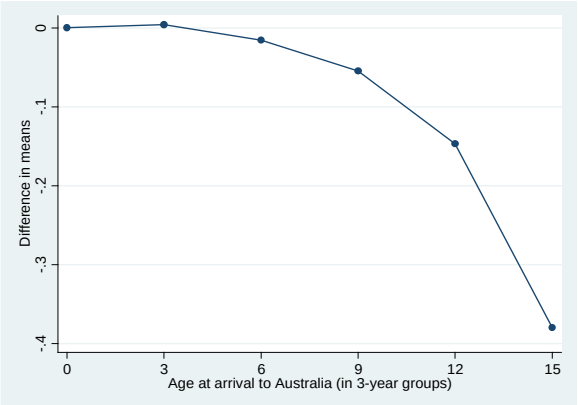


Figure 2: Differences in Mean English Ability: Non-English-Speaking Country of birth minus English-Speaking Country of Birth

Panel A: Age at Arrival, 0–17

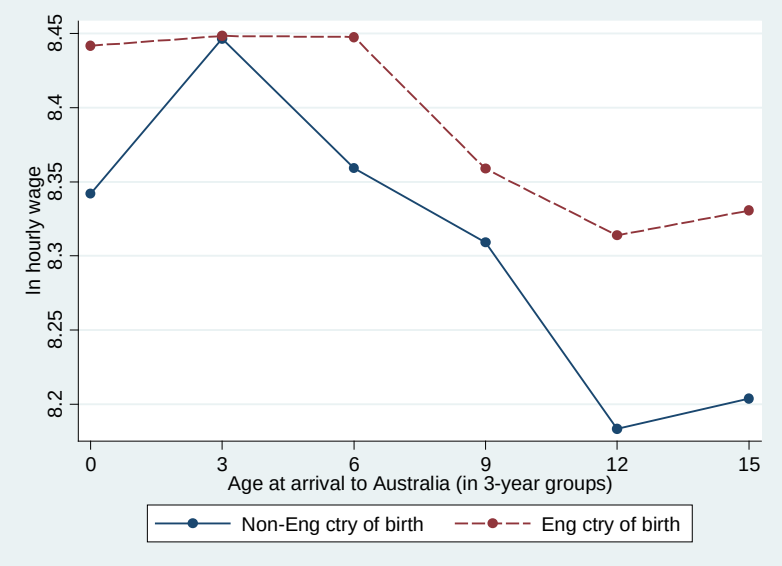


Panel B: Age at arrival in 3-year groups



Notes 1-2: The sample consists of individuals who arrived in Australia at or before age 17. The total sample size is 10709: 5558 observations are from non-English-speaking birth countries and 5151 observations are from English-speaking birth countries. English ability is an ordinal measure: 0 = no English, 1 = not spoken well, 2 = spoken well and 3 = spoken very well. The means have been **regression-adjusted** for years of schooling, age, and a male dummy.

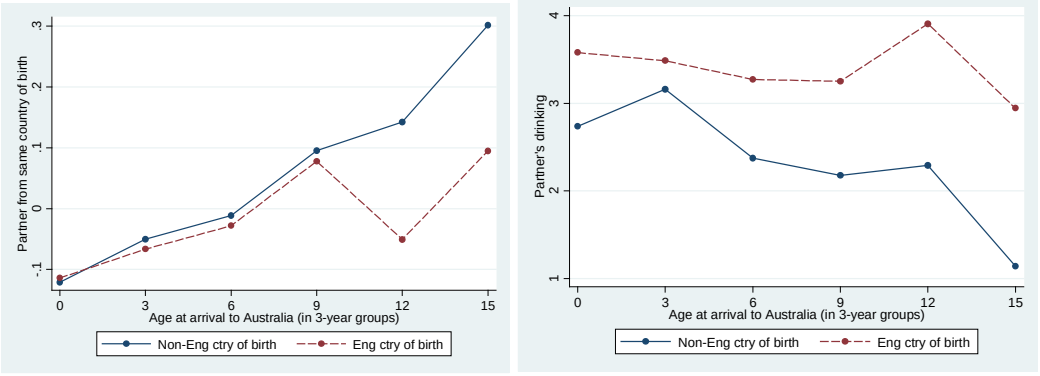
Figure 3: Log Hourly Wages by Age at Arrival for the Full-time Employed Sample



Notes: The samples consist of individuals who arrived in Australia at or before age 17 and have been living in Australia for 16–30 years. The sample size is 1632, which includes 863 people from a non-English-speaking country and 769 people from an English-speaking country. English ability is an ordinal measure: 0 = no English, 1 = not spoken well, 2 = spoken well and 3 = spoken very well. The means have been **regression-adjusted** for years of schooling, age, and a male dummy.

