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Social assimilation and immigrants' labour market outcomes

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Abstract

We analyse how immigrants' level of social assimilation is related to their labour market outcomes. More precisely, we estimate the association between assimilation and employment, wages, underemployment, three measures of job satisfaction, overeducation and wages. Using Australian longitudinal data, we find that assimilation is strongly associated with employment and wages as well as a number of job satisfaction measures. We then split our data and repeat the analysis for before and after the financial crisis of 2008–2009. We find important differences in the way assimilation is associated with different measures of labour market outcomes under different economic conditions. Finally, we explore mechanisms that may underlie the results.

Keywords Ethnic identity · Assimilation · Employment · Wages · Job quality · Overeducation

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1 Introduction

Recent literature has shown that ethnic identity/social assimilation plays an important role in the economic outcomes of immigrants (Constant and Zimmermann, 2008; Constant et al., 2009; Battu and Zenou, 2010; Bisin et al., 2011; Cai and Zimmermann, 2020; Carillo et al., 2021). However, there is no consensus in the studies as the results are highly dependent on the type of country under study and the type of data available to determine an immigrant's ethnic identity. It is, therefore, important to further explore the conditions that affect ethnic identity in different settings and how those are related to the labour market performance of immigrants, especially given that different countries have different immigration and integration policies, and these policies change over time. We contribute to the literature by addressing the following questions: do immigrants who identify with the host country culture have a higher probability of getting a job as well as better wages than those who identify more with the culture of their country of origin? Is social assimilation associated with measures of employment 'quality' such as underemployment, satisfaction with job and pay, and job security? How is social assimilation associated with labour market mismatches? Do economic downturns affect immigrants with different levels of social assimilation differently? To the best of our knowledge, this is not only the first paper that uses Australian data to explore the association between social assimilation and labour market outcomes but also the first one in this literature to analyse questions the last three questions.¹

While ethnicity is generally considered a fixed trait during a person's lifetime, ethnic identity can change over time.² At one extreme, immigrants may reject the dominant culture, whereas at the other extreme they may shun their own culture (language and/or religion) in favour of the dominant one (Battu and Zenou, 2010). A particular ethnic group can therefore form 'oppositional identities' where some belong to one group while others belong to the second group. Akerlof and Kranton (2000) argue that these extreme positions may be a result of discrimination or perhaps due to preferences for solidarity to one's own culture and/or religion. Oppositional identities may produce economic and social conflict, resulting in adverse economic outcomes for those who strongly identify with their own ethnic background (Bisin et al., 2011).³

¹ Using Canadian data, Islam and Raschky (2015) also include 'job satisfaction' in their estimation. Their (aggregated) job satisfaction variable ranges from 0–10, with higher values associated with higher job satisfaction. However, as explained later in this section, we differ from them because we use a disaggregated measure of 'job satisfaction', which also includes whether immigrants are happy with their pay and whether they have job security, etc. This is important because there could be heterogeneous correlation of assimilation with different aspects of the job.

² There is indeed a possibility that one ethnic group could choose to 'pass' for another one. For instance, Nix and Qian (2015) show that between 1880 and 1940, a number of Americans with African ancestry chose to 'pass' as Whites. However, it is probably less likely that first-generation immigrants are likely to manage that, or at least not at a large scale, to have significant effect on results in this paper or in the existing literature on the topic.

³ For instance, African American students in some parts of the USA could be stigmatized for 'acting White' if they learn standard English and perform well at school (see Bisin et al., 2011).

As noted above, the existing literature has not reached a consensus on the role ethnic identity plays in immigrants' economic outcomes. For instance, Carillo et al. (2021) use Italian data and show that ethnic identity has a significant positive effect on the probability of finding employment. Similarly, using Chinese internal migration data, Cai and Zimmermann (2020) find a positive and significant impact of assimilation on hourly wages, and assimilation also reduces the number of hours worked. However, Islam and Raschky (2015), using Canadian data, find a negligible effect of assimilation on immigrants' labour market outcomes.

Part of the reason for different results is the country context and the data used, but another aspect is how ethnic identity is measured. For instance, Casey and Dustmann (2010) and Constant and Zimmermann (2008, 2009) both use German data but do not find similar results, primarily because they use different definitions of ethnic identity and different immigrant groups. Casey and Dustmann (2010) follow the strand of literature in which the identity measure is based on immigrants' self-reporting, generally in terms of their answer to two questions: how strongly do they feel they are from the host country, e.g. "how strongly 'German' do they feel", and how strongly they feel connected to the country of origin, e.g. Turkey. The answers are based on a scale, which then determines their level of attachment to a particular group, i.e. their identity. Using this measure, Casey and Dustmann find that ethnic identity does not play any role for men, though it does have a determinantal impact on women's economic outcomes.⁴ Constant and Zimmermann (2008, 2009), on the other hand, use a different measure which they call a two-dimensional *ethnosizer*. The *ethnosizer* is constructed by using five measures of ethnic identity: language, culture, ethnic self-identification, social interactions and history of migration. Using this measure, they find that those who are assimilated are much more likely to find employment than those who are marginalized or separated.⁵ Nekby and Rodin (2010) use data from Sweden and show that assimilation and integration have similar positive outcomes in the labour market, though this result holds only for male immigrants.

We contribute to the literature by exploiting information unique to the Household Income and Labour Dynamics in Australia (HILDA), a detailed annual longitudinal survey data that started in 2001. Like a number of other immigrant-receiving countries in Europe and elsewhere, Australia has made adopting the host country's 'way of life' one of the key elements of its immigration policy. For instance, the immigration policy change of 1995 increased the level of English required in its selective

⁴ Casey and Dustmann (2010) also find that ethnic identity is negatively correlated with employment outcomes of second-generation immigrants.

⁵ The two-dimensional measure of ethnic identity assumes four possibilities: assimilation, integration, marginalization and separation (see Berry, 1998; Constant et al., 2008; Constant and Zimmermann, 2008). Assimilation is the one extreme where the immigrant adopts the native culture, which usually means she prefers the 'White social network', while giving up the culture of her country of origin. Separation, on the other hand, is the opposite of assimilation where the immigrant only identifies with her own ethnic background. The other two possibilities are integration and marginalization, which are defined as follows: in the former case the migrant keeps her own cultural traits (e.g. speaking her native language at home) but adopts significant aspects of the host country culture whereas latter is the weak dedication to both home and host country culture.

(points based) system, which was an implicit recognition of the importance of integration once immigrants move to Australia.⁶ A later policy document explicitly stated that immigrants are expected to ‘...embrace Australian values and integrate into the Australian society’ (Department of Immigration and Citizenship, 2009). With this backdrop, it is important to analyse the association between assimilation with immigrant’s economic outcomes. This is especially relevant because Australia uses a selective immigration policy to address labour shortages in the country.

As important as it is to understand how immigrants’ level of assimilation is related to their employment opportunities and wages, it is also important to understand to what extent assimilation influences the quality of jobs they get, measured here using job satisfaction indicators. Like the concept of ethnic identity/social assimilation, the notion of job quality primarily comes from sociology, though it is inherent in labour economics within the idea of compensating wage differentials. As Kalleberg and Vaisey (2005: 432) point out, “people differ in their expectations and needs regarding work as well as their preferences about the importance of various job facets and so may differ in their conceptions of what constitutes a ‘good’ or a ‘bad’ job”, which is why it is important to also look at different types and levels of job satisfaction.⁷ Our job satisfaction indicators are happy with job, happy with pay and feel secure about the job. We also measure whether assimilation is related to underemployment (i.e. they would prefer to work more hours but are not given the opportunity), which captures the underutilization of immigrants’ human capital.

