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Skilled migration policy and the labour market performance of immigrants

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ABSTRACT

This working paper examines whether migration policy, in addition to managing a country's population size, is a suitable tool to influence immigrants' labour market outcomes. It exploits a migration policy change that occurred in Australia in the late 1990s and data collected by the Longitudinal Survey of Immigrants to Australia. The statistical techniques employed in the empirical analysis consistently reveal that the policy change has no detectable impact on the employment rate, wages, over-education, occupational downgrading, and self-reported use of skills for male immigrants, who account for about 75 per cent of the sample, while they have a modest short-term positive impact on female immigrants. These results support the view that migration policy is an ineffective policy tool to influence migrants' labour market outcomes. However, the economic relevance of making an effective use of migrants' skills provides scope for close coordination between immigration and employment policy to ensure that efforts in attracting foreign talent are not dissipated by labour market frictions and other inefficiencies.

INTRODUCTION

Australia has the world's largest skilled migration program. The annual inflow of skilled foreign workers is about 1 per cent of Australia's population, and an even higher proportion of its skilled labour force. Despite the potential competition with skilled natives, over the past three decades Australia has experienced wage growth and returns to higher education unparalleled in any other advanced economy.

Yet, the labour market outcomes for many foreign-educated migrants are substantially and stubbornly below those of comparably educated natives. The incidence of skill mismatch (over-education) among university-educated foreign workers in Australia is as high as 40–50 per cent versus 10–20 per cent among comparable domestic workers, placing Australia on equal footing with countries that do not implement selective immigration policies.¹ This evidence is counterintuitive, as selective policies are designed to admit only the most productive migrants. Skill mismatch is also inefficient: migrants' economic under-achievement costs Australia potential income, spending for consumption and investment, and taxation revenue, and could compromise its ability to compete with other countries in attracting and effectively using the best foreign talent available.

Can migration policy be used as a tool to address immigrants' education–occupation mismatch? This question is addressed by exploiting a migration policy change that occurred in Australia in the late 1990s and a detailed migrant survey that took place at the time. The survey is used to analyse the effect of the policy change on immigrants' labour market outcomes using various quantitative techniques.

The migration policy change occurred between two cohorts of immigrants surveyed in detail by the Longitudinal Survey of Immigrants to Australia (LSIA). This makes this particular policy change unique as the available data can be used to identify changes due to time effects and other determinants of immigrants' labour market outcomes.

This working paper focuses on five indicators of labour market performance: employment rate (the probability of finding employment); occupational downgrading; wages; whether the job carried out requires a lower level of education than the one held by the migrants (over-education); and a self-reported use of skills. The paper begins with a short review of the economics literature focusing on migration policy and the use of selective admission criteria. It then describes Australia's immigration policy change in the late 1990s, and presents data from the LSIA and the results of the analysis of the effects of the policy change on labour market outcomes.

MIGRATION AS SELF-SELECTION: INCOME, SKILLS, AND EDUCATION

Economics-based studies tend to view migration as an individual decision, resulting from a rational cost-benefit analysis in which the net expected benefits that can be gained by staying in the home country are compared to those obtained by moving abroad. Migration occurs if the latter are greater than the former.² As individuals differ in innate and demographic characteristics and circumstances, migrating does not occur at random in the population, but characterises a subgroup of self-selected individuals.

¹ Colin Green, Parvinder Kler and Gareth Leeves, "Immigrant Overeducation: Evidence from Recent Arrivals to Australia", *Economics of Education Review* 26, Issue 4 (2007), 420–432; Anke Schuster, Maria Vincenza Desiderio and Giuliana Urso (eds), *Recognition of Qualifications and Competences of Migrants* (Geneva: International Organization for Migration, 2013).

² Larry Sjaastad, "The Costs and Returns of Human Migration", *Journal of Political Economy* 70, No 5, Part 2 (1962), 80–93.

The literature has exploited the notion of self-selection into migration to identify the type of migrants attracted to different countries.³ Average differences in incomes between home and host countries play a critical role in determining who migrates where, as does the quality of the information set facing migrants. If information is complete and average incomes at home are below those of the host for each level of skill, then every home citizen will have an incentive to emigrate. However, if home and host countries place a similar value on skills, average incomes per capita will be similar, and the most skilled individuals will migrate to the country with the higher income inequality to increase the economic benefit they receive for their skills. Conversely, the least skilled will migrate to the country with a compressed income distribution to maximise the economic benefits for their skills. If the information is incomplete or imperfect then 'irrational' migration behaviours can occur.⁴

A selective immigration policy becomes relevant to the host country's decision to impose restrictions about the type of migrant allowed to stay if the host country has a relatively high average income compared with the home country (most home citizens would want to emigrate), a compressed income distribution (low-skill home citizens want to emigrate), and a comprehensive welfare system for its low-income earners.⁵ Keeping out low-skill immigrants in favour of skilled immigrants may not only 'protect' the host country's welfare system and address its domestic employers' needs, but may also stabilise income inequality trends between skilled native and unskilled native workers. This is because the earnings growth of skilled immigrants will be constrained (as there will be a large supply of them), whereas unskilled native workers will be in shorter supply and therefore will command higher wages.

A new strand of literature argues that restricting migration could be efficient because it prevents migrants from low-income countries 'transmitting' low productivity to high-income countries. However, a recent study suggests that current restrictions to migration are still excessive for the 'low productivity contagion hypothesis' to be supported based on current migrant flows.⁶

In practice, countries such as Australia, Canada, and New Zealand limit the inflow of migrants using a point system.⁷ This is typically based on level of education, language proficiency, and age. However, the effects

³ AD Roy, "Some Thoughts on the Distribution of Earnings", *Oxford Economic Papers* 3, No 2 (1951), 135–146; George Borjas, "Self-selection and the Earnings of Immigrants", *American Economic Review* 77, No 4 (1987), 531–553; George Borjas, "Immigration Policy, National Origin, and Immigrant Skills: A Comparison of Canada and the United States", NBER Working Paper No 3691, April 1991.

⁴ See, for example, Linguère Mously Mbaye, "Barcelona or Die: Understanding Illegal Migration from Senegal", *IZA Journal of Migration* 3, No 21 (2014), 1–19, <https://izajom.springeropen.com/articles/10.1186/s40176-014-0021-8>.

⁵ Massimiliano Tani, "Using a Point System for Selecting Immigrants", *IZA World of Labor*, May 2014, <https://wol.iza.org/uploads/articles/24/pdfs/using-a-point-system-for-selecting-immigrants.pdf?v=1>.

⁶ Michael Clemens and Lant Pritchett, "The New Economic Case for Migration Restrictions: An Assessment", IZA Discussion Paper No 9730, February 2016.

⁷ The selected criteria of a point system typically arise from the findings of applied research on migration and surveys of immigrants to determine the ingredients for successful economic assimilation. Points are assessed based on short-term labour market criteria, such as having skills in high demand domestically, and desirable individual characteristics, such as youth, education, and language proficiency. Once applicants pass the point test, they must still meet additional minimum standards in other areas including health and good character. The economic principle underpinning the point system is to identify prospective immigrants' net benefit to the host country (their effect on gross domestic product or public finances), which has to be positive. As a result, points are awarded to younger immigrants, who can potentially contribute for longer to the public finances through income taxes and are less likely to need welfare assistance in the short term. Points are also given to applicants with high levels of formal education or vocational training, as their human capital can be employed without further training costs for the host country. These characteristics are also associated with high levels of adaptability and mobility, which help to minimise time out of the labour force. Furthermore, points are awarded for proficiency in the host country's language, as this reduces retraining costs and facilitates rapid economic and social integration. Canada,

of such restrictions are debatable,⁸ especially regarding level of education and the influence of immigration policies on the self-selection process from both a theoretical and an empirical perspective.⁹ Studies suggest that imposing minimum educational requirements raises the educational profile of immigrants, but this does not guarantee better labour market outcomes. For example, screening potential migrants on the basis of observable characteristics, in particular education, may reduce the quality of admitted migrants because education also influences migrants' self-selection on variables that are not measured, such as ability and motivation.¹⁰ An increase in selectivity based on education may lead to admitting less able and less motivated migrants.