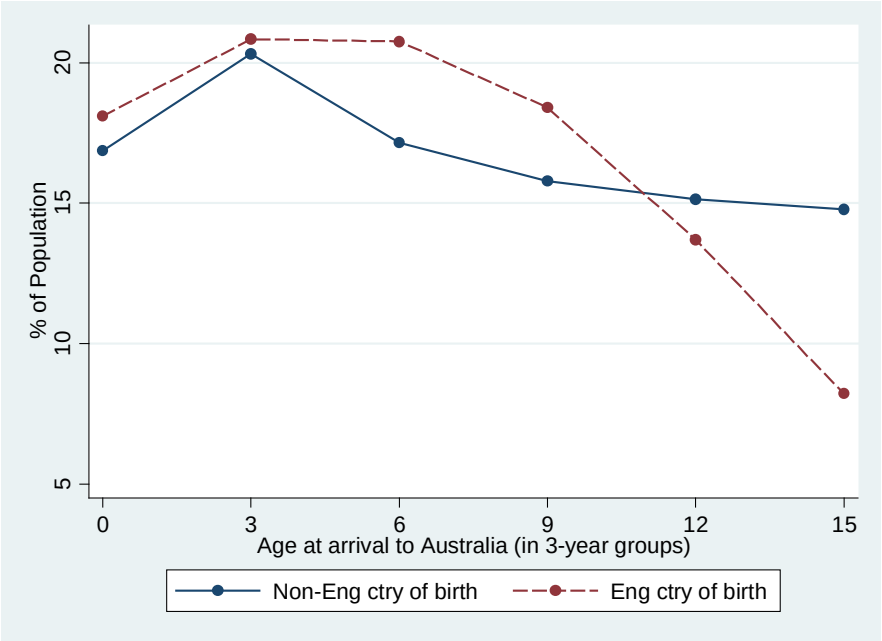
Figure 4: Partner Outcomes by Age at Arrival

a) Partner from same country of birth b) Partner's drinking



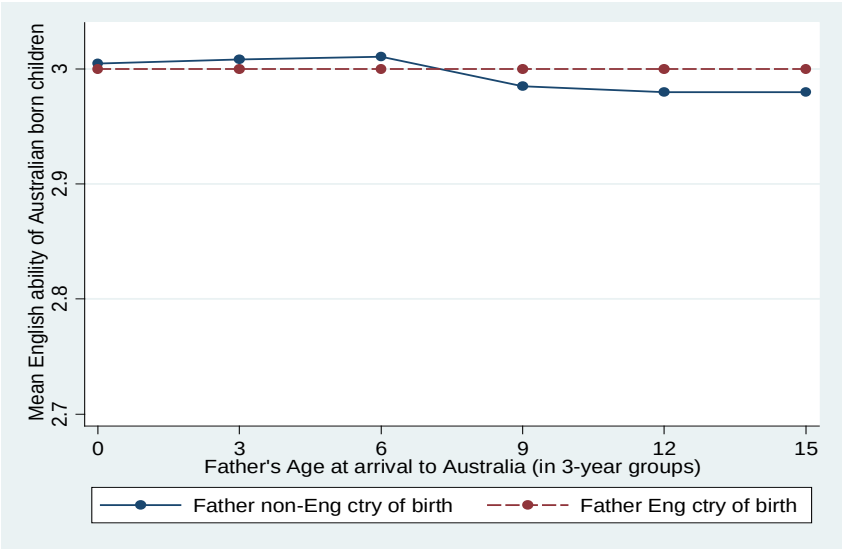
Notes: Data from HILDA 2001–2010 is used which is composed of individuals who arrived to Australia by age 17 and have been living in Australia for 16–30 years. Panel A includes 1748 observations: 877 from non-English-speaking countries and 871 from English-speaking countries. Panel B includes 1265 observations: 597 from non-English-speaking countries and 668 from English-speaking countries. English ability is an ordinal measure: 0 = no English, 1 = not spoken well, 2 = spoken well and 3 = spoken very well. Means have been **regression-adjusted** for years of schooling, age, and a male dummy.

Figure 5: Probability Distribution Function of Age at Arrival



Notes: The data are from HILDA, 2001–2010, and consist of individuals who arrived in Australia by age 17 and have been living in Australia for 16–30 years. The sample size is 2994, including 1679 people from non-English-speaking countries and 1315 from English-speaking countries.

Figure 6: English-Speaking Ability of Australian-born Children by Father's Age at Arrival



Notes: The data are from HILDA, 2001–2010, and consist of individuals who were born in Australia and whose fathers arrived in Australia by age 17 and have been living in Australia for 16–30 years. The sample size is 1302 observations, 643 from non-English-speaking countries and 659 from English-speaking countries. English ability is an ordinal measure: 0 = no English, 1 = not spoken well, 2 = spoken well and 3 = spoken very well. Means have been **regression-adjusted** for years of schooling, age, a male dummy, and father's age.