In addition, education-occupation mismatches are a common problem among immigrants. This phenomenon has been widely studied in the literature emphasizing the determinants as well as the consequences of mismatch and the corresponding potential wage loss individuals experience in the labour market (see Piracha and Vadean, 2013 for an overview of this literature). However, the previous literature on ethnic identity has not analysed the relationship between social assimilation and the education-occupation mismatch. Finally, it is possible that the role of assimilation in labour market outcomes changes when economic conditions change.⁸ For instance, assimilation may not be important when there are plenty of jobs available, although it might still be quite relevant for ‘good’ jobs (that pay well and are more secure than ‘bad’ jobs). On the other hand, in an economic downturn, assimilation may be relevant for both finding a job and keeping one, although people’s views and expectations about the level of job satisfaction, in terms of wages or being overeducated,

⁶ Manning and Roy (2010: F73) point out, ‘If cultural diversity has costs and benefits then public policy needs to take account of them. This policy might be immigration policy (how many immigrants from what countries to allow in) or policy on the assimilation of immigrants once they are in the country, e.g., forcing them to learn the language....’.

⁷ Pendakur and Pendakur (2005) explore something along the similar lines but they have an objective measure of job ‘prestige’ using Blisshen occupational score whereas our measure is whether the immigrant employee is satisfied/happy with his/her job and pay as well as feels to have job security.

⁸ Tani (2003) shows that business cycles have a different effect on migrants and natives. Also, using data on the COVID-induced economic downturn in the UK, Morando (2021) shows that migrants were more adversely affected than natives. It is therefore likely that immigrants’ level of assimilation could have a different impact in good economic conditions than in bad ones.

might change. We therefore repeat the analysis by looking at the association between assimilation and all our outcome measures before and after the 2008 financial crisis.

We use three measures of social assimilation: language proficiency, whether an individual is happy to live in Australia (which is our proxy for self-identification) and ethnic concentration, which captures whether the immigrant lives in a high co-ethnic concentration area. We run separate estimations for all three components to ascertain which measure(s) of social assimilation are most relevant for labour market outcomes. Finally, since assimilation is a multifaceted concept that may differ across our three measures, we follow Constant and Zimmermann (2008) in building an index along the lines of the one-dimensional *ethnosizer* in their paper.⁹ We call our index the *assimilation index* (AI). The value of AI correlates positively with assimilation, i.e. the higher the value of the index, the more assimilated the migrant.

The results show that assimilation has a strong and positive association with the probability of employment as well as a number of job satisfaction indicators for both men and women.¹⁰ One key difference in the employment indicators is that assimilated men are less likely to be overeducated, whereas there is no such correlation for women. Assimilation is also positively associated with wages for both men and women. When looking at the association before and after the financial crisis, we find differences across different measures of labour market outcomes in the two periods as well as between the genders. We also show separate results for each of the three measures of assimilation. However, since assimilation is across a spectrum of different measures, 'it is practically impossible to summarize the overall balance of migrant's commitments by one response' (Constant and Zimmermann 2008: 428), and therefore, the focus in the paper is on the results using the assimilation index. Finally, we show that assimilation is strongly correlated with the formation of networks, which helps explain the channels through which ethnic identity plays a role in the labour market.

It is important to point out that none of the results discussed should be considered causal. This is a common feature in this literature since finding a reasonable instrument in this setting is not straightforward, especially when the data is limited in terms of information about the immigrants, like HILDA.¹¹ We, therefore, cannot

⁹ HILDA does not have the kind of data needed to build a *two-dimensional ethnosizer*.

¹⁰ Vast literature in labour economics has shown a significant difference between males and females labour market outcomes. Similarly, a number of papers on ethnic identity and labour market outcomes have shown differentiated impact on males and females. For instance, Constant and Zimmermann (2008) find a strong association between probability of employment and wages for men while Casey and Dustmann (2010) find no association between identity and labour market outcomes for females. It is therefore important to provide additional evidence on how the level of assimilation affects labour market outcomes of males and females.

¹¹ A few papers that have used instruments have nevertheless acknowledged problems with their IVs. For instance, Battu and Zenou (2010: F62) point out the shortcomings of their chosen IVs and state, 'One then needs to take care in interpreting our results and perhaps cautious in making strong claims of causality. The results that we report, be they two stage instrumental estimation or otherwise are simply an indication of the relationship between identity choices and employment but by no means the final word.' Similarly, Delaporte (2019: 4) uses five instruments in her paper but then states, 'Due to the fact that the estimates are imprecise; however, it is difficult to make any conclusive inference'.

rule out reverse causality (see, for instance, Casey and Dustmann, 2010; Pendakur and Pendakur, 2005; Nekby and Rodin, 2007).

The rest of the paper is organized as follows. We discuss the theoretical background and explain the measurement of ethnic identity in Sect. 2. Descriptive statistics are presented in Sect. 3, while Sect. 4 explains the empirical strategy. Results on the role of ethnic identity in employment, wages and job satisfaction indicators and social networks are presented in Sect. 5. The last section concludes the paper.

2 Theory and measurement of ethnic identity

The economics literature has identified a number of factors that affect immigrants' labour market performance. These include the country of origin, age at entry, migrant's gender, host country-specific human capital as well as social network. In recent years, ethnic identity has become another important element of interest to economists. Identity is primarily based on social differences (Akerlof and Kranton, 2000), in the sense that each individual belongs to a certain social group or category and his behaviour is thus 'conditioned' or formed within the norms of that group. Changing behaviour to identify oneself with another category might bring benefits but these benefits are likely to come at a cost, possibly in terms of the impact it will have on the group's utility.

The underlying notion of how ethnic identity manifests itself in economic outcomes comes through its importance in the formation of social networks. Battu et al. (2007) argue that since Whites do not suffer from discrimination, the non-Whites (immigrants) might prefer interacting with Whites as that social network is likely to be more rewarding in the labour market. However, because of peer pressure and social preferences within their own 'community/group', each non-White person's interaction with the White person or group decreases the non-White group's overall utility. The individuals for whom the non-White group utility is more important than their own labour market performance might form *oppositional identities*, i.e. stay closer to their own ethnic group by not mixing with Whites.

It is indeed possible that within the two extremes discussed above, immigrants (or non-Whites) form plural identities, as also acknowledged by Battu et al. (2007). We explore one element of identity, that of social assimilation, in this paper. More precisely, we use three possible categories to determine whether a migrant has assimilated in the host country or keeps the ethnic identity of their country of origin. We use information based on three questions to determine the level of migrants' social assimilation in the host country. The measures we use are: (i) their language ability, as measured by their spoken language skills; (ii) their happiness to live in Australia, as a measure of self-identity and (iii) the proportion of immigrants living in an area with high ethnic concentration, as a measure of residential choice. Below we provide more detailed information on how each variable is constructed.

Language ability HILDA indicates whether immigrants have poor, good or very good English language skills and whether they speak any other language at home. A four-category variable is therefore constructed indicating (a) whether or not

immigrants are able to communicate in the host country's language and (b) whether or not their English language skills are poor or good/very good. Based on that, we create a language-related variable with values ranging between 0 and 3. If a migrant has good/very good spoken English skills and speaks no other language at home then that is assigned a value of 3 (which means completely assimilated in this category); good/very good spoken English skills and speaks another language at home is assigned a value of 2; average spoken English and speaks another language at home gets a value of 1 and poor or no spoken English skills and speaks another language at home gets a value of 0.

Glad to live in Australia This set of indicators builds on a question asking to score one's happiness about living in Australia on a 0–10 scale. The precise question asked is “to what an extent do you agree/disagree with the statement I am glad to live in Australia?” This question is asked only once, when an individual is first surveyed. As in the case of language, we construct a four-category variable reflecting whether happiness is scored 9–10 (value: 3), which we associate with being more assimilated, and decreasing values the lower the assimilation (i.e. value of 2 for a score of 6–8; a value of 1 for a score of 3–5 and a value of 0 for a score of 0–2).

Ethnic concentration Living in a neighbourhood with a high number of immigrants may increase chances of socializing with co-ethnics; thus, ethnic concentration was constructed as an indicator of social networks using the proportion of foreign-born living in the same local government area (this is similar to a county in the USA and the UK). It was created using a four-category dummy, each value representing a different quantile of the distribution: hence, being more assimilated is associated with the lowest concentration of foreign-born living in the same local government area (value: 3), while being least assimilated is associated with the highest concentration (value: 0).