This working paper adds to existing work that aims to draw general conclusions on the labour market effects of migration policy by studying the effect of a specific policy change in Australia. The policy change, which is well documented in the literature,¹¹ tightened entry conditions for applicants in the skilled independent and concessional family visa categories, but not in the preferential family, employer

Australia, and New Zealand each award points to prospective immigrants in different ways, assigning different weights to desired characteristics that reflect the evolution of migration policy objectives.

⁸ See, for example, Borjas, "Self-selection and the Earnings of Immigrants"; Heather Antecol, Deborah Cobb-Clark, Stephen Trejo, "Immigration Policy and the Skills of Immigrants to Australia, Canada, and the United States", *Journal of Human Resources* 38, Issue 1 (2003), 192–218; Daniel Chiquiar and Gordon Hanson, "International Migration, Self-selection, and the Distribution of Wages: Evidence from Mexico and the United States", *Journal of Political Economy* 113, Issue 2 (2005), 239–281; Guillermina Jasso and Mark Rosenzweig, "Selection Criteria and the Skill Composition of Immigrants: A Comparative Analysis of Australian and US Employment Immigration", in Jagdish Bhagwati and Gordon Hanson (eds), *Skilled Migration Today: Prospects, Problems, and Policies* (New York: Oxford University Press, 2009); Jesús Fernández-Huertas Moraga, "New Evidence on Emigrant Selection", *Review of Economics and Statistics* 93, Issue 1 (2011), 72–96; J William Ambrosini and Giovanni Peri, "The Determinants and the Selection of Mexico–US Migrants", *The World Economy* 35, Issue 2 (2012), 111–151; Vianney Dequiedt and Yves Zenou, "International Migration, Imperfect Information, and Brain Drain", *Journal of Development Economics* 102 (2013), 62–78; Robert Kaestner and Ofer Malamud, "Self-selection and International Migration: New Evidence from Mexico", *Review of Economics and Statistics* 96, Issue 1 (2014), 78–91.

⁹ For determinants of selection on education, see David McKenzie and Hillel Rapoport, "Self-selection Patterns in Mexico–US Migration: The Role of Migration Networks", *Review of Economics and Statistics* 92, Issue 4 (2010), 811–821; Michel Beine, Frédéric Docquier and Cecily Oden-Defoort, "A Panel Data Analysis of the Brain Gain", *World Development* 39, No 4 (2011), 523–532. For a theoretical perspective, see Frédéric Docquier, Olivier Lohest and Abdeslam Marfouk, "Brain Drain in Developing Countries", *World Bank Economic Review* 21, Issue 2 (2007), 193–218.; Simone Bertoli and Herbert Brücker, "Selective Immigration Policies, Migrants' Education and Welfare at Origin", *Economics Letters* 113, No 1 (2011), 19–22; Simone Bertoli and Hillel Rapoport, "Heaven's Swing Door: Endogenous Skills, Migration Networks, and the Effectiveness of Quality-selective Immigration Policies", *Scandinavian Journal of Economics* 117, No 2 (2015), 565–591. For an empirical perspective, see Antecol et al, "Immigration Policy and the Skills of Immigrants to Australia, Canada, and the United States"; Jasso and Rosenzweig, "Selection Criteria and the Skill Composition of Immigrants: A Comparative Analysis of Australian and US Employment Immigration"; Abdurrahman Aydemir, "Immigrant Selection and Short-term Labour Market Outcomes by Visa Category", *Journal of Population Economics* 24, Issue 2 (2011), 451–475; Michèle Belot and Timothy Hatton, "Immigrant Selection in the OECD", *Scandinavian Journal of Economics* 114, Issue 4 (2012), 1105–1128.

¹⁰ Simone Bertoli, Vianney Dequiedt and Yves Zenou, "Can Selective Immigration Policies Reduce Migrants' Quality?", *Journal of Development Economics* 119 (2016), 100–109.

¹¹ See, for example, Deborah Cobb-Clark, "Public Policy and the Labor Market Adjustment of New Immigrants to Australia", *Journal of Population Economics* 16, Issue 4 (2003), 655–681; Sue Richardson et al, "The Changing Settlement Experience of New Migrants", Report to the Department of Immigration and Multicultural and Indigenous Affairs, National Institute of Labour Studies, Flinders University, June 2004; PJ Thapa and T Gørgens, "Finding Employment after Migration: How Long does it Take?", in Deborah Cobb-Clark and Siew-Ean Khoo (eds), *Public Policy and Immigrant Settlement* (Cheltenham: Edward Elgar Publishing Ltd, 2006), 219–229; Raja Junankar and Stéphane Mahuteau, "Do Migrants Get Good Jobs in Australia? The Role of Ethnic Networks in Job Search", *Economic Record* 84, Issue s1 (2008), S115–S130.

nomination, and humanitarian streams.¹² This differential treatment across visa categories offers a unique opportunity to identify the effect of the policy change on applicants and address the key question of this paper: is migration policy a suitable tool to influence not only a country's population size (the main objective of migration policy) but also the labour market performance of its immigrants?

AUSTRALIA'S IMMIGRATION POLICY CHANGE IN THE LATE 1990S

In 1996 the newly elected Howard government introduced a number of significant changes to Australia's migration policy, affecting some visa categories in the skilled and family reunification streams but not the remaining migration channels.¹³ The new policy:

- abolished the social security benefit to new immigrants in the first two years after their arrival, as well as access to the Adult Migrant English Program, whose costs were to be met by the immigrant, and labour market programs, whose costs were to be repaid after securing work
- allocated the highest points weighting to employability factors, namely skills, age, and English-language ability. Age-related points for applicants over the age of 45 were abolished while bonus points were awarded to those with relevant Australian or international professional work experience, a job offer, a spouse meeting the skill application criteria, an Australian sponsor who had agreed to provide a guarantee, and A\$100,000 or more in capital
- introduced additional points for occupations in demand in addition to degree-level specific qualifications, and bonus points for qualifications obtained recently in Australia
- outsourced pre-migration qualification screening to professional bodies, which could disqualify non-English speaking background (NESB) applicants from eligibility for skill migration.

The effect of this policy change has been examined in detail by previous studies, which compare the outcomes of the first cohort of the LSIA, who arrived in Australia prior to the policy change between 1993 and 1995 (LSIA1), with those of the second cohort, who arrived after the change between 1999 and 2000 (LSIA2). These studies offer a mixed picture of the policy's effects on migrants' labour market outcomes. In line with the policy's aims, the second cohort had better education levels compared to the first cohort (in particular higher university degrees at the time of arrival), higher workforce participation rates,¹⁴ and lower durations to access their first job.¹⁵ However, the job quality of the second cohort is markedly inferior to that of the first, with widespread occupational downgrade.¹⁶ This is partly attributed to the worsening macroeconomic conditions faced by migrants surveyed in the second cohort.

¹² For more on the policy change, see, for example, Cobb-Clark, "Public Policy and the Labor Market Adjustment of New Immigrants to Australia"; Richardson et al, "The Changing Settlement Experience of New Migrants"; Thapa and Gørgens, "Finding Employment after Migration: How Long does it Take?"; Junankar and Mahuteau, "Do Migrants Get Good Jobs in Australia? The Role of Ethnic Networks in Job Search".