Table 1: Descriptive Statistics

	All immigrants				Non-English-speaking country of birth		English-speaking country of birth	
Variable	Mean	S.D	Min	Max	Age at arrival (0-11)	Age at arrival (12–18)	Age at arrival (0–11)	Age at arrival (12–18)
Non-English-speaking country of birth	0.546	0.498	0	1				
Arrived young (0–11 years)	0.698	0.459	0	1				
Arrived young (0–9 years)	0.708	0.454	0	1				
Age at migration (0–18 years)	8.363	5.293	0	18				
Age at migration (0–14 years)	6.653	4.054	0	14				
Migrant first language was not English	0.482	0.500	0	1	0.736	0.871	0.028	0.034
English ability	2.753	0.585	0	3	2.966	2.698	2.999	2.995
Male	0.477	0.500	0	1	0.439	0.477	0.521	0.438
Age	49.753	16.918	15	100	38.629	42.700	43.168	47.764
Years of schooling	13.093	2.771	10	20	12.724	12.740	13.059	12.455
ln hourly wages (all jobs)	8.090	0.602	1.239	12.013	8.036	8.045	8.074	8.070
Employed	0.946	0.225	0	1	0.935	0.935	0.948	0.953
Fulltime employed	0.948	0.222	0	1	0.938	0.948	0.948	0.946
Promoted	0.052	0.221	0	1	0.062	0.054	0.068	0.064
Probability of losing job	11.739	22.101	0	100	11.110	13.742	9.911	9.317
Subjective health	3.324	0.997	1	5	3.528	3.409	3.371	3.364
Objective health	67.826	21.577	0	100	70.932	69.400	68.038	68.621
Mental health	73.362	17.390	0	100	72.721	70.618	73.806	74.434
Vitality	60.662	19.590	0	100	61.162	60.651	59.179	60.802
Drinker	0.790	0.407	0	1	0.800	0.676	0.891	0.881
Drinking frequency	2.326	1.954	0	6	2.008	1.663	2.736	2.856
Drinking amount	5.125	4.881	1	42	1.689	1.416	1.850	1.752
BMI	1.830	0.936	1	5	1.837	1.750	1.921	1.872
Smoking amount	13.340	40.691	0	500	73.732	69.423	90.173	88.179
Risk-averse	0.418	0.493	0	1	0.400	0.413	0.358	0.354
Life satisfaction	7.813	1.602	0	10	7.902	7.615	7.808	7.898
Ever married	0.810	0.393	0	1	0.594	0.690	0.727	0.750
Age at marriage	28.312	8.705	14	90	27.099	25.535	28.008	27.273
Importance of religion	4.466	3.695	0	10	4.733	5.720	2.963	3.476
Same country of birth as partner	0.382	0.486	0	1	0.132	0.409	0.101	0.130
Satisfaction with:								
Partner	8.273	2.099	0	10	8.127	8.264	8.203	8.118
Partner's relationship with children	8.241	2.145	0	10	8.056	8.357	8.059	8.196
Children's relationship with each other	8.015	2.056	0	10	7.771	8.145	7.723	7.925
Feeling part of community	6.619	2.248	0	10	6.626	6.578	6.578	6.643
Job	7.558	1.812	0	10	7.658	7.610	7.609	7.709
Health	7.209	2.056	0	10	7.592	7.360	7.080	7.252
Neighbourhood	7.842	1.768	0	10	7.836	7.792	7.853	7.922
Working hours	7.100	2.201	0	10	7.063	7.196	7.104	7.266

Table 2: First-Stage Results: Age at Migration and English Skills

Dependent variable:	English ability (0–3)								Speaks English well or very well	Speaks English very well	English ability (0–3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Arrived Young (0–11 years)	–0.0005698	0.07493***							–0.00355	–0.00971	–0.0133
	(0.004598)	(0.009713)							(0.00388)	(0.0110)	(0.0132)
Arrived Young (0–9 years)			0.003728	0.02476***							
			(0.004130)	(0.005451)							
Arrived Young * Non-English-speaking country of birth	0.2292***		0.06372***						0.0660**	0.217***	0.283***
	(0.02549)		(0.01604)						(0.0231)	(0.0391)	(0.0572)
Arrived Young * Migrants whose first language was not English		0.1074***		0.02428*							
		(0.01746)		(0.01082)							
Age At Migration (0–18 years)					0.00005206	–0.002979***					
					(0.0003318)	(0.0007509)					
Age At Migration (0–15 years)							–0.0002934	–0.0003731			
							(0.0004563)	(0.0003380)			
Age at migration* Non-English-speaking country of birth					–0.02010***		–0.007802***				
					(0.002133)		(0.001660)				
Age at migration* Migrants whose first language was not English						–0.01503***		–0.008273***			
						(0.001920)		(0.001453)			
N	11298	11298	9366	9366	11298	11298	9366	9366	11298	11298	11298
Adjusted R^2	0.318	0.301	0.285	0.281	0.315	0.311	0.285	0.290	0.054	0.151	0.152