Making use of these three indicators, we build our *assimilation index* using the Stata command *Sumscale*, which generates a new variable by combining the scores of a set of ordinal/dummy variables of an underlying factor (Mehmetoglu, 2015). The resulting assimilation index thus created has several possible categories, ranging from 0.67 to 3—the highest value representing the fully assimilated migrants. We also build a second assimilation index based only on language skills and ethnic concentration, which we apply to dependent variables related to job satisfaction indicators: happiness with the job, happiness with pay and feel secure about the job. We therefore carry out the empirical analysis using either (i) the three indicators (language, glad to live in Australia and ethnic concentration) as independent explanatory variables or (ii) the assimilation index, based on 3- or 2-variables, respectively, depending on whether the dependent variable relates to happiness.

3 Data and descriptive statistics

We conduct the empirical analysis using HILDA data. These were collected annually from 2001 and tracked the same individuals over time, allowing for people to (re)enter and (re)exit the survey. More than 17,000 individuals are surveyed each year. The longitudinal survey data provides information about family formation, socio-economic status, general and psychological health as well as life satisfaction, among others. We use the first 17 waves of the database.

The panel data nature of HILDA implies that its respondents include both those who drop out of the survey (e.g. emigrating from Australia), and those who join it at a later wave (e.g. immigrating to Australia). This feature leads to an unbalanced panel and to reduce the bias and skewness arising from such attrition; the HILDA provides longitudinal sample weights on a regular basis.

We focus on 25 to 65 years old migrants living in Australia, in order to avoid the effect of part-time work during schooling years, using an age window that moves with the waves of the survey. As a result, the working sample loses those who become 65 during the period examined and acquires new entrants who become 25 during the 17 waves used. The relationship of interest is not affected by the changing composition of the sample and is therefore not further discussed, as adding a cohort indicator in the empirical analysis or performing separate regressions does not modify the results presented.

In total, our unbalanced panel contains more than 39,000 observations of about 2700 individuals who are born abroad and are between the set ages during the period. Table 1 summarizes the unconditional mean demographic and labour market characteristics of the working sample as well as the means of the assimilation index.

Migrants are predominantly middle aged (46.9 is the average age), females (52.4%) and married (77.7%). Many have migrated when very young, as the average number of years since migration is just over 28 years. The fact that many migrants arrive when still in schooling age generates a working sample almost equally split between individuals who complete their formal education in Australia (45.7%) and abroad (53.4%), respectively. This in turn makes it possible to disentangle the effects of ethnic identity of migrants from similar countries of origin and with similar profiles but acquiring their human capital in home and host countries, which is generally not possible in most databases.

Migrants are typically born in English-speaking countries (57.4% for the pooled sample),¹² many in the UK, Ireland, New Zealand, Canada and the USA, but the underrepresentation of non-English-speaking migrants diminishes over time, as HILDA oversamples them in subsequent waves. Among non-English-speaking migrants, several originate from Europe and especially Germany, the Netherlands and Italy: the (roughly) 2% of the sample for each country is low compared with the historical number of migrants from these countries. Asian

¹² We identify English-speaking countries with the use of English as an official language, as sourced from https://en.wikipedia.org/wiki/List_of_countries_and_territories_where_English_is_an_official_language.

Table 1 Unconditional means

	Pooled		Men		Women	
	Mean	SD	N	Mean	SD	N
Dependent variable						
Employed	0.953	0.211	29,533	0.955	0.208	15,851
Self-employed	0.120	0.325	28,157	0.141	0.348	15,131
Log hourly wage	3.270	0.563	24,938	3.321	0.581	13,056
Underemployed	0.280	0.449	39,100	0.187	0.390	18,617
Overeducated	0.282	0.450	28,132	0.253	0.435	15,111
Happy with job (job happy) (scale 0–10)	7.547	1.752	28,143	7.471	1.766	15,125
Happy with pay (pay happy) (scale 0–10)	6.953	2.013	27,771	6.965	1.974	14,947
Feel to have job security (job security) (scale 0–10)	7.701	2.094	27,778	7.646	2.090	14,903
Controls						
Age (censored to be between 25 and 65)	45.920	11.195	39,100	46.007	11.258	18,617
Female	0.524	0.499	39,100			
Married	0.777	0.416	39,098	0.794	0.405	18,617
Nr people in household	3.025	1.434	39,100	3.024	1.475	18,617
Education: year 11 or less (reference)	0.200	0.400	39,100	0.167	0.373	18,617
Education year 12	0.143	0.350	39,100	0.127	0.333	18,617
Certificate III or IV	0.192	0.394	39,100	0.253	0.435	18,617
Diploma/advanced diploma	0.107	0.309	39,100	0.105	0.307	18,617
BA or honours	0.198	0.398	39,100	0.185	0.389	18,617
Postgrad diploma/certificate	0.070	0.255	39,100	0.061	0.239	18,617
Masters/PhD	0.090	0.286	39,100	0.101	0.302	18,617
Completed highest education in Australia	0.457	0.498	39,100	0.453	0.498	18,617
Has at least 1 Australian parent	0.047	0.212	39,100	0.051	0.220	18,617
Migrated from: English-speaking country (reference)	0.574	0.494	39,100	0.613	0.487	18,617

Table 1 (continued)

	Pooled		Men		Women	
	Mean	SD	N	Mean	SD	N
Germany	0.024	0.152	39,100	0.019	0.135	18,617
Netherlands	0.019	0.138	39,100	0.020	0.141	18,617
Italy	0.021	0.144	39,100	0.020	0.142	18,617
Vietnam	0.035	0.184	39,100	0.031	0.174	18,617
Philippines	0.042	0.201	39,100	0.025	0.155	18,617
China	0.033	0.178	39,100	0.026	0.161	18,617
India	0.038	0.190	39,100	0.042	0.202	18,617
Other non-English speaking	0.214	0.410	39,100	0.203	0.402	18,617
Years since migration	26.782	14.637	39,042	26.990	14.451	18,581
Average unemployment in local govt. area	5.155	1.041	39,100	5.136	1.045	18,617
English language skills	2.531	0.618	36,988	2.582	0.585	17,574
Glad to live in Australia	2.624	0.564	26,708	2.629	0.554	12,541
Ethnic concentration	1.032	1.018	39,100	1.011	1.011	18,617
3-variable assimilation index	2.092	0.474	24,598	2.102	0.465	11,499
2-variable assimilation index	1.790	0.648	36,988	1.806	0.635	17,574

Shown are sample means, standard deviations and the number of observations using data from HILDA waves 1–17. Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65

migrants are now the largest group of immigrants in Australia and account for larger shares of respondents with about 4% each from the Philippines, Vietnam, China and India. It is interesting to note that female immigrants represent a higher percentage, compared to males, from China, the Philippines and Vietnam.

Migrants are relatively well educated, as about a third has completed university or higher tertiary degree. Migrants with less than 12 years of schooling represent a sizeable 20% of the working sample: they are typically older migrants, arrived in Australia in the post-WWII boom and carry with them the educational features of the time: lower age levels to complete mandatory schooling and migration carried out after finishing required their education. In contrast, recent migrants from Asia (especially India and China) include individuals who arrived in Australia as students and then stayed on, reflecting a specific migration policy implemented from the year 2000, which gave extra points towards permanent residence to individuals acquiring education in Australia. Table 11 in the Appendix provides a breakdown of the country of origin and years of arrival.

Migrants typically live in small households of about 3 individuals. Australian lineage is small, with less than 5% of migrants having an Australian parent.

We use the Australian Classification of Occupation (ASCO) to match immigrants' employment to the corresponding education level as outlined in Australia's Department of Immigrant and Citizenship (DIAC). Based on that, those who hold a higher level of education than the one required to be employed in a particular occupation are considered overeducated. In particular, the educational level required to perform the job in the occupational category manager, administrators, etc. (categories 1–3) as classified in the ASCO is 'bachelor or higher'. Similarly, those who are classified in ASCO occupations 4–7 include associate professionals, tradespersons, clerks, salespersons and personal service workers and plant and machine operators. For these occupational categories, the required level of education is a 'diploma or vocational degree'. Finally, the required level of education for labourers and related workers (ASCO categories 8–9) is 'secondary education or less'.