¹³ Lesleyanne Hawthorne, "Picking Winners: The Recent Transformation of Australia's Skill Migration Policy", *International Migration* 39, No 3 (2005), 663–696.

¹⁴ Cobb-Clark, "Public Policy and the Labor Market Adjustment of New Immigrants to Australia"; Barry Chiswick and Paul Miller, "Immigration to Australia during the 1990s: Institutional and Labour Market Influences", in Deborah Cobb-Clark and Siew-Ean Khoo (eds), *Public Policy and Immigrant Settlement* (Cheltenham: Edward Elgar Publishing Ltd, 2006), 121–148.

¹⁵ Thapa and Gørgens, "Finding Employment after Migration: How Long does it Take?".

¹⁶ Junankar and Mahuteau, "Do Migrants Get Good Jobs in Australia? The Role of Ethnic Networks in Job Search".

DATA: LONGITUDINAL SURVEY OF IMMIGRANTS TO AUSTRALIA (LSIA)

The LSIA is an extensive longitudinal survey of migrants to Australia commissioned in the 1990s to collect better information on the settlement of new immigrants relative to what was available through the national census.¹⁷ The survey is based on a representative sample of 5 per cent of permanent migrants from two successive cohorts.¹⁸ Despite being a very short panel (two years), the LSIA captures valuable information about migrants' conditions prior to moving and during the initial stages of settlement in Australia.¹⁹

To improve the comparability between the first and second cohort and focus on labour market outcomes, the sample is restricted to working-age primary applicants (20 to 65 year olds). Additional restrictions include the removal of observations with missing occupational data and information on the education–occupation mismatch in the year before migration, which is used as a proxy for ability.

Figures 1–5 in Appendix B present some salient features of the five labour market outcomes used in the empirical analysis measured as of the first wave of LSIA1 and LSIA2 (about six months after settlement in Australia): employment rate, wage, incidence of over-education, self-assessed use of skills, and occupational downgrading. As found by previous research, the employment rate in the second cohort is higher, but the other labour market indicators do not show substantial improvements in the visa classes affected by the policy change, despite the marked shift towards better qualified, English-proficient immigrants in these streams.

Table 1 reports the mean and standard deviation of key variables measured as of the first wave of the sample by cohort (before/after the policy change) and visa class (affected/not affected visa categories). Migrants in affected and not affected visa categories are different in many respects, including in their labour market outcomes, demographic and educational characteristics, places of origin, and residential choices post-migration. These differences are used as controls in the quantitative analysis.

Since the effect of time is measured by membership to the cohort (first/second) and that of immigration policy by the visa class, the effect of the change in immigration policy arises from their interaction: namely, the change in the difference between the second and first cohort of affected and not affected groups ('difference in differences' or DiD).²⁰ This indicator is reported in the last column of Table 1, and its values across migrant characteristics may be interpreted as (unconditional) effects of the policy change.

¹⁷ For a full description of the LSIA, see Deborah Cobb-Clark, "The Longitudinal Survey of Immigrants to Australia", *Australian Economic Review* 34, Issue 4 (2001), 467–477.

¹⁸ LSIA1 surveys migrants who arrived between September 1993 and August 1995 and is composed of three waves collected between 4 to 6 months after settlement and up to 41 months after. LSIA2 surveys immigrants who arrived between September 1999 and August 2000 and contains two waves collected between 4 to 6 months after settlement and about 15 months later. A third cohort, LSIA3, was collected using a substantially reduced version of the questionnaire. These data are not suitable for the analysis carried out in this paper and are therefore not used. The LSIA oversamples some groups of individuals notably on visa categories. The humanitarian (refugee) category is over-represented but the weights to recover population statistics are available in the database.

¹⁹ One of the strengths of the LSIA is the information it provides prior to migration, including the occupation at a 4-digit code in the last job prior to migrating and the job subsequently carried out in Australia. The LSIA has a number of limitations. It surveys a relatively small sample, so that categories within relevant explanatory variables often need to be aggregated. It covers neither native Australians nor New Zealanders, who face no work restrictions if settling in Australia, forcing comparisons only between different immigrant groups. It does not cover onshore applicants, such as international students already in Australia, whose contribution to the skilled independent immigrant flow has been substantial since the early 2000s.

²⁰ The 'difference in differences' is defined as: $(C2_a - C1_a) - (C2_{na} - C1_{na})$ where $C1$ and $C2$ indicate the first and second cohort of the LSIA, respectively, and the subscripts a and na refer to whether or not the migrant was affected by the policy change.

Table 1: Unconditional means in the working sample

	Cohort 1 (pre-change)		Cohort 2 (post-change)		DiD*
	Not affected	Affected	Not affected	Affected	
Employment rate	.605 (.489)	.667 (.471)	.799 (.401)	.871 (.336)	+0.010
Occupational downgrading (ASCO 2)	8.35 (25.7)	6.64 (24.1)	8.23 (23.9)	7.21 (22.0)	+0.113
Wage	3.696 (.788)	3.780 (.699)	3.683 (.635)	3.880 (.543)	-0.025
Over-education	.169 (.375)	.268 (.443)	.213 (.410)	.287 (.453)	+0.104
Use of skills	.587 (.355)	.562 (.337)	.603 (.372)	.682 (.349)	+0.690
Age	34.3 (10.67)	33.6 (6.63)	36.0 (10.64)	33.8 (6.50)	-1.530
Female	.488 (.500)	.265 (.441)	.491 (.500)	.343 (.475)	+0.075
Secondary schooling or below	.447 (.497)	.052 (.222)	.398 (.490)	.068 (.252)	+0.065
Vocational diploma	.258 (.437)	.369 (.483)	.285 (.451)	.293 (.456)	-0.103
Tertiary education or above	.296 (.456)	.578 (.494)	.317 (.465)	.638 (.481)	+0.039
Interview in English	.492 (.500)	.804 (.397)	.545 (.498)	.950 (.219)	+0.093
Born in North Europe or North America	.146 (.353)	.230 (.421)	.184 (.388)	.268 (.443)	+0.000
Born in South and East Europe or Middle East and North Africa	.348 (.476)	.208 (.406)	.338 (.473)	.108 (.311)	-0.090
Born in Asia	.347 (.476)	.424 (.494)	.345 (.476)	.423 (.494)	+0.001
Born elsewhere	.158 (.365)	.138 (.345)	.132 (.339)	.201 (.401)	+0.089
Living in Tas/Vic	.706 (.455)	.700 (.458)	.669 (.471)	.703 (.457)	+0.040
Living elsewhere	.294 (.455)	.300 (.458)	.331 (.471)	.297 (.457)	-0.034
No of observations	3,229	1,492	2,096	556	7,373

Notes: Source first wave of LSIA1 and LSIA2

* The difference in differences (DiD) is defined as $(C2_a - C1_a) - (C2_{na} - C1_{na})$

Some general features of affected and not affected groups are outlined below as well as differences across cohorts and the unconditional effects of the policy change.

The affected visa categories comprise immigrants selected through Australia's point system and include mostly highly educated migrants under the age of 45. It is therefore not surprising that those in the affected visa category in both cohorts are predominantly males, younger, have a higher incidence of tertiary education, and better English-language skills than those in the not affected visa category, who are predominantly migrants reunifying with family already in Australia. The affected groups also include a larger proportion of migrants who originate from Asia and settle in the more urbanised states in Australia, where the largest cities and the national capital are located.

With reference to changes over time between the first and second cohort, the affected groups are characterised by an increased proportion of female primary applicants,²¹ higher rates of tertiary educated, and migrants with a better command of English. They also experience better labour market outcomes, especially in terms of employment rate, wages, and use of skills. However, they are also characterised by a higher incidence of over-education and occupational downgrading.