Notes: OLS regressions. Each regression includes whether male, age, and dummies for country of birth. Age at migration is used as a dummy variable in columns 1–4 and as a continuous variable in columns 5–8. Standard errors which are clustered at the person and country of birth levels are in parentheses. The regressions in columns 9–11 include dummies for males, ages, arrived young (0–11) and non-English-speaking country of birth. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

Table 3: English Skills and Labor Market Outcomes: IV Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln hourly wage(s) from				Employed	Full-time employed	Promoted	Probability of losing job
	All jobs (all workers)	All jobs (full-time workers)	All jobs (all workers, controlling for job tenure)	Main job (all workers)				
Panel A: OLS								
English[1]	0.148**	0.190**	0.146**	0.150***	0.0106	–0.0139	0.0456	–7.766**
	(0.0460)	(0.0628)	(0.0471)	(0.0452)	(0.0181)	(0.0236)	(0.0269)	(2.433)
N	2330	1697	2328	2329	2652	1920	2362	2179
Adjusted R^2	0.217	0.212	0.218	0.207	0.071	0.112	0.076	0.091
Panel B: IV Including schooling as control								
English[1]	0.536*	0.702**	0.557*	0.567*	–0.195	–0.334	0.304*	–20.64
	(0.225)	(0.233)	(0.225)	(0.239)	(0.147)	(0.206)	(0.139)	(10.76)
English[2]	1.554***	1.684**	1.557***	1.668***	–0.259	–0.192	0.120	–48.80*
	(0.432)	(0.544)	(0.427)	(0.477)	(0.182)	(0.182)	(0.242)	(22.35)
Panel C: IV Without schooling control								
English[1]	0.505	0.803***	0.519	0.536	–0.207	–0.307	0.300*	–20.64
	(0.265)	(0.241)	(0.266)	(0.274)	(0.155)	(0.207)	(0.135)	(10.74)
English[2]	1.678***	1.812**	1.676***	1.793***	–0.244	–0.140	0.147	–47.69*
	(0.499)	(0.573)	(0.487)	(0.544)	(0.176)	(0.168)	(0.233)	(21.21)
N	2330	1697	2328	2329	2652	1920	2362	2179

Notes: Each regression includes whether male, age, age at migration dummy, and dummies for country of birth. **Employed**: 1 if fulltime or part-time employed, 0 if unemployed. **Fulltime employed**: 1 if fulltime employed, 0 if unemployed and looking for a fulltime job. **Promoted:** Promoted at work? Asked in waves 2–10 and coded as follows: 1= Yes; 0 = No. **Probability of losing job:** "What do you think is the percentage chance that you will lose your job during the next 12 months? (That is, get retrenched or fired, or not have your contract renewed.)" The answer is given on a scale of 0–100. Standard errors which are clustered at the person and country of birth levels are in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

[1] IV: Arrived Young (0–11 years) * Non-English-speaking country of birth.

[2] IV: Arrived Young (0–11 years) * Migrants whose first language was not English.

Table 4: English Skills and Wages by Education, Industry and Occupation: IV Estimates

Outcome	ln hourly wages from all jobs[1]	ln hourly wage from main job[1]	*N*
Panel A: Education			
Bachelor's degree or more	–0.198	0.0522	624
	(0.971)	(0.978)	
Post-school qualification	1.324*	1.416	485
	(0.672)	(0.754)	
High school only	1.440**	1.482**	388
	(0.447)	(0.455)	
Less than high school	0.117	0.112	197
	(0.324)	(0.327)	
Panel B: Industry			
Wholesale trade	0.562**	0.570**	49
	(0.178)	(0.183)	
Information, media and telecommunications	3.827***	4.112***	105
	(0.578)	(0.472)	
Financial and insurance services	1.603	1.936*	173
	(1.033)	(0.839)	
Professional, Scientific and Technical Services	1.848	2.160*	248
	(0.981)	(1.071)	
Other services	1.076***	1.159***	65
	(0.120)	(0.119)	
Panel C: Occupation			
Managers and professionals	1.060	1.099	890
	(0.668)	(0.694)	
Technicians and trades workers	–0.427	–0.419	290
	(0.985)	(0.982)	
Community and personal service workers, clerical administrative workers and sales workers	0.499	0.724	820
	(1.038)	(0.998)	
Machinery operators and drivers and labourers	0.759***	0.631***	329
	(0.129)	(0.139)	

Notes: Regressions are estimated for the whole sample. Each regression includes whether male, age, age at migration dummy, and dummies for country of birth. Standard errors which are clustered at the person and country of birth levels are in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.
[1]IV: Arrived Young (0-11 years) * Non-English-speaking country of birth.