The sample covers the first 18 years of the new millennium, a time of relative prosperity in Australia despite the inclusion of years before and especially after the financial crisis of 2008–2009. Australia suffered the financial crisis only to a limited extent, thanks to rapid and decisive government intervention amounting to about 5% of the country's GDP. Subsequent close economic relationships with a recovering China contributed to a fast recovery thanks to exports of material, higher education (due to the policy changes favouring a two-step migration) and tourism. On average, 95% of the respondents in the sample are employed, and a substantial component includes self-employed. They are mostly professionals on the higher end of the wage income distribution. Despite the high share of employed, about 28% of respondents report to want to work more hours than currently experienced (females are twice the number of male underemployed), suggesting a phenomenon of underemployment, which becomes more prominent and persistent after the financial crisis. Overall, however, migrants in Australia feel good about their jobs: on average, they are happy with their employment and pay (7.547 and 6.953 out of 10, respectively). Most importantly, they feel to have job security (7.701/10).

Our key independent variables are the three separate measures of assimilation (language, self-identification and ethnic concentration) as well as the assimilation index built using those measures, as explained above. As evident from Table 1, migrants to Australia possess good English language skills (average score: 2.531 out of a maximum value of 3) and strongly agree with the statement about being glad to live in Australia (average score: 2.62 out of 3). Their residential choices illustrate a relatively spread-out geographic distribution (average score: 1 out of 3), consistent with the general lack of migrant ‘ghettos’ in Australia. In addition, migrants feel well assimilated, as the average value of the 3-variable assimilation index is just over 2 out of a maximum value of three (slightly less in the case of the 2-variable AI). The minimum value of the 3-variable AI is 0.67, and it applies to 0.18% of the working sample, while 6.5% has the maximum index score of 3. The skew towards higher values of the index is not surprising given that Australia is generally considered a successful destination for migrants, suggesting a priori that the role of assimilation is not as striking as in other destination countries.

4 Empirical strategy

To analyse the relationship between assimilation and various measures of labour market outcomes, we initially estimate the following micro-econometric model:

$$Y_{it} = a_0 + X_{it}a_1 + a_2\text{Assimilation}_{it} + t_1a_3 + u_i + v_{it} \quad (1)$$

where Y is one of the labour market outcomes chosen (employment, self-employment, hourly wage, various measures of job satisfaction, overeducation) for individual i at time t . X_{it} is a vector of individual characteristics that includes age, gender, marital status, educational level, household size, place of origin, whether one or both parents are Australian and years since migration; t is a year dummy. In terms of assimilation, we run estimations not only with the index but also separately for each measure. In addition, to address concerns about the possible simultaneity between glad to live in Australia and happy with job and pay variables,¹³ we also run estimations for those two, plus job security (as all three are ‘feeling’ variables) using only language and ethnic concentration measures of assimilation as explanatory variables. The variable *assimilation* in the equation, therefore, refers to variables measuring assimilation in the host country using four alternative indicators: (i) separate measures of assimilation (English language skills, self-identify based on whether one is glad to live in Australia and ethnic concentration), (ii) the 2-variable assimilation index, (iii) the 3-variable assimilation index and (iv) the 2-variable assimilation index for the job satisfaction indicators. The empirical results reported in the Tables that are discussed in the main text report the coefficients obtained under each specification.

¹³ We should point out that we found the correlation coefficient to be less than 1 between glad to live in Australia and both happiness variables.

The parameters u_i and v_{it} form the composite error term: u_i captures time-invariant individual unobserved heterogeneity; v_{it} is an i.i.d. component. The parameter of interest in Eq. (1) is α_2 as that captures the effect of ethnic identity on labour market outcomes, conditional on demographic and employment characteristics.

To partially eliminate the problem of likely serial correlation in the composite error term as OLS pools data across time, Eq. (1) is estimated using panel data techniques. Since several covariates are time invariant (gender, household size, education), the random-effects model is used.¹⁴ Equation (1) is augmented with the time-averaged values of the time-varying variables (Mundlak, 1978; Chamberlain, 1980; Wooldridge, 2010) as a way to control for unobserved time-invariant heterogeneity and, crucially, to relax the assumption of orthogonality between u_i and the observed covariates ('Mundlak correction'). We use the random-effects model (RE probit for binary-dependent variables) with Mundlak corrections in all estimations.

5 Identity and labour market outcomes

5.1 Full sample

In all tables, we run the regression using separate assimilation measures as well as with the assimilation index to ascertain which particular measure matters more for which particular outcomes and to what extent does that differ from our version of the one-dimensional ethnosizer, i.e. the assimilation index. Table 2 reports the association between assimilation and the four employment indicators while Table 3 report results of the association between assimilation and the individuals' job satisfaction indicators: happy with their job (job happy), with their pay (pay happy) and whether they have job security (job security). Extant literature on overeducation shows that overall migrants are more overeducated than the natives (see, for instance, Green et al., 2007). A priori one would expect that assimilated migrants are least likely to be overeducated since they behave most like the natives.

Our results for the pooled data show that language proficiency and living in an ethnically concentrated area are positively associated with being employed, but only the latter is important for males while none of the individual measures is significant for females. However, results with the assimilation index show a strong and positive association with being employed for both males and females and a negative

¹⁴ The panel random estimator transforms the data by subtracting from each observation a portion h of its time average, where h depends on the variance of u_i and v_{it} and the number of period for which data are observed (Wooldridge, 2010, chapters 10 and 15). Although h is not known in practice, it can always be estimated (various methods are discussed in Wooldridge, 2010, chapters 10 and 15). An estimated h close to zero results in random effect estimates being close to those obtained by pooled OLS, implying that time-invariant unobserved heterogeneity is relatively unimportant, as the variance of u_i is small relative to that of v_{it} . Conversely and more commonly, if the estimated h is close to 1, then the variance of u_i is large relative to that of v_{it} , and the bias caused by unobserved time-invariant heterogeneity is large. Schunck (2013) has shown that RE with Mundlak correction has advantages over the fixed effects model in a number of setups when using panel data.

Table 2 Employment indicators—random effects with Mundlak correction with three assimilation measures and 3-variable assimilation index

	Pooled	Men	Women	Pooled	Men	Women
Employment:						
Language skills	0.012** (0.005)	0.011 (0.011)	0.014 (0.010)			
Glad to live in Australia	0.009 (0.008)	0.010 (0.010)	0.006 (0.011)			
Ethnic concentration	0.006** (0.003)	0.008** (0.000)	0.004 (0.000)			
Assimilation index				0.023*** (.007)	0.026*** (0.010)	0.017* (0.011)
<i>N</i>	18,239	9601	8638	18,239	9601	8638
Self-employment:						
Language skills	−0.001 (0.007)	−0.000 (0.012)	−0.004 (0.010)			
Glad to live in Australia	−0.028*** (0.011)	−0.034* (0.020)	−0.026 (0.011)			
Ethnic concentration	0.001 (0.003)	0.002 (0.011)	−0.000 (0.000)			
Assimilation index				−0.004 (0.009)	−0.002 (0.011)	−0.011 (0.010)
<i>N</i>	17,472	9211	8261	17,472	9211	8261
Underemployment:						
Language skills	−0.034*** (0.007)	−0.024** (0.010)	−0.038*** (0.012)			
Glad to live in Australia	0.002 (0.012)	0.001 (0.020)	0.005 (0.021)			
Ethnic concentration	−0.004 (0.004)	0.002 (0.000)	−0.009 (0.010)			
Assimilation index				−0.028*** (0.010)	−0.007 (0.010)	−0.04*** (0.010)
<i>N</i>	24,556	11,474	13,082	24,556	11,474	13,082
Overeducation:						
Language skills	−0.023** (0.010)	−0.045*** (0.010)	−0.005 (0.010)			
Glad to live in Australia	−0.012 (0.014)	−0.046** (0.020)	0.014 (0.023)			
Ethnic concentration	0.002 (0.005)	−0.001 (0.010)	0.006 (0.011)			
Assimilation index				−0.010 (0.012)	−0.036** (0.020)	0.015 (0.020)
<i>N</i>	13,848	6769	7079	13,848	6769	7079