In the second cohort, the migrants in the not affected visa categories tend to be older, better educated, and have better English-language skills than those of the first cohort. They also experience better employment rates and skill usage although their probability of over-education is also higher.

The key indicator of the policy change, the last column of Table 1, shows that affected migrants in the second cohort are younger, have better knowledge of English, and a higher probability of holding a university degree (although secondary schooling only is also more likely). Labour market outcomes are mixed: the employment rate is higher and so is the self-assessed use of skills but the other indicators point to worsened conditions as over-education and occupational downgrading are more prevalent, while wages are lower. Of course, as these results are obtained from unconditional means, they therefore cannot be relied on as the potential influence of the other observed (but omitted) variables summarised in Table 1 is masking the underlying relationship of interest.

WHAT THE REGRESSION MODEL TELLS US

In order to provide a general test of whether immigration policy influences migrants' labour market performance, the empirical analysis employs four different techniques widely used in the literature to detect causality in survey data (these are presented in some detail in Appendix A). It also makes use of two different data specifications: the cross-section capturing only the first wave of each cohort; and the panel dimension of the LSIA capturing the first two waves of each cohort.

²¹ Under Australia's point system, the primary applicant is the household member with the highest score. As most points are given for young age using a scale reducing to zero for the age of 45, it is likely that the primary applicant of a tertiary-educated and working couple where the male partner is beyond some intermediate age cut-off is actually female.

This combination of data specification and technique generates several regressions, each using wage as a dependent variable and the following independent variables:

- individual characteristics:
 - education level (secondary schooling and below, vocational, tertiary)
 - age group (four categories: 25–34, 35–44, 45–49, and 50–65)
 - English-language proficiency based on whether the LSIA interview was conducted in English or in another language
 - main regions of origin (four categories: North Europe/North America, South and East Europe/Middle East and North Africa, Asia, and rest of the world)
 - state of residence after settlement (two categories: Tas/Vic and Other)
- control variables such as which cohort the migrant belongs to. This indicator also captures the economic conditions at the time the migrants settled in Australia.

For analyses based on panel data, two additional indicators are included:

- a variable that controls for the particular wave in which data was collected
- a dummy variable for each individual surveyed, which controls for unobserved but time-invariant individual characteristics.

Table 2 shows the estimated link between a change in immigration policy and migrants' labour market outcomes controlling for all the observed covariates above. It summarises 60 separate regressions — one for each labour market outcome, by gender,²² and across various techniques. Only the key relationship of interest is analysed: namely whether migration policy affects migrants' subsequent labour market outcomes.

²² Separate results are reported for males and females to provide more detailed analysis.

Table 2: Regression results

Model	Cross-section (first wave)			Panel (first and second wave)		
	1	2	3	4	5	6
Males			(.2–.6)			
Employment rate	.059* (.031)	–.020 (.021)	.032 (.022)	.037* (.022)	.039 (.026)	.034 (.026)
Occupational downgrading	2.36 (1.89)	.422 (1.038)	1.17 (1.24)	2.47 (1.94)	n.m.	n.m.
Wage (ANU job score)	.012 (.054)	–.046 (.037)	–.051 (.046)	.005 (.046)	.010 (.048)	.004 (.048)
Over-education	.018 (.036)	.034 (.021)	.028 (.028)	.033 (.031)	.036 (.030)	.038 (.029)
Use of skills	.052 (.035)	–.021 (.021)	–.010 (.025)	.055* (.029)	.052* (.029)	.050* (.028)
Females			(.2–.4)			
Employment rate	–.006 (.048)	.042 (.030)	.114** (.048)	–.031 (.032)	–.039 (.038)	–.043 (.038)
Occupational downgrading	–3.58 (2.76)	–4.69** (1.90)	–1.42 (2.56)	–3.23 (2.80)	n.m.	n.m.
Wage (ANU job score)	.157** (.071)	.242*** (.053)	.232*** (.064)	.091 (.056)	.086 (.060)	.087 (.057)
Over-education	–.105* (.056)	–.155*** (.044)	–.200*** (.057)	–.052 (.045)	–.051 (.043)	–.053 (.043)
Use of skills	.140*** (.051)	.142*** (.034)	.162*** (.043)	.067* (.041)	.072* (.039)	.072* (.039)

Notes: Source first and second waves of LSIA1 and LSIA2

***, **, and * indicate whether the estimate is statistically significantly different from zero at the 1%, 5%, and 10% level of significance
n.m. = not meaningful

Models (1) to (6) are as follows: (1) ordinary least squares (OLS); (2) propensity score matching (unrestricted scores); (3) propensity score matching (central scores only); (4) pooled OLS; (5) random effects; (6) random effects with Mundlak correction. See Appendix A for a description of each model.

A few general observations linking the results to the findings of the previous literature are worth noting before discussing the overall picture that emerges from Table 2. First, the increase in employment rate documented by previous studies²³ is partly confirmed when policy-evaluation specific techniques are applied, but it arises only for males and in models 1 and 4 applying a low significance level (10 per cent). No detectable effect on employment rate emerges when the effect of the policy change is estimated using estimators that better control for individual heterogeneity (models 2, 3, 5, and 6). In the case of females, the only notable effect on employment arises using model 3. These outcomes imply a very modest effect, if any, of the policy change on the short-term employment prospects of the immigrants of the second cohort.

Second, in contrast to employment rate, the policy change seems to have had mixed effects on occupational downgrading:²⁴ there is no effect in the case of men, where the estimate is positive (implying that the occupation after migration is lower in the occupation scale than what was held before migrating) but statistically equivalent to zero.

The effect of the policy change on occupational downgrading is negative and significant in the case of females but only in model 2. This result implies that after migrating, women take up jobs that are on a substantially lower level of the occupational scale relative to what they were performing in their countries of origin. However, part of this result may be attributed to the characteristics of the migrants rather than the effect of the policy change due to a composition effect of the groups analysed by model 2. Furthermore, the effect of migration policy on occupational downgrading for women appears mixed across estimation techniques, suggesting additional caution in interpreting the result as conclusive that the policy change was principally responsible for the negative outcome observed.

Third, in relation to wages, over-education, and use of skills, the policy change has affected immigrant men and women differently. In particular, the policy had no detectable statistical effect on the three indicators in the case of immigrant men in all models reported in Table 2. The small effect observed in the use of skills in models 5 and 6 indicates better matches between education and occupation, but it could arise from changing job or employer rather than being the effect of the policy change.

In contrast, the policy change seems to have significantly raised the wage and the use of skills, and lowered the degree of over-education among immigrant women, although only at the time of the first wave. This outcome likely reflects the higher proportion of unmarried women of working age in the second cohort (49 per cent vs 27 per cent in the first cohort), which could be the result of concurrent circumstances characterising immigrant trends in addition to the policy change examined. None of these results holds in the panel data analysis, where the estimation controls for unobserved individual characteristics that do not change over time. This suggests that results attributable to the effect of the policy change in models 1 to 3 may be caused by unobserved variables that affect migrants' quality rather than the policy change (e.g. higher volume of international students qualifying for a permanent visa at the time of the second cohort).

Overall, the estimates of the effects of the immigration policy change on migrants' labour market outcomes in Table 2 are remarkably consistent, with most results statistically no different from zero, and only a handful of exceptions in the case of females. In the case of males, the policy change appears to have had no detectable effect on the five indicators of labour market performance regardless of whether using cross-sections or panel data techniques. The modest increase in the self-reported use of skills is confined to models 5 and 6, which cover a longer period of time during which migrants had the opportunity to gain

²³ Richardson et al, "The Changing Settlement Experience of New Migrants"; Cobb-Clark, "Public Policy and the Labor Market Adjustment of New Immigrants to Australia".