Table 5: IV Estimations: Health, Social and Partner Outcomes (Coefficient of English Ability**)**

Outcome	Full sample[1]	Full sample[2]	*N*	Female sample[1]	*N*	Male sample[1]	*N*
Panel A: Health Outcomes							
Subjective health	–0.678	–0.751	2654	–0.0739	1414	–2.323	1240
	(0.564)	(0.778)		(0.689)		(1.261)	
Objective health	–29.24	–60.14*	2676	–23.26	1422	–53.00*	1254
	(15.47)	(27.56)		(21.49)		(21.64)	
Mental health	–21.63*	–27.73	2689	–22.56	1433	–24.84	1256
	(9.046)	(16.88)		(13.20)		(12.91)	
Vitality	–44.36**	–45.03	2689	–49.85**	1433	–41.39	1256
	(15.61)	(23.36)		(17.33)		(23.90)	
Drinker	1.400***	0.737	2687	1.656**	1433	0.534	1254
	(0.409)	(0.455)		(0.507)		(0.420)	
BMI	1.345	0.0180	1313	1.787*	698	0.240	615
	(0.770)	(1.234)		(0.826)		(0.609)	
Risk-averse	–0.119	–0.992*	1873	–0.442	1000	0.370	873
	(0.235)	(0.500)		(0.422)		(0.545)	
Life satisfaction	–1.318*	–1.630	3133	–0.505	1620	–2.560*	1513
	(0.585)	(1.017)		(0.589)		(1.246)	
Panel B: Social Outcomes							
Age at marriage	11.09*	9.666*	1312	7.250	740	22.42*	572
	(4.696)	(4.609)		(5.545)		(10.04)	
Importance of religion	–4.673	–0.245	800	–1.029	417	–8.368***	383
	(2.861)	(3.350)		(2.884)		(2.119)	
Panel C: Satisfaction with:							
Partner	–3.649**	–0.292	1802	–2.963*	1101	–5.280	901
	(1.209)	(2.643)		(1.255)		(3.081)	
Partner's relationship with children	–4.455*	–0.823	1050	–5.024**	663	–10.12	502
	(2.028)	(1.960)		(1.660)		(13.25)	
Children's relationship with each other	–2.610*	–5.324	936	–4.352*	613	2.884	415
	(1.320)	(2.739)		(2.115)		(2.586)	
Feeling part of community	–2.024**	–1.073	2805	–1.834	1450	–2.842	1355
	(0.774)	(1.722)		(1.548)		(2.065)	
Job	–2.367*	–3.713**	2500	–3.797	1191	–2.167*	1309
	(1.146)	(1.429)		(2.678)		(1.046)	
Panel D: Partner Outcomes							
Partner's schooling	–2.996*	–4.335	1739	–5.556	1035	0.148	804
	(1.357)	(3.462)		(2.947)		(2.724)	
Partner drinker	1.561**	0.0598	1522	1.312*	806	1.612	716
	(0.551)	(0.979)		(0.644)		(1.993)	
Partner's drinking frequency	7.744**	1.260	1522	5.086	806	18.50	716
	(2.696)	(3.384)		(2.715)		(10.54)	

Notes: Each regression includes schooling, whether a male, age, an age-at-migration dummy and dummies for country of birth.

Subjective health: "In general, how would you say your health is?" Asked in each wave 1–10 and coded as follows: 5 = Excellent; 4 = Very good; 3 = Good; 2 = Fair; 1 = Poor.

Objective health: Measure of overall health, calculated from SF-36 items and given on a scale 0–100.

Mental health: One of the health measures derived from several health items from SF-3,6 and given on a scale 0–100.

Drinker: 0 = I have never drank alcohol or I no longer drink; 1 = Yes, but only rarely; 2 = Yes, I drink alcohol 2 or 3 days per month; 3 = Yes, I drink alcohol 1 or 2 days per week; 4 = Yes, I drink alcohol 3 or 4 days per week; 5 = Yes, I drink alcohol 5 or 6 days per week; 6 = Yes, I drink alcohol every day.

Smoker: 1 if currently smokes, 0 otherwise.

Risk averse: "Which of the following statements comes closest to describing the amount of financial risk that you are willing to take with your spare cash? That is, cash used for savings or investment?" The answers are recoded as follows: 0 = Takes substantial risks expecting substantial returns, Takes above-average risks expecting above-average returns, Takes average financial risks expecting average returns; 1 = Not willing to take financial risks ('Never has any spare cash' is coded as missing).

Life satisfaction: "All things considered, how satisfied are you with your life? The answers are coded on a scale of 0–10: 0 = Totally dissatisfied; 5 = Neither satisfied nor dissatisfied; 10 = Totally satisfied.

Age at marriage: Calculated as age – current marriage duration in years, both of which are available in each wave 1–10.

Importance of religion: The answers are coded on a 0 to 10 scale: 0 = Not at all important; 10 = Very important. Religion dummies are included.