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Estimates obtained by performing a linear probability model on the binary-dependent variable. Random effects include Mundlak correction terms, namely the average value of each time-varying covariate. Control variables not reported in the table include age, education, marital status, number of household members, whether one of the parents lives in Australia, whether the highest level of education was acquired in Australia, years since migration, country of origin (Germany, Netherlands, Italy, Vietnam, Philippines, China, India, other non-English-speaking countries and English-speaking countries, which is the reference group), the state of residence in Australia (New South Wales, the reference group, Australian Capital Territory, Victoria, Queensland, Tasmania, South Australia, Northern Territory and Western Australia) and the unemployment rate in the local government area. Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

Table 3 Job satisfaction indicators with three assimilation measures and 3-variable assimilation index

	Pooled	Men	Women	Pooled	Men	Women
Job happy:						
Language skills	0.075 (0.050)	0.101 (0.070)	0.052 (0.070)			
Glad to live in Australia	0.275*** (0.058)	0.278** (0.091)	0.293*** (0.08)			
Ethnic concentration	0.017 (0.024)	0.032 (0.030)	0.001 (0.031)			
Assimilation index				0.174*** (0.059)	0.212*** (0.090)	0.151* (0.080)
<i>N</i>	13,843	6769	7074	13,843	6769	7074
Pay happy:						
Language skills	0.118** (0.056)	0.159** (0.080)	0.073 (0.080)			
Glad live in Australia	0.221*** (0.066)	0.217** (0.090)	0.211** (0.101)			
Ethnic concentration	0.031 (0.027)	0.011 (0.040)	0.040 (0.040)			
Assimilation index				0.207*** (0.067)	0.179** (0.091)	0.206** (0.102)
<i>N</i>	13,718	6712	7006	13,718	6712	7006
Job security:						
Language skills	0.034 (0.057)	0.142* (0.080)	−0.064 (0.080)			
Glad to live in Australia	0.229*** (0.067)	0.157 (0.10)	0.301** (0.09)			
Ethnic concentration	0.016 (0.027)	0.027 (0.040)	−0.004 (0.040)			
Assimilation index				0.135** (0.069)	0.182* (0.100)	0.079 (0.101)
<i>N</i>	13,703	6685	7018	13,703	6685	7018

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Estimates obtained by performing a linear probability model if the dependent variable is binary. Random effects include Mundlak correction terms, namely the average value of each time-varying covariate. Control variables not reported in the table include age, education, marital status, number of household members, whether one of the parents lives in Australia, whether the highest level of education was acquired in Australia, years since migration, country of origin (Germany, Netherlands, Italy, Vietnam, Philippines, China, India, other non-English-speaking countries and English-speaking countries, which is the reference group), the state of residence in Australia (New South Wales, the reference group, Australian Capital Territory, Victoria, Queensland, Tasmania, South Australia, Northern Territory and Western Australia) and the unemployment rate in the local government area. Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

association with underemployment for females. In addition, there is a negative correlation between the level of assimilation and the likelihood of being overeducated for males while there is no such association for females. One possible reason for that is male immigrants are likely to have more pressure on getting jobs and therefore are likely to take jobs that may not commensurate their qualifications whereas females, most of whom are ‘tied’ migrants, may not feel such pressure. Furthermore, when looking at the estimates for the three components of assimilation separately, only language has a strong negative correlation with being overeducated for males only. In terms of the association between assimilation and employment, our results are in line with those in Constant and Zimmermann (2008) and Cai and Zimmermann (2020) though they are contrary to those found by Gorinas (2014), Casey and Dustmann (2010) and Nekby and Rodin (2010).

Table 3 shows a positive and significant association between being glad to live in Australia and happy with job and pay as well as with job security. We observe the same association with the assimilation index for all three job satisfaction indicators as well, though more so for males than for females. More precisely, one standard deviation increase in the assimilation index is associated with a 10 and 7 percentage points increase in the probability being ‘happy with job’ for males and females, respectively. However, assimilated females are relatively slightly happier about their pay than their male counterparts while assimilated males are more likely to feel secure about their job. The results in Tables 2 and 3 suggest that the level of assimilation is strongly related to not only obtaining employment but to the characteristics of the job as well, especially in terms of the reduction in the incidence of overeducation. Individually, different measures of assimilation are differently associated with each outcome measure, highlighting the importance of all of our three measures.

One concern about the results in Table 3, especially for the job happy and pay happy estimates, is the potential simultaneity problem with the indicator measuring being glad to live in Australia. We address this issue in two ways. First, we estimate the correlation between the two job indicators and glad to live in Australia. We find that the correlation is less than 0.1—it is 0.0715 with job happy and 0.0514 with pay happy—indicating that simultaneity is an unlikely a major problem. However, to avoid any lingering concerns, we also re-run the estimations for the job and pay happy as well as job security variables without the ‘glad to live in Australia’ measure (see Table 4). It is clear that assimilation measures have little association with being happy about one’s job and only language proficiency is associated with being happy about pay and that too only for males. Our interpretation of the difference in results between Tables 3 and 4 for the two outcome variables is that including the measure of being glad to live in Australia reduces the variation of the 3-variable indicator relative to the 2-variable indicator. This result does not prove the existence of simultaneity per se, but justifies the use of complementary approaches and estimates for robustness..

Table 5 reports separate results for wages for males and females. Consistent with some of the existing literature, we find a positive correlation between assimilation and wages for both males and females, though for males these are significant only at a 10% level. In terms of individual measures of assimilation, only language has a strong association with wages. While there are a number of papers that study the

Table 4 Job satisfaction indicators with two assimilation measures and two-variable assimilation index

	Pooled	Men	Women	Pooled	Men	Women
Job happy:						
Language skills	0.065* (0.036)	0.054 (0.050)	0.077 (0.050)			
Ethnic concentration	0.016 (0.020)	0.001 (0.030)	0.035 (0.030)			
Assimilation index				0.056 (0.035)	0.026 (0.050)	0.091* (0.050)
<i>N</i>	21,417	10,803	10,614	21,417	10,803	10,614
Pay happy:						
Language skills	0.092** (0.041)	0.115* (0.060)	0.070 (0.061)			
Ethnic concentration	0.010 (0.023)	-0.033 (0.031)	0.046 (0.031)			
Assimilation index				0.060 (0.039)	0.004 (0.050)	0.104* (0.060)
<i>N</i>	21,224	10,711	10,513	21,224	10,711	10,513
Job security:						
Language skills	0.060 (0.042)	0.099* (0.059)	0.021 (0.060)			
Ethnic concentration	0.039* (0.023)	0.042 (0.032)	0.035 (0.034)			
Assimilation index				0.088** (0.040)	0.110** (0.056)	0.063 (0.058)
<i>N</i>	21,196	10,665	10,531	21,196	10,665	10,531

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Random effects include Mundlak correction terms, namely the average value of each time-varying covariate. Control variables not reported in the table include age, education, marital status, number of household members, whether one of the parents lives in Australia, whether the highest level of education was acquired in Australia, years since migration, country of origin (Germany, Netherlands, Italy, Vietnam, Philippines, China, India, other non-English-speaking countries and English-speaking countries, which is the reference group), the state of residence in Australia (New South Wales, the reference group, Australian Capital Territory, Victoria, Queensland, Tasmania, South Australia, Northern Territory and Western Australia) and the unemployment rate in the local government area. Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