²⁴ Junankar and Mahuteau, "Do Migrants Get Good Jobs in Australia? The Role of Ethnic Networks in Job Search".

labour market experience and complete additional educational and professional qualifications in Australia. With reference to the other indicators of performance, the policy change has no statistical effect on salaries, over-education (where the sign points to worsening conditions relative to those occurring before the policy change), and skills usage.

In the case of females, the improvement across indicators of labour market performance only in the first wave of both cohorts may be caused by unobserved variables that affect migrants' quality but are unrelated to the policy change, such as an increase in the number of female international students completing their degrees in Australia and applying for permanent migration. Alternatively, this may reflect aspects of the policy change that are only corollary to immigration policy, such as the deferred access to welfare and/or heightened skill shortages in Australia, particularly in scientific and engineering jobs.²⁵ These changes may have prompted women to find a better education–occupation match in the labour market.

LABOUR MARKET POLICY vs IMMIGRATION POLICY

The results in Table 2 show that the immigration policy change of the late 1990s had no real impact on the labour market performance of affected immigrants. Indeed, this is the key message of the analysis, notwithstanding that the results are obtained from an imperfect database covering only the very short term.

This conclusion raises the question of what set of policy tools could be used to influence migrants' labour market outcomes. One answer is labour market policy, which broadly ensures the proper functioning of the labour market. In the case of migrants, employment departments guarantee the respect of legislation and established practices, ensuring, for example, that migrants' employment reflects the laws of the country, and that they have access to the same rights and responsibilities enjoyed by native workers. Employment departments are therefore the obvious regulatory body to oversee whether the skills brought by immigrants, especially highly educated migrants, are efficiently used, and whether policy intervention is necessary.

Such responsibilities are markedly different from those of immigration departments. Broadly speaking, immigration departments administer the orderly management of population inflows, but in countries that operate a selective immigration policy, such as Australia, Canada, and New Zealand, they also carry out the immigration selection mechanism, deciding whether applicants meet stated selection criteria. Immigration departments ultimately determine migrants' skill composition, which they regularly review using research covering economic and other aspects of integration. This has limited effect on outcomes once immigrants enter the host country's labour market, as shown by the results reported in Table 2.

This consideration raises another question: namely, to what extent is it desirable for immigration and employment policies to coordinate their aims and policy tools, at least with respect to migrants undergoing a selection process? The division of policy responsibility between immigration departments attracting foreign talent and employment departments ensuring its efficient usage in the labour market can generate discrepancies if carried out independently from each another. This presents a cost for the migrants, who may spend additional time working in jobs for which they are overqualified before their skills are properly utilised and rewarded. It also presents a cost for the host country due to the inefficient valuation of its immigrants' skills once they join the workforce.

The results of the analysis in this paper suggest that immigration and employment policymakers could benefit from working together to address issues around recruiting foreign talent and ensuring the

²⁵ See reports prepared by the Australian Industry Group (*World Class Skills for World Class Industries*, 2004), the Department of Employment and Workplace Relations (*Workforce Tomorrow: Adapting to a More Diverse Australian Labour Market*, 2005), and the Department of Education, Science and Technology (*Audit of Science, Engineering, and Technology Skills*, 2006).

subsequent utilisation of that talent in the labour market. Examples of collaborative work could include the development of accreditation programs to ease the path into licensing for foreign-trained professionals, English-language support, or access to finance for new start-ups. Coordination between immigration and employment policies is important as the costs of going it alone are not only borne by immigrants and their families, but also by the host society at large, which does not benefit from the skills and talent that were selected (at some) cost and had been made available for use in the host country.

While issues related to the efficiency of the labour market do not appear to be at the forefront of migration policies, including in Australia, at times of sluggish economic growth even a small forward step in improving efficiency in migrants' skill utilisation can make a substantial positive contribution to a country's economy.

APPENDIX A

METHODOLOGY: AVERAGE TREATMENT EFFECT ON THE TREATED (ATT)

The fundamental evaluation problem of measuring the effect of a policy change is that only one of the outcomes of a treatment for an individual can be observed.²⁶ This occurs because an individual can only be observed as either treated or untreated, not in both states at once.²⁷ As noted by Athey and Imbens, “estimates of causal effects are ultimately based on comparisons of different units with different levels of the treatment”.²⁸

To mitigate this issue, the literature has developed alternative strategies to generate suitable counterfactual groups by focusing on average treatment effects at the level of population, and especially on the ‘average treatment effect on the treated’ (ATT). This is defined as:

$$T_{ATT} = E(T | D = 1) = E[Y(1) | D = 1] - E[Y(0) | D = 1]$$

The ATT can be estimated directly if assignment to treatment is randomised so that the average effect on the untreated when treated $E[Y(0) | D = 1]$, which is not observed, can be replaced by the average effect on the untreated $E[Y(0) | D = 0]$. However, as the decision to migrate is highly unlikely to be random in the population, the estimate of the ATT is possible only by assuming some additional identifying premises. I follow four well-established alternative approaches.²⁹

The first is to focus on the pooled cross-sections collected in the first wave of LSIA1 and LSIA2 using a ‘before-after estimator’,³⁰ whereby the before and after migration difference between affected and not affected is identified with the policy change in the statistical model:

$$Y_i = a + X_i b + c C_2 + d V_i + f C_2 V_i + \varepsilon_i \quad (1)$$

where X_i is a set of individual characteristics of migrant i that includes age, gender, education level, country of origin, and state of residence after settlement; C ($= 0,1$) indicates whether the migrant belongs to the second cohort, which migrates after the policy change; V_i ($= a, na$) indicates whether the visa used to migrate is affected by the policy change occurring between the two cohorts; the interaction term $C_2 V_i$ is equal to 1 for migrants affected by the policy change surveyed in the second cohort and 0 otherwise; and ε_i is an idiosyncratic error term. The parameter of interest is f as it measures the effect of the policy change

²⁶ Marco Caliendo and Sabine Kopeinig, “Some Practical Guidance for the Implementation of Propensity Score Matching”, *Journal of Economic Surveys* 22, Issue 1 (2008), 31–72; Roy, “Some Thoughts on the Distribution of Earnings”; Donald Rubin, “Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies”, *Journal of Educational Psychology* 66, No 5 (1974), 688.

²⁷ Indicating with D a binary indicator for the treatment for individual i (1 if treated and 0 otherwise) and with $Y_i(D_i)$ the outcome of interest, the individual treatment effect is $T_i = Y_i(1) - Y_i(0)$ but only $Y_i(1)$ if treated or $Y_i(0)$ if not treated can be measured.

²⁸ Susan Athey and Guido Imbens, “The State of Applied Econometrics: Causality and Policy Evaluation”, *Journal of Economic Perspectives* 31, No 2 (2017), 4.

²⁹ Myoung-jae Lee and Changhui Kang, “Identification for Difference in Differences with Cross-sections and Panel Data”, *Economics Letters* 92 (2006), 270–276; Guido Imbens and Jeff Wooldridge, “What’s New in Econometrics? Difference-in-Differences Estimation”, Lecture Notes 10, NBER Summer Institute, 2007, http://www.nber.org/WNE/lect_10_diffindiffs.pdf.

³⁰ In Imbens and Wooldridge this is referred to as the “difference-in-differences estimate”: *ibid*, 1, equation (1.2).

on the second cohort. This before-after estimator is obtained by applying ordinary least squares (OLS) to equation (1), and is calculated as:

$$\hat{f} = (\bar{Y}_{Va,C1} - \bar{Y}_{Va,C0}) - (\bar{Y}_{Vna,C1} - \bar{Y}_{Vna,C0})$$

where the subscripts refer to the affected (va) and not affected (vna) groups in the second ($c1$) and first ($c0$) LSIA cohort, respectively. This is exactly the equivalent of the difference-in-differences (DiD) indicator reported in Table 1, but conditioned on other observed determinants of labour market outcomes.