The **Satisfaction variables** are the answers the following questions, on a scale of 0–10, where 0 = Totally dissatisfied; 5 = Neither satisfied nor dissatisfied; 10 = Totally satisfied. Satisfaction with partner? Satisfaction with partner's relationship with children? Satisfaction with children's relationship with each other? Satisfaction with feeling part of community? Satisfaction with job?

Partner's schooling: Years of schooling.

Partner's drinking: 0 = I have never drunk alcohol or I no longer drink; 1 = Yes, but only rarely; 2 = Yes, I drink alcohol 2 or 3 days per month; 3 = Yes, I drink alcohol 1 or 2 days per week; 4 = Yes, I drink alcohol 3 or 4 days per week; 5 = Yes, I drink alcohol 5 or 6 days per week; 6 = Yes, I drink alcohol every day.

Standard errors which are clustered at the person and country of birth levels are in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

[1] IV: Arrived Young (0–11 years) * Non- English-speaking country of birth.

[2] IV: Arrived Young (0–11 years) * Migrants whose first language was not English.

Table 6: Intergenerational Transmission of English Skills
(Dependent Variable: Children's English proficiency)

English ability (0–3)	(1)	(2)	(3)	(4)	(5)	(6)
Sample	Full sample	Full sample	Years in Australia ≥16 and ≤30	Full sample	Full sample	Years in Australia ≥16 and ≤30
Father's age	0.00552**	0.00632*	0.00347			
	(2.58)	(2.20)	(0.87)			
Father's English	0.0819***	0.0656*	0.0716**			
	(4.37)	(2.39)	(3.19)			
Mother's age				0.00749***	0.00712	0.00376
				(3.87)	(1.79)	(0.67)
Mother's English				0.100***	0.115***	0.106***
				(3.91)	(5.17)	(3.69)
Schooling	0.0119	0.0193	0.00439	0.0185***	0.0200*	0.00637
	(1.95)	(1.63)	(0.52)	(3.68)	(2.05)	(0.68)
Male	–0.00652	0.0113	0.0155	–0.00925	–0.0110	0.00995
	(0.36)	(0.36)	(0.54)	(0.66)	(0.40)	(0.30)
Age	–0.00900	–0.0106*	–0.00621	–0.0116**	–0.00790	–0.00309
	(1.76)	(2.34)	(0.98)	(3.21)	(1.41)	(0.61)
Age at arrival		–0.0150***	–0.00820		–0.0120**	–0.00595
		(3.57)	(0.79)		(2.91)	(0.96)
N	1785	814	266	2455	1069	343
Adjusted R^2	0.091	0.178	0.175	0.113	0.198	0.134

Notes: OLS regressions. Columns (3) and (6) are estimated for immigrants who have been living in Australia for at least 16 years and no more than 30 years. *t*-statistics are given in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

Table 7: First stage: Parents' Age at Migration and Parents' English Skills

	Father born overseas		Mother born overseas	
English ability (0–3)	(1)	(2)	(3)	(4)
Arrived Young * Non-English-speaking country of birth	0.104***		0.407***	
	(6.62)		(21.42)	
Arrived Young (0–11)	–0.00565		0.00692	
	(0.51)		(0.54)	
Age	–0.00219***	–0.00177***	0.000156	0.00135**
	(5.44)	(4.33)	(0.31)	(2.73)
Age at immigration * Non-English-speaking country of birth		–0.0120***		–0.0289***
		(8.29)		(–17.64)
Country of birth dummies	Yes	Yes	Yes	Yes
Age at immigration dummies	No	Yes	No	Yes
N	3936	3936	5116	5116
Adjusted R^2	0.408	0.441	0.490	0.533

Notes: OLS regressions. *t*-statistics are given in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

Table 8: IV Estimates: Parents' English Skills and Australian-born Children's Outcomes

PANEL A: Father's English							
IV: Father's age at migration * Father Non-English-speaking country of birth							
Outcome	(1) English Ability	(2) High school GPA	(3) Importance of hobbies and sports when respondent is 35 years old	(4) Importance of long-term relationship	(5) Occupational prestige	(6) Urban residence	(7) Satisfaction with children
Father's English ability	1.566***	3.977**	9.763**	–11.07*	11.23**	–2.757**	15.60*
	(0.151)	(1.501)	(3.751)	(4.598)	(4.291)	(0.915)	(6.071)
N	148	81	81	81	613	3936	41
Panel B: Mother's English							
IV: Mother's age at Migration * Mother Non- English-speaking country of birth							
Outcome	(1) Likelihood of voluntarily leaving job	(2) Life satisfaction	(3) Social functioning	(4) Age married	(5) Drinking amount		
Mother's English ability	113.1*	2.615*	47.55*	–1.805*	7.032*		
	(47.99)	(1.229)	(20.42)	(0.780)	(3.479)		
N	1003	1596	1407	23	882		