Table 5 Assimilation and wages—random effects with Mundlak correction

	Pooled		Men		Women		Pooled	Men	Women
Language skills	0.055***	(0.011)	0.042**	(0.020)	0.064***	(0.020)			
Glad to live in Australia	0.003	(0.020)	0.011	(0.030)	0.001	(0.021)			
Ethnic concentration	0.008	(0.011)	0.008	(0.011)	0.007	(0.011)			
Assimilation index							0.047***	(0.010)	0.049*** (0.021)
<i>N</i>	13,374		6,719		7,015		13,374	6,719	7,015

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Random effects include Mundlak correction terms, namely the average value of each time-varying covariate. Control variables not reported in the table include age, education, marital status, number of household members, whether one of the parents lives in Australia, whether the highest level of education was acquired in Australia, years since migration, country of origin (Germany, Netherlands, Italy, Vietnam, Philippines, China, India, other non-English-speaking countries and English-speaking countries, which is the reference group), the state of residence in Australia (New South Wales, the reference group, Australian Capital Territory, Victoria, Queensland, Tasmania, South Australia, Northern Territory and Western Australia) and the unemployment rate in the local government area. Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

association between ethnic identity/assimilation and employment, only a small number look at wage effects as well. Within that literature, Mason (2004) and Cai and Zimmermann (2020) also found a positive effect of ethnic identity on wages, whereas Casey and Dustmann (2010) and Islam and Raschky (2015) found no such effect. As discussed in Sect. 1, one reason for varied results in this literature is possibly the way ethnic identity is measured as well as the host country characteristics, including the country's immigration policy.

5.2 Labour market outcomes before and after the global financial crisis

Our sample covers the first 18 years of the new millennium, which was a time of relative prosperity in Australia. At the macro-level, Australia was relatively less adversely affected by the financial crisis of 2008–2009, primarily due to sound economic policy and close trade relations with China, another country that was not much affected by the financial crisis (OECD, 2010). However, at the micro-level, it became more difficult to gain permanent employment after 2008 (Junakar, 2015). We therefore split our sample into before and after 2008 and run the same estimations as before.

Table 6 shows employment, self-employment and underemployment. Results for employment and self-employment indicators before the financial crisis are generally the same, when using the assimilation index, as those in the full sample, but the association disappears after the financial crisis. This is an interesting result. One possible intuition of the results is that perhaps assimilation matters more when economic conditions are good but does not play a significant role when there is economic uncertainty, possibly because productivity and necessity (to remain in employment) trump all other aspects. When looking at the individual measures of assimilation, language has a negative association with underemployment before the crisis as it was in the full sample.

The other key difference from the full sample is that assimilated males are less likely to be overeducated after the financial crisis whereas females are more likely to be overeducated before the downturn, with assimilation having no correlation with overeducation after the crisis for females and before the crisis for males (although the coefficient is still negative). This seems to imply that assimilated males are much more likely to get a correctly matched occupation. In terms of individual measures, language skills and glad to live in Australia are both negatively associated with overeducation for males after the financial crisis. In the next subsection, we explore possible channels that could generate these results.

In terms of job satisfaction indicators (Table 7), ethnic concentration is positively associated with indicators of job happy and job security while language skills are negatively associated with all three indicators for females, both before and after the crisis. It is important to highlight that all three job indicators are positive and highly significant for females before the crisis, showing strong association with the assimilation index, even when there is no association with 'glad to live in Australia'. This is further evidence that assimilation is a collective measure consisting of different elements and that our self-identification variable is not driving our job satisfaction

Table 6 Employment indicators before and after the financial crisis

	Before financial crisis				After financial crisis			
	Employment	Self-employed	Underemployed	Overeducated	Employment	Self-employed	Underemployed	Overeducated
Pooled:								
Language skills	0.012 (0.001)	0.006 (0.001)	-0.039*** (0.010)	-0.016 (0.010)	0.005 (0.011)	-0.007 (0.011)	-0.039*** (0.010)	-0.023* (0.010)
Glad to live in Australia	0.010 (0.010)	-0.031** (0.001)	0.006 (0.001)	-0.010 (0.020)	0.006 (0.011)	-0.024* (0.010)	-0.002 (0.021)	-0.025 (0.022)
Ethnic concentration	0.010** (0.000)	0.018** (0.010)	-0.000 (0.010)	0.025*** (0.010)	-0.003 (0.000)	-0.001 (0.000)	0.009 (0.010)	-0.006 (0.010)
Assimilation index	0.031*** (0.010)	0.023* (0.010)	-0.029** (0.010)	0.028 (0.022)	-0.002 (0.011)	-0.010 (0.011)	-0.003 (0.010)	-0.033* (0.020)
<i>N</i>	8368	8001	11,554	6291	9871	9471	13,002	7557
Men:								
Language skills	0.018* (0.010)	0.008 (0.021)	-0.047*** (0.010)	-0.035 (0.021)	-0.005 (0.011)	-0.006 (0.011)	-0.020* (0.010)	-0.050*** (0.020)
Glad to live in Australia	0.005 (0.001)	-0.044** (0.002)	0.002 (0.020)	-0.048** (0.020)	0.013 (0.011)	-0.003 (0.021)	-0.006 (0.022)	-0.059** (0.031)
Ethnic concentration	0.005 (0.010)	0.016 (0.010)	0.011 (0.011)	0.020 (0.011)	-0.002 (0.002)	0.002 (0.010)	0.015** (0.010)	-0.003 (0.012)
Assimilation index	0.023** (0.010)	0.017 (0.021)	-0.007 (0.021)	-0.006 (0.030)	-0.003 (0.011)	0.001 (0.021)	0.021 (0.021)	-0.046** (0.020)
<i>N</i>	4528	4350	5502	3169	5073	4861	5972	3600
Women:								
Language skills	0.005 (0.010)	0.003 (0.011)	-0.031** (0.010)	-0.002 (0.021)	0.016 (0.011)	-0.006 (0.010)	-0.050*** (0.010)	-0.000 (0.020)
Glad live in Australia	0.013 (0.010)	-0.019 (0.021)	0.013 (0.021)	0.016 (0.022)	-0.004 (0.012)	-0.043** (0.02)	-0.001 (0.020)	-0.001 (0.030)
Ethnic concentration	0.014* (0.010)	0.020** (0.010)	-0.009 (0.011)	0.025** (0.010)	-0.004 (0.003)	-0.003 (0.013)	0.005 (0.011)	-0.010 (0.010)

Table 6 (continued)

	Before financial crisis			After financial crisis				
	Employment	Self-employed	Underemployed	Overeducated	Employment	Self-employed	Underemployed	Overeducated
Assimilation index	0.036** (0.020)	0.027 (0.021)	-0.034 (0.020)	0.054* (0.030)	-0.003 (0.01-)	-0.024 (0.022)	-0.018 (0.021)	-0.020 (0.021)
N	3840	3651	6052	3122	4798	4610	7030	3957

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Estimates obtained by performing a linear probability model if the dependent variable is binary. Random-effects estimator includes Mundlak correction terms (for a full list of the other covariates, please see the description in Table 2). The number of observations applies to both specifications shown for each outcome in each group (pooled, men and women). Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