One drawback of this approach is the assumption that the sampling error arising from measuring the means of each subgroup is the only type of uncertainty of the inference carried out. In reality, it is possible that other sources of error (e.g. sampling selection, clustering) interfere with the quality of the sample used, and could potentially be a source of bias for the estimates obtained.

An alternative approach is to make recourse to the conditional independence assumption (CIA), which states that for a given set of observed covariates that do not depend on the policy change, the outcome of interest is independent of whether or not an individual belongs to the particular group affected by the change. When this occurs, it is possible to obtain a counterfactual group using a propensity score matching (PSM). This statistical matching technique attempts to reduce the potential bias originating from simply comparing outcomes among individuals that migrate under the visa classes affected by the policy change versus those who did not. In addition to the CIA, PSM requires an overlap of the characteristics observed among migrants affected and not affected by the policy change ('common support')³¹ to ensure that individuals with similar characteristics have a positive probability to migrate in either affected or not affected visa categories. The PSM estimator is the mean difference in outcomes over the common support weighted by the propensity score distribution of the individuals included. The PSM applied in the empirical analysis uses the nearest neighbour matching optimisation algorithm and is obtained by Stata's user-written package *pscore*.³²

A third approach involves exploiting the panel nature of the LSIA for both cohorts, and including the second wave of observations using the model:

$$Y_{it} = \alpha + \sigma t + X_{it}\beta + \gamma C_2 + \delta V_i + \mu C_2 V_i + u_i + \eta_{it} \quad (2)$$

where Y , X , i , C_2 , and V_i are described as for model (1), while t indicates time (survey wave) and $u_i + \eta_{it}$ is a composite error term that includes an individual-specific time-invariant unobserved component (u_i) and an idiosyncratic error term (η_{it}). Model (2) can be estimated by OLS but its main drawback is that the unobserved time-invariant individual heterogeneity is left entirely in the composite error term. This may not be problematic if individual heterogeneity is uncorrelated with the observed covariates. More serious is the possibility of serial correlation in the composite error term as OLS pools data across time. To partially eliminate the problem, I then estimate equation (2) using panel data techniques to control for time-invariant unobserved individual heterogeneity. As the covariate of interest (V_i) is itself time-invariant I apply random effects panel estimation.³³

³¹ Caliendo and Kopeinig, "Some Practical Guidance for the Implementation of Propensity Score Matching".

³² Sacha Becker and Andrea Ichino, "Estimation of Average Treatment Effects Based on Propensity Scores", *The Stata Journal* 2, No 4 (2002), 358–377.

³³ Panel estimation transforms the data by subtracting from each observation a portion θ of its time average, where θ depends on the variance of u_i and η_{it} and the number of periods for which data are observed: Jeffrey Wooldridge,

To relax the assumption of orthogonality between u_i and the observed covariates the suggested (fourth) approach is to augment the random effects model with the time-averaged values of the time-varying variables.³⁴ This leads to the statistical model:

$$Y_{it}^* = \alpha_0 + \sigma_0 t + X_{it}\beta_0 + \bar{X}_{it}\beta_{10} + \gamma_0 C_2 + \delta_0 V_i + \mu_0 C_2 V_i + z_i + \eta_{it} \quad (3)$$

where \bar{X}_i is the time average of X_{it} and z_i is the individual effect. Adding \bar{X}_i to the model as a control for unobserved heterogeneity allows the effect of changing X_{it} to be estimated while holding fixed the time average.³⁵

All regressions³⁶ are performed on the following broad specification:

$$Y_{it} = X_{it}\beta + \gamma C_t + \delta t + \mu_i + \varepsilon_{it}$$

where the dependent variable is the labour market outcome of interest for an individual surveyed at a given time. The five outcomes considered are: the employment rate (the probability of finding employment); wages (derived from the ANU-4 scale of occupational prestige³⁷); the probability of being over-educated for the job according to the job analysis method;³⁸ the subjective perception of skill usage; and occupational downgrading, defined as a reduction in the occupational prestige (as measured by occupational codes at 4-digits) between the last job performed before migrating and the job carried out after settlement at the time of the survey.

Econometric Analysis of Cross Section and Panel Data (Cambridge, MA: MIT Press, 2010). This quasi-demeaning of the data transforms equation (2) into:

$$Y_{it} - \theta \bar{Y}_i = \alpha(1 - \theta) + \sigma(1 - \theta)t + (X_{it} - \theta \bar{X}_i)\beta + \gamma(1 - \theta)C_2 + \delta(1 - \theta)V_i + \mu(1 - \theta)C_2 V_i + (\eta_{it} - \theta \bar{\eta}_{it})$$

Estimation of the above model yields consistent estimates under the assumption of orthogonality between u_i and the observed covariates as well as of $u_i \sim N(0, \sigma_u^2)$ and $\eta_{it} \sim N(0, \sigma_\eta^2)$. Although θ is not known in practice it can always be estimated (various methods are discussed in Wooldridge, *Econometric Analysis of Cross Section and Panel Data*). An estimated θ 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 η_{it} . Conversely and more commonly, if the estimated θ is close to 1, then the variance of u_i is large relative to that of η_{it} , and the bias caused by unobserved time-invariant heterogeneity is large.

³⁴ Yair Mundlak, "On the Pooling of Time Series and Cross Section Data", *Econometrica* 46, No 1 (1978), 69–85; Gary Chamberlain, "Analysis of Covariance with Qualitative Data", *Review of Economic Studies* 47, Issue 1 (1980), 225–238; Wooldridge, *ibid*.

³⁵ Wooldridge, *ibid*.

³⁶ The empirical analysis consists of six regressions. The first three are performed on cross-sectional data using the first wave of the LSIA for both cohorts. They are: (i) OLS based on model (1); (ii) PSM based on the nearest neighbour matching using the male's and female's common supports. These are depicted in Figure 6 and Figure 7 in Appendix B, respectively; and (iii) PSM using only the centre of the common support, after removing the observations in the propensity score's bottom and top 25 per cent. The next set of regressions is carried out on panel data using the first and second wave of the LSIA. They are: (iv) pooled OLS based on model (2); (v) the random effect estimator based on model (2); and (vi) the random effect estimator using Mundlak's correction based on model (3).