Notes: **High school GPA:** 5 = Well above average; 4 = Above average; 3 = About average; 2 = Below average; 1 = Well below average. **Importance of hobbies and sports at 35**, on a scale of 0–10: 0 = Not at all important; 10 = Very important. **Importance of long-term relationship:** Asked of youths aged 15–29 in wave 4 only; the answers are coded on scale of 0–10: 0 = Not at all important; 10 = Very important. **Occupational prestige:** 8 = Managers; 7 = Professionals; 6 = Technicians and Trades Workers; 5 = Community and Personal Service Workers; 4 = Clerical and Administrative Workers; 3 = Sales Workers; 2 = Machinery Operators and Drivers; 1 = Labourers. **Urban residence:** 1 = Major Urban; 0 = Other Urban, Bounded Locality, Rural Balance, Migratory. **Satisfaction with children:** 0 = Totally dissatisfied; 5 = Neither satisfied nor dissatisfied; 10 = Totally satisfied. **Likelihood of voluntarily leaving job:** Answers are on a scale 0–100. **Life satisfaction:** 0 = Totally dissatisfied; 5 = Neither satisfied nor dissatisfied; 10 = Totally satisfied. **Social functioning:** one of the SF-36 health items and takes values 0-100. **Age married:** Age at first marriage. Standard errors are given in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

Appendix (for Publication)

Table A.1: IV Estimates: English Skills and Education

IVREG2 Outcome	(1) Years of schooling	(2) Bachelor's degree or more	(3) Any other post-school qualification	(4) Completed high school only	(5) Did not complete high school
English[1]	–10.08	–2.101	1.672	–0.201	0.637
	(9.863)	(1.953)	(1.265)	(0.956)	(0.727)
N	2636	2636	2636	2636	2636
Adjusted R^2	–0.447	–0.570	–0.391	0.194	0.016

Notes: The dependent variable for columns 2–5 is a binary variable. Each regression includes whether male, age, age-at-migration dummy and dummies for country of birth. Standard errors which are clustered at the person and country of birth levels are in parentheses.
[1]IV: Arrived Young (0–11 years) * Non-English-speaking country of birth.

Table A.2: Interacting Country of Birth Indicators with Age at Arrival

Z ⇒	(1) Infant mortality rate	(2) GDP per Capita	(3) Teacher-pupil ratio at primary school	(4) Teacher-pupil ratio at secondary school	(5) Education expenditures at primary school	(6) Education expenditures at secondary school
PANEL A (OLS):English skills (0–3)						
Arrived-young dummy (0–11) * Non-English-speaking country of birth	0.143**	0.124**	0.0811*	0.0733*	0.0568*	0.0493*
	(0.0462)	(0.0425)	(0.0322)	(0.0325)	(0.0282)	(0.0249)
Arrived-young dummy (0–11) * *Z*	0.000854	–0.0000170**	–0.00103	0.00109	0.0000118	0.00000543
	(0.000854)	(0.00000520)	(0.00110)	(0.00136)	(0.0000125)	(0.00000790)
N	2536	2834	2162	2009	1816	1664
Panel B (IV): ln hourly wage						
English skills	2.890*	4.721*	2.456	–0.0229	5.838	2.556
	(1.320)	(1.998)	(1.312)	(0.921)	(3.129)	(1.946)
Arrived-young dummy (0–11) * *Z*	–0.00919***	0.0000970*	–0.0149***	0.0136**	0.000232**	0.000127**
	(0.00232)	(0.0000399)	(0.00406)	(0.00525)	(0.0000804)	(0.0000427)
N	1914	2113	1624	1509	1365	1252
Panel B (IV): ln hourly wage (fulltime employed)						
English skills	4.401*	10.86	4.010*	1.534	14.42	6.824
	(1.903)	(6.857)	(2.017)	(1.261)	(11.76)	(6.124)
Arrived-young dummy (0–11) * *Z*	–0.0137***	0.000270	–0.0116*	0.00829	0.000307	0.000151
	(0.00408)	(0.000170)	(0.00465)	(0.00631)	(0.000185)	(0.0000863)
N	1390	2113	1196	1109	998	930

Notes: Each regression includes whether male, age, arrived-young dummy (0–11) and country of birth dummies. The instrument used in the IV regressions is the Arrived-young dummy (0–11) * Non-English-speaking country of birth. Standard errors which are clustered at the person and country of birth levels are in parentheses. ***, **, * indicate significance at the 1, 5 and 10 per cent level, respectively.