Table 7 Job satisfaction indicators before and after the financial crisis

	Before financial crisis			After financial crisis		
	Job happy	Pay happy	Job security	Job happy	Pay happy	Job security
Pooled:						
Language skills	0.032 (0.071)	0.132* (0.080)	0.114 (0.080)	0.122* (0.060)	0.087 (0.071)	0.021 (0.081)
Glad to live in Australia	0.314*** (0.071)	0.249*** (0.081)	0.273*** (0.081)	0.185*** (0.070)	0.114 (0.082)	0.131 (0.081)
Ethnic concentration	0.075 (0.042)	0.074 (0.052)	0.071 (0.052)	0.000 (0.032)	−0.000 (0.031)	0.014 (0.042)
Assimilation index	0.242** (0.140)	0.249* (0.150)	0.232 (0.151)	0.182* (0.110)	0.098 (0.121)	0.290*** (0.130)
<i>N</i>	6289	6221	6214	7554	7497	7489
Men:						
Language skills	0.031 (0.101)	0.230** (0.110)	0.216* (0.120)	0.163* (0.090)	0.110 (0.103)	0.155 (0.110)
Glad to live in Australia	0.395*** (0.102)	0.253*** (0.101)	0.241** (0.112)	0.087 (0.102)	0.119 (0.110)	0.042 (0.122)
Ethnic concentration	−0.022 (0.061)	−0.032 (0.071)	−0.025 (0.070)	0.036 (0.040)	−0.001 (0.052)	0.091 (0.051)
Assimilation index	0.242* (0.140)	0.249* (0.151)	0.232 (0.152)	0.182* (0.111)	0.098 (0.123)	0.290** (0.132)
<i>N</i>	3169	3140	3123	3600	3572	3562
Women:						
Language skills	−0.160* (0.080)	0.169* (0.101)	−0.835*** (0.091)	−0.179** (0.071)	−0.139* (0.082)	−0.689*** (0.090)
Glad to live in Australia	0.048 (0.104)	0.047 (0.120)	0.008 (0.110)	0.082 (0.093)	0.065 (0.102)	−0.091 (0.110)
Ethnic concentration	0.252** (0.091)	0.204 (0.120)	0.281* (0.112)	0.278** (0.102)	0.121 (0.113)	0.204* (0.113)
Assimilation index	0.512*** (0.130)	0.498*** (0.153)	0.464*** (0.152)	0.078 (0.114)	0.094 (0.123)	−0.087 (0.132)
<i>N</i>	3120	3081	3091	3954	3925	3927

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Estimates obtained by performing a linear probability model if the dependent variable is binary. Random-effects estimator includes Mundlak correction terms (for a full list of the other covariates, see the description in Table 2). The number of observations applies to both specifications shown for each outcome in each group (pooled, men and women). Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

results. However, the results for the assimilation index are insignificant after the financial crisis, even if some of the individual affects remain. The most interesting result for males is that assimilation is much more important when it comes to job security after the financial crisis. It could be that more assimilated are more likely to keep their jobs as they are now the 'insiders', but one cannot rule out reverse causality as well: those who stay in their jobs are more likely to have a higher 'level' of assimilation, perhaps established through their network with native colleagues. Either way, it shows that the more assimilated immigrants are more likely to be better off than the less assimilated immigrants.

As before, we run estimations for job indicators without the 'glad to live in Australia' variable. The results are shown in Table 8 and suggest that a positive link remains, operating through females. The results are very similar to those in Table 7. Assimilation is still positively and significantly associated with all three indicators before the crisis for females and is positively associated with job security for females after the crisis.

Overall, these results show that being assimilated has a differential association with at least some aspects of migrants' labour market performance, especially being overeducated for males who benefit from assimilating in terms of getting better matching jobs under relatively worse economic conditions. The extent of assimilation, therefore, does play an important role in the labour market outcomes of immigrants in terms of different attributes of employment, especially in different economic conditions.

Finally, Table 9 shows that being assimilated has no correlation with hourly wages before the crisis while it is negatively correlated for males, though there is a positive association with language proficiency before and after the crisis. Interestingly, ethnic concentration has a negative association with wages. In the next section, we argue that social networks with the natives maybe more important for the returns in the labour market during an economic downturn, and those living in areas with a higher proportion of natives are likely to generate 'better' networks. Overall, it seems that language is the main link with better wages. This is consistent with the extant literature that has shown the causal effect of language proficiency on wages, which gives us a certain level of confidence that at least some of our relationships might be causal.

5.3 Ethnic identity and social network

In this section, we explore the channels through which social assimilation and employment outcomes might be correlated. It has been shown in the literature that social networks have a significant impact on the labour market outcomes of immigrants and they also play a role in determining the kind of jobs migrants get (see, for instance, Montgomery, 1991; Mouw, 2003; Carroll and Tani, 2015; Kalfa and Piracha, 2018). If more assimilated immigrants are more likely to have a native social network then that might be an important channel to succeed in the labour market. Based on the information available in the data, we explore four possible ways in which an immigrant can build a network. These are based on the following

Table 8 Job satisfaction indicators before and after the financial crisis—2-variable assimilation index

	Before financial crisis			After financial crisis		
	Job happy	Pay happy	Job security	Job happy	Pay happy	Job security
Pooled:						
Language skills	0.036 (0.070)	0.151* (0.080)	0.096 (0.081)	0.080** (0.040)	0.057 (0.051)	0.068 (0.051)
Ethnic concentration	0.052 (0.040)	0.031 (0.050)	0.049 (0.051)	0.006 (0.020)	−0.000 (0.030)	0.051** (0.030)
Assimilation index	0.095 (0.072)	0.129 (0.081)	0.124* (0.070)	0.051 (0.041)	0.030 (0.052)	0.111** (0.050)
<i>N</i>	7040	6960	6952	14,377	14,264	14,244
Men:						
Language skills	0.022 (0.090)	0.215** (0.102)	0.177 (0.111)	0.073 (0.062)	0.074 (0.061)	0.114* (0.070)
Ethnic concentration	−0.055 (0.062)	−0.112* (0.062)	−0.066 (0.062)	0.002 (0.033)	−0.021 (0.042)	0.089** (0.041)
Assimilation index	−0.067 (0.101)	−0.042 (0.100)	0.002 (0.111)	0.040 (0.061)	0.007 (0.061)	0.191*** (0.070)
<i>N</i>	3553	3518	3498	7250	7193	7167
Women:						
Language skills	0.061 (0.102)	0.090 (0.110)	0.011 (0.110)	0.091 (0.063)	0.038 (0.072)	0.025 (0.073)
Ethnic concentration	0.150** (0.062)	0.161** (0.071)	0.148** (0.060)	0.014 (0.041)	0.018 (0.042)	0.011 (0.040)
Assimilation index	0.251*** (0.091)	0.282*** (0.110)	0.220** (0.110)	0.071 (0.061)	0.048 (0.071)	0.029 (0.070)
<i>N</i>	3487	3442	3454	7127	7071	7077

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Estimates obtained by performing a linear probability model if the dependent variable is binary. Random-effects estimator includes Mundlak correction terms (for a full list of the other covariates, see the description in Table 2). The number of observations applies to both specifications shown for each outcome in each group (pooled, men and women). Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

Table 9 Wages before and after the financial crisis

	Before financial crisis			After financial crisis		
	Pooled	Men	Women	Pooled	Men	Women
Language skills	0.059*** (0.021)	0.052* (0.032)	0.071*** (0.022)	0.053*** (0.021)	0.045*** (0.021)	0.057*** (0.020)
Glad to live in Australia	-0.004 (0.022)	-0.005 (0.031)	0.002 (0.032)	-0.002 (0.020)	0.008 (0.032)	-0.007 (0.030)
Ethnic concentration	-0.002 (0.011)	-0.001 (0.022)	-0.006 (0.011)	-0.012 (0.011)	-0.026*** (0.011)	0.000 (0.012)
Assimilation index	0.034 (0.022)	0.028 (0.030)	0.039 (0.031)	0.002 (0.022)	-0.034* (0.021)	0.029 (0.032)
<i>N</i>	6242	3145	3574	7492	3097	3918

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Random-effects estimator includes Mundlak correction terms (for a full list of the other covariates, see the description in Table 2). The number of observations applies to both specifications shown for each outcome in each group (pooled, men and women). Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

information: (i) ‘have many friends’, (ii) frequency of contact, (iii) social participation, which is split into two aspects: (a) club member and (b) trade member. These variables cover individuals’ level of activity and the extent of connections beyond immediate family (living in the same household). The four variables were constructed from the following questions in the data:

Have many friends This was based on the reply to a general question about the amount of support, using the following statement: ‘I seem to have a lot of friends’. The response ranges from 1 (strongly disagree) to 7 (strongly agree).

Frequency of contacts The following question was asked in HILDA:

- ‘In general, about how often do you get together socially with friends or relatives not living with you?’

The response ranges from 1 to 7 (every day, several times a week, about once a week, 2 or 3 times a month, about once a month, once or twice every 3 months). A dummy variable has been created equal to one of the individuals report to socially interact with friends and relatives at least twice a month and zero if contact is less frequent than that.