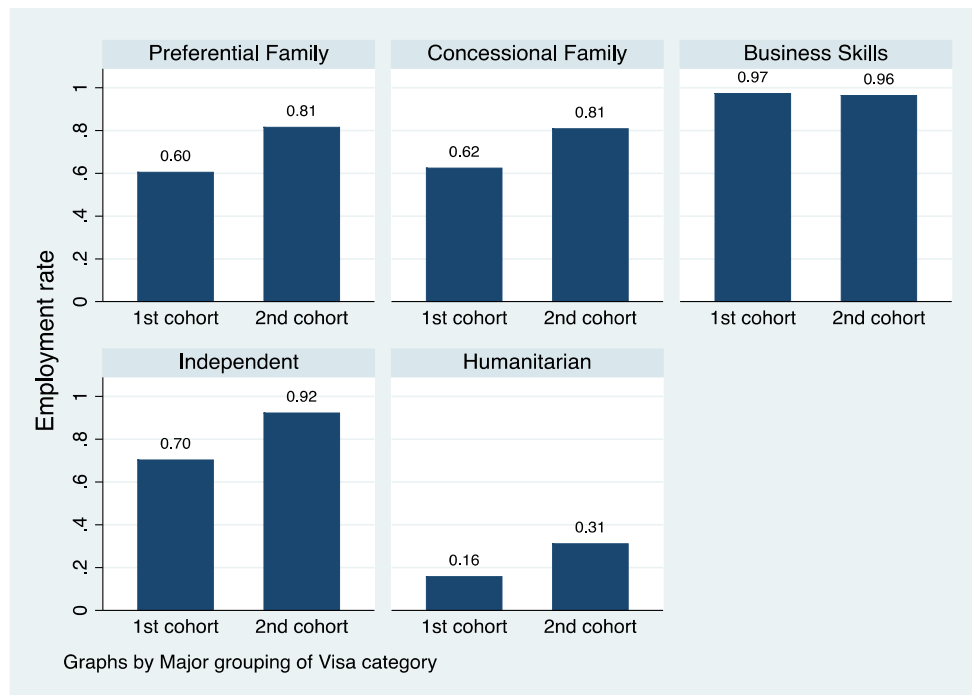
³⁷ FL Jones and Julie McMillan, "Scoring Occupational Categories for Social Research: a Review of Current Practice, with Australian Examples", *Work, Employment & Society* 15, No 3 (2001), 539–563, http://ipumsi.anu.edu.au/SiteTools/Status_Scales/scale4.php (accessed 4 May 2017).

³⁸ The job analysis method measures over-education on the basis of occupational definitions developed by professional job analysts, in this case the Australian Bureau of Statistics: see Australian Bureau of Statistics and Statistics New Zealand, *ANZSCO: Australian and New Zealand Standard Classification of Occupations*, First Edition (ABS and Statistics New Zealand, 2006), [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/B4B626DEB4A0C558CA2571E600092D5A/\\$File/12200_2006.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/B4B626DEB4A0C558CA2571E600092D5A/$File/12200_2006.pdf). A worker is considered to be over-educated if their actual education level is higher than the required education level specified in the occupational classification.