Appendix (Not for Publication)

Table A.3: Regression Sample: Immigrants by Country of Birth

English-speaking Country of birth	***N***	***N*/ Total *N***	**Non-English-speaking Country of birth**	***N***	***N*/Total *N***
United Kingdom	675	48.21	Papua New Guinea	228	13.13
New Zealand	465	33.21	Solomon Islands	131	7.55
South Africa	165	11.79	Kiribati	77	4.44
Canada	47	3.36	Marshall Islands	65	3.74
United States of America	42	3	Nauru	60	3.46
Ireland	6	0.43	Cook Islands	56	3.23
Total	1400	100	Fiji	53	3.05
			Samoa	51	2.94
			Tonga	48	2.76
			Austria	47	2.71
			Belgium	47	2.71
			France	42	2.42
			Germany	42	2.42
			Netherlands	40	2.3
			Sweden	39	2.25
			Italy	37	2.13
			Malta	30	1.73
			Portugal	29	1.67
			Spain	28	1.61
			Albania	25	1.44
			Bosnia and Herzegovina	25	1.44
			Bulgaria	22	1.27
			Croatia	22	1.27
			Cyprus	22	1.27
			Former Yugoslav Republic of Macedonia	20	1.15
			Greece	19	1.09
			Romania	19	1.09
			Federal Republic of Yugoslavia	18	1.04
			Belarus	17	0.98
			Czech Republic	17	0.98
			Estonia	17	0.98
			Hungary	16	0.92
			Poland	16	0.92
			Ukraine	15	0.86
			Egypt	14	0.81
			Libya	14	0.81
			Sudan	13	0.75
			Bahrain	12	0.69
			Iran	11	0.63
			Iraq	11	0.63
			Kuwait	11	0.63

Lebanon	11	0.63
Turkey	10	0.58
Cambodia	10	0.58
Laos	10	0.58
Thailand	10	0.58
Vietnam	9	0.52
Indonesia	8	0.46
Malaysia	8	0.46
Philippines	7	0.4
Singapore	7	0.4
East Timor	7	0.4
China (excludes SARs and Taiwan)	6	0.35
Hong Kong (SAR of China)	6	0.35
Taiwan	6	0.35
Japan	6	0.35
Republic of South Korea	6	0.35
Bangladesh	5	0.29
India	5	0.29
Sri Lanka	5	0.29
Afghanistan	5	0.29
Azerbaijan	5	0.29
Argentina	5	0.29
Brazil	4	0.23
Chile	4	0.23
Colombia	4	0.23
Peru	4	0.23
Uruguay	4	0.23
Venezuela	4	0.23
Other South America	3	0.17
Costa Rica	3	0.17
El Salvador	3	0.17
Bahamas	3	0.17
Jamaica	3	0.17
Trinidad and Tobago	2	0.12
Congo	2	0.12
Sierra Leone	2	0.12
Malawi	2	0.12
Mauritius	2	0.12
Mozambique	1	0.06
Zambia	1	0.06
Zimbabwe	1	0.06
Southern and East Africa	1	0.06
Total	1736	100

Notes: Tabulations are sorted by *N*, and the classifications provided in HILDA are displayed. Frequencies (*N*/Total *N*) are shown as percentages. The above tabulations by country of birth use the following sample: HILDA (waves 1–10), arrived in Australia at or before age 18, have been living in Australia for 16–30 years, and have non-missing value for English-speaking ability.

Table A.4: Information on Immigrants Who Arrived in Australia After 1999

Age at Migration	6	8	9	11	12	13	14	15	16	17	18	20	21	22	23	24	25
Australian Visa Primary Applicant																	
Self	0	0	0	0	0	0	0	6	0	0	3	7	4	3	43	9	20
Someone else	1	3	10	7	7	10	2	4	6	6	14	10	10	0	0	10	15
Migration category when first arrived in Australia (Primary Applicant = Self)																	
Skilled								0			0	0	0	0	0	0	7
Business								0			0	0	0	0	0	0	7
Family								0			0	0	0	2	26	8	0
None of the above								6			3	7	4	1	17	1	6
Who paid for airfare when first arrived in Australia (Primary Applicant = Self)																	
Self or other family members								6			3	7	4	3	36	9	20
Friend								0			0	0	0	0	0	0	0
Australian Government								0			0	0	0	0	0	0	0
Other								0			0	0	0	0	7	0	0
Employment status (Primary Applicant = Self)																	
Full-time employed								0			0	0	1	0	21	8	20
Part-time employed								2			3	4	2	1	6	0	0
Unemployed and looking for full-time work								0			0	0	1	0	5	0	0
Not in the labor force								4			0	3	0	2	11	1	0
Last Schooling is in Australia (All)																	
Yes		1	8	2	5	5		9	2		6	0	0	0	0	0	0
No		0	0	0	0	0		0	0		11	17	20	3	43	20	35
Last Qualification is in Australia (All)																	
Yes			4	1	3			1			10	12	5	1	8	0	1
No			0	0	0			0			0	4	8	0	6	14	22

Notes: Tabulation of migrant characteristics by age at migration. Each cell indicates the number of observations for that category. The information is gathered through questions asked to migrants who arrived in Australia after 1999, in HILDA rounds 4–10. This information is not used in our regressions because these observations do not satisfy our regression sample criterion that migrants should have been living in Australia between 16 and 30 years.