Social participation The following questions were asked as part of this measure (we present these separately in Table 10; *club member* refers to the answer to the first question while *trade member* refers to answer to the second question. Answer to each question was ‘yes’ or ‘no’).

- ‘Are you currently an active member of a sporting, hobby or community-based association?’
- ‘Do you belong to a trade union or employee association?’

These aspects of the social network are based on the notion of ‘weak’ ties. One key finding in the literature is that weak ties have a more significant impact on finding a job than do ‘strong’ ties. Strong ties are associated with social contacts and resources within an individual’s own network (Barbieri et al. 2000; Lin 1999), while weak ties are classified as contacts individuals have in networks that are distant from the individual’s own network (e.g. close family members who maybe living in the same household). Using a theoretical model, Granovetter (1973) argues that weak ties increase individuals’ economic outcomes as they provide them with information and resources of the distant network.

Given the role social networks play in the labour market outcomes of immigrants,¹⁵ the estimations presented in Table 10 could be used to explore the mechanism through which assimilation has an impact on employment and wages as

¹⁵ See Piracha and Vadean (2013) for a review of this literature.

Table 10 Assimilation index and social network

	Many friends	Socialize often	Club member	Trade member
Pooled:				
Language skills	0.054* (0.030)	0.089*** (0.030)	−0.017* (0.010)	0.002 (0.012)
Glad to live in Australia	0.161*** (0.050)	−0.042 (0.043)	−0.018* (0.010)	−0.003 (0.010)
Ethnic concentration	0.019 (0.022)	0.057*** (0.020)	−0.018*** (0.000)	0.015*** (0.000)
Assimilation index	0.113*** (0.041)	0.158*** (0.041)	−0.053*** (0.013)	0.034*** (0.011)
<i>N</i>	21,974	21,853	21,933	17,467
Men:				
Language skills	0.095* (0.052)	0.020 (0.053)	−0.006 (0.014)	0.002 (0.011)
Glad live in Australia	0.142** (0.072)	−0.060 (0.063)	−0.014 (0.022)	0.001 (0.022)
Ethnic concentration	0.039* (0.023)	0.044** (0.022)	−0.013* (0.010)	0.006 (0.010)
Assimilation index	0.169*** (0.061)	0.088 (0.062)	−0.037** (0.021)	0.014 (0.022)
<i>N</i>	10,224	10,171	10,199	9208
Women:				
Language skills	0.037 (0.042)	0.120*** (0.042)	−0.030** (0.011)	0.001 (0.012)
Glad to live in Australia	0.180*** (0.072)	−0.024 (0.063)	−0.016 (0.022)	−0.011 (0.023)
Ethnic concentration	0.004 (0.023)	0.066*** (0.022)	−0.023*** (0.012)	0.029*** (0.012)
Assimilation index	0.082 (0.064)	0.203*** (0.051)	−0.071*** (0.020)	0.060*** (0.021)
<i>N</i>	11,750	11,682	11,734	8259

Observations are restricted to migrants who are either Australian citizens or permanent residents ages 25–65. Random-effects estimator includes Mundlak correction terms (for a full list of the other covariates, see the description in Table 2). The number of observations applies to both specifications shown for each outcome in each group (pooled, men and women). Standard errors in parentheses: * $p < .1$; ** $p < .05$; *** $p < .01$

well as other outcomes. The first two columns show that more assimilated are likely to have a lot of friends and are more likely to socialize regularly as well, with the differentiated impact of different components of assimilation for males and females. Since more assimilated live in low ethnic concentration areas (one measure of our assimilation index), their friendships are more likely to be with the natives. Similarly, there is a strong negative correlation between club membership, which is typically measured as a membership of co-ethnic clubs and assimilation. This shows that the more likely an immigrant is to be a member of a club the higher the likelihood of him/her finding a ‘bad’ job—lower pay, higher possibility of mismatch, etc. On the positive side though, this avenue of the network could mean finding a job (even if not a ‘good’ job), which might explain some of the results for females. Finally, more assimilated immigrants are likely to have more information about the benefits of belonging to a trade union which could then be helpful in creating job security and also getting better wages. Of course, we cannot rule out reverse causality here: being a trade member helps establish strong links with native co-workers which could result in a higher level of assimilation. However, it is clear that assimilation is strongly associated with

the four social network variables which can help explain the channels through which labour market outcomes are materialized.

6 Conclusions

This paper examined the association between immigrants' social assimilation and their labour market performance in the host country. In order to understand the relationship between assimilation and labour market outcomes, we not only examined employment and wages as outcomes but also immigrants' satisfaction with their employment, especially exploring whether individuals are happy with their job and pay as well as they whether feel to have job security and required number of hours of work. Since the extant literature on overeducation has shown that immigrants are more overeducated than natives, we also explored to what extent assimilation mitigates this negative outcome. Furthermore, we split the longitudinal data set in order to assess whether and how the 2008 financial crisis impacted our results. Finally, we explored the different mechanisms through which assimilation might be associated with our measures of labour market outcomes of immigrants.

For our analysis, we used Household, Income and Labour Dynamics in Australia (HILDA) and identified three measures of assimilation available in the data: (i) language proficiency, (ii) whether an individual is happy to live in Australia (which is our proxy for self-identification) and (iii) ethnic concentration, which captures whether the immigrant lives in a high co-ethnic concentration area. We used the three measures to an assimilation index along the lines of a one-dimensional ethnosizer as in Constant and Zimmermann (2008). We ran estimations for each measure separately as well as with our index. In addition, we ran the three job satisfaction measures with only two assimilation components: language and ethnic concentration.

Using a random-effects model with Mundlak corrections, we first used all the waves of the data together and showed that language proficiency is positively associated with being employed for males while none of the individual measures is significant for females. However, results with the assimilation index show a strong and positive association with being employed as well as with wages for both males and females. This is one proof of the notion that assimilation is a multifaceted concept which cannot be fully captured by migrants' commitment to one response. We also found a negative association with underemployment for females and a negative correlation between assimilation and being overeducated for males. Furthermore, the results showed that assimilation has a strong correlation with different measures of what we call job satisfaction indicators, including happy with the job and pay and have job security. This is a novel and important result as employment is not the only measure of how immigrants' fare in the host country's labour market.

In order to further explore the role of assimilation, we ran the same estimations above for two separate time periods: before and after the financial crisis of 2008/2009. The main aim was to see whether the level of assimilation has a

differentiated impact under different economic conditions. We found that assimilation is still strongly correlated with a number of job satisfaction indicators though there are important differences during an economic boom versus a recession. Results also differ between males and females, especially when economic conditions change with assimilation less important for females' job satisfaction indicators during a recession (i.e. after the financial crisis).

Appendix

Table 11 Years of arrival and countries of origin as of the first wave of HILDA

Country of birth	Years of arrival					Total
	Up to 1949	1950–1970s	1980s	1990s	2000s	
ESB migrants	15	671	263	148	46	1,143
<i>in %</i>	1.31	58.71	23.01	12.95	4.02	100
Germany	0	59	13	9	3	84
	0	70.24	15.48	10.71	3.57	100
Netherlands	0	66	3	4	0	73
	0	90.41	4.11	5.48	0	100
Italy	0	93	1	2	0	96
	0	96.88	1.04	2.08	0	100
Vietnam	0	18	55	31	0	104
	0	17.31	52.88	29.81	0	100
Philippines	0	9	34	36	3	82
	0	10.98	41.46	43.9	3.66	100
China	0	5	22	33	3	63
	0	7.94	34.92	52.38	4.76	100
India	0	16	11	24	4	55
	0	29.09	20	43.64	7.27	100
Other NESB	2	383	252	258	50	945
	0.21	40.53	26.67	27.3	5.29	100
Total	17	1,320	654	545	109	2,645
	0.64	49.91	24.73	20.6	4.12	100

ESB and NESB stand for English-speaking background and non-English-speaking background, respectively.

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Declarations

Conflict of interest The authors declare no competing interests.

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