APPENDIX B

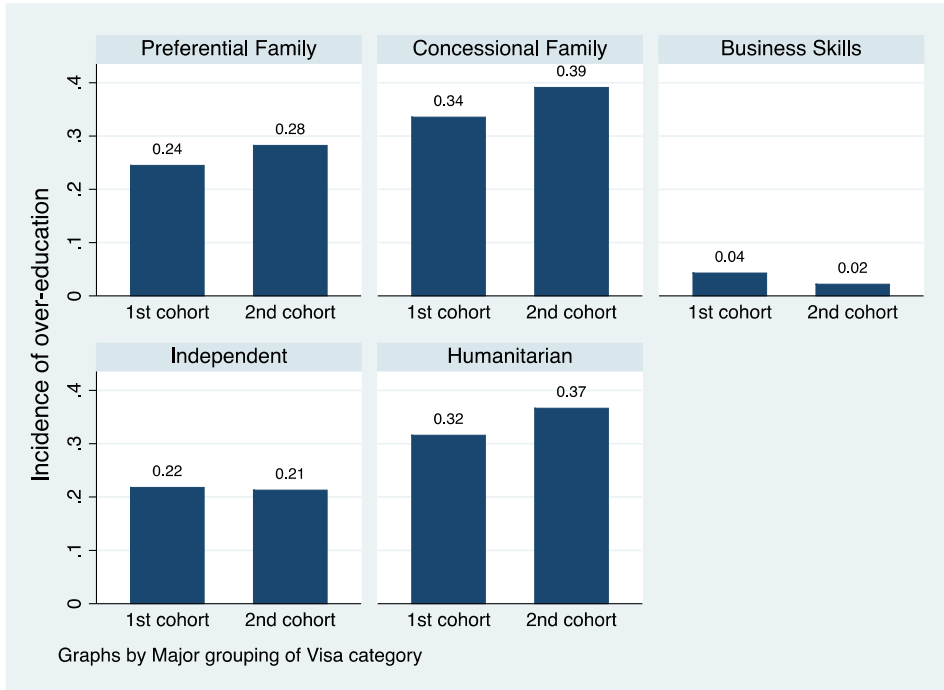
LABOUR MARKET OUTCOMES

Figure 1: Employment rate



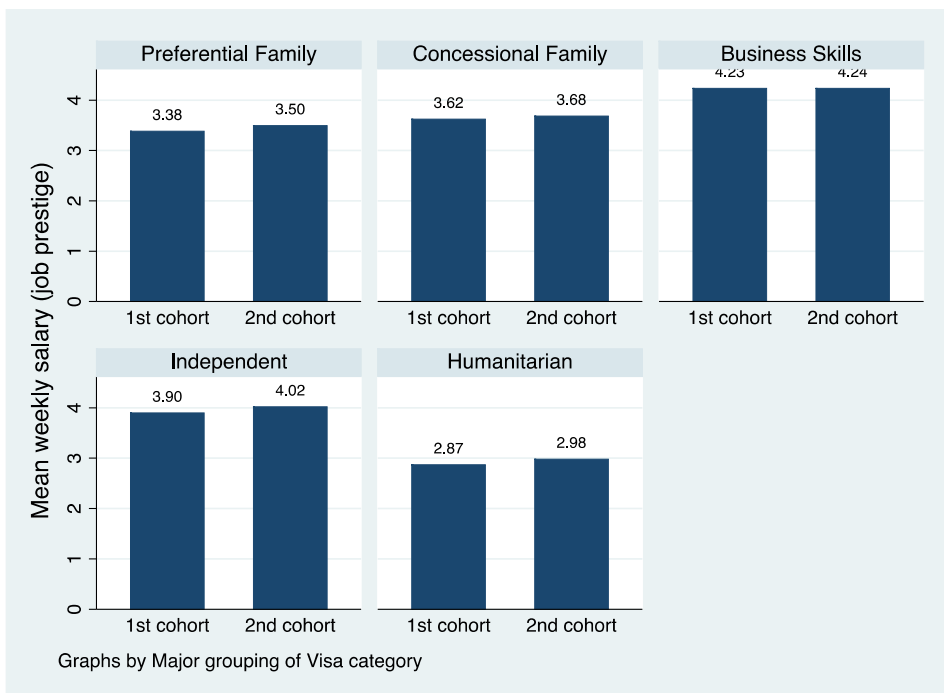
Source: First wave, LSIA1 and LSIA2

Figure 2: Incidence of education-occupation mismatch by visa class



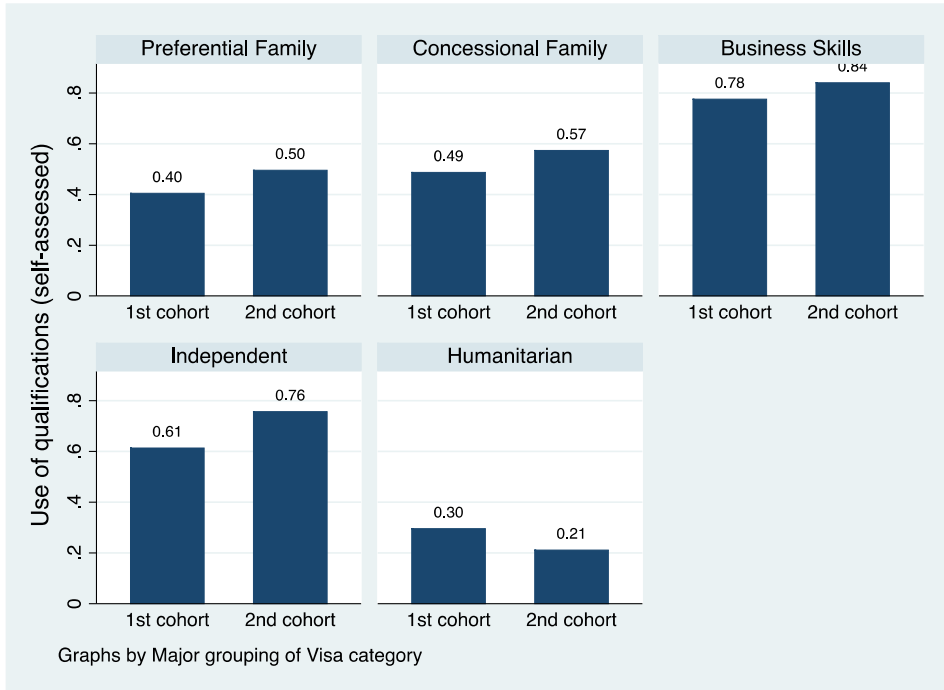
Source: First wave, LSIA1 and LSIA2

Figure 3: Weekly wage – based on ANU job score



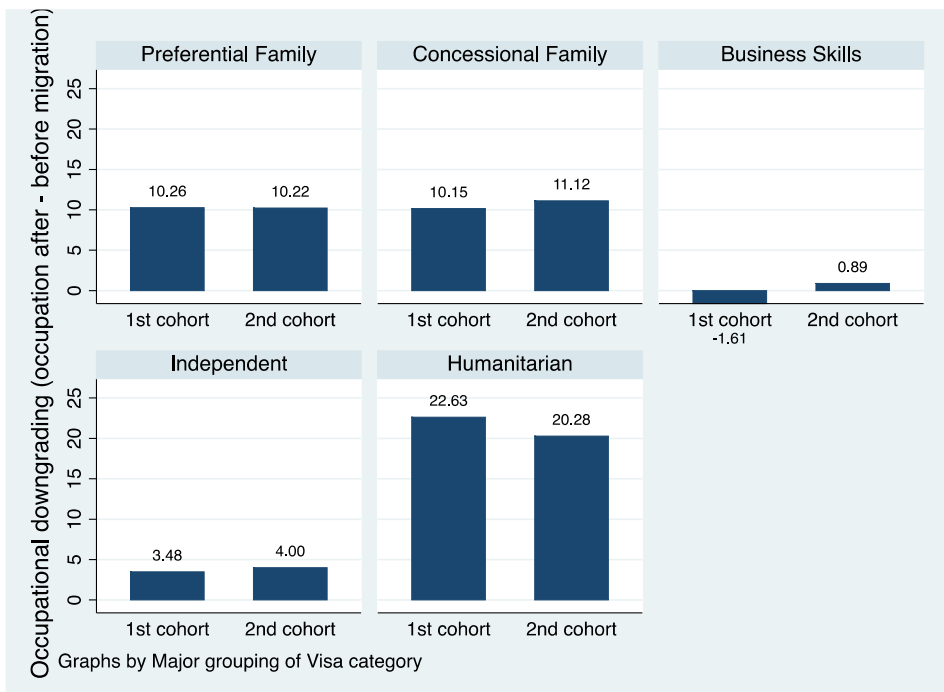
Source: First wave, LSIA1 and LSIA2

Figure 4: Use of qualifications (self-assessed)



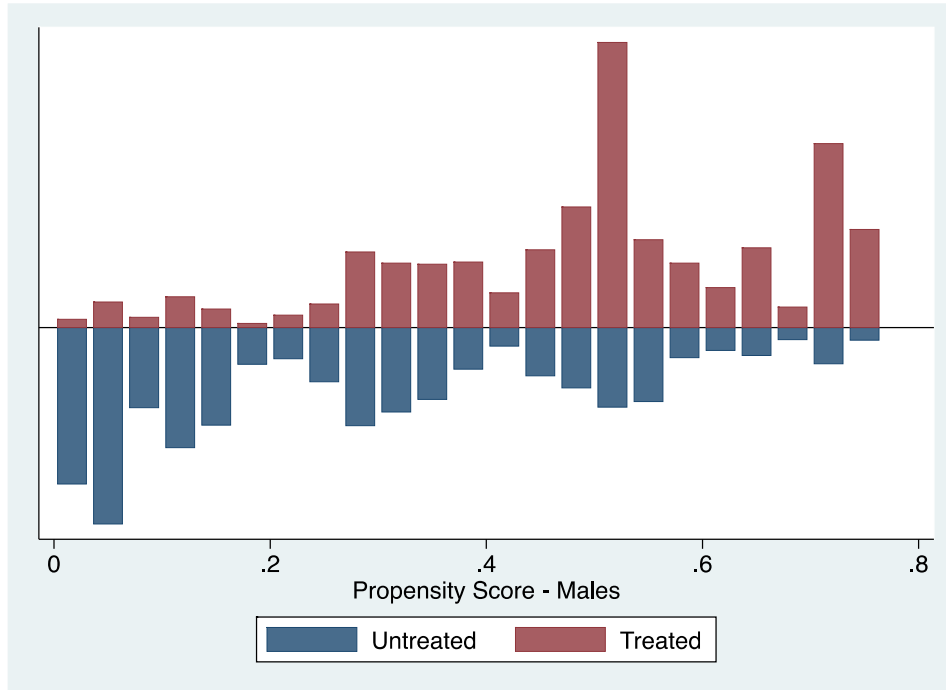
Source: First wave, LSIA1 and LSIA2

Figure 5: Occupational downgrading



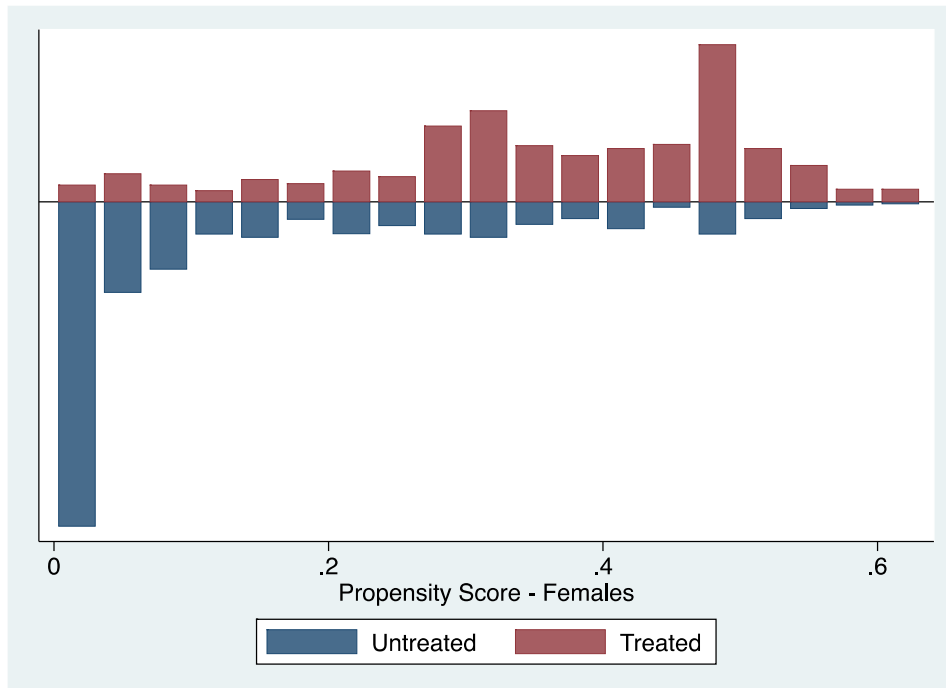
Source: First wave, LSIA1 and LSIA2

Figure 6: Common support – Males



Source: First wave, LSIA1 and LSIA2

Figure 7: Common support – Females



Source: First wave, LSIA1 and LSIA2

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