Does Ethnic Discrimination Vary Across Minority Groups? Evidence from a Field Experiment[*]

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Abstract

We conduct a large-scale field experiment to measure labour market discrimination in Australia, one quarter of whose population was born overseas. To denote ethnicity, we use distinctively Anglo-Saxon, Indigenous, Italian, Chinese and Middle Eastern names. We compare multiple ethnic groups, rather than a single minority as in most other studies. In all cases we applied for entry-level jobs and submitted a CV indicating that the candidate attended high school in Australia. We find significant differences in callback rates: ethnic minority candidates would need to apply for more jobs in order to receive the same number of interviews. These differences vary systematically across ethnic groups.

> *'After completing TAFE in 2005 I applied for many junior positions where no experience in sales was needed – even though I had worked for two years as a junior sales clerk. I didn't receive any calls so I decided to legally change my name to Gabriella Hannah. I applied for the same jobs and got a call 30 minutes later.'*
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> ~Gabriella Hannah, formerly Ragda Ali, Sydney

I.   Introduction

How should we measure ethnic discrimination? Among economists, the most common approach has been to compare labour market outcomes across ethnic groups. But this method may not provide an accurate answer. If an individual's ethnicity is correlated with some unobserved productive trait, then differences in economic outcomes will reflect more than just discrimination. Similarly, social researchers have often used surveys to measure the degree of racism in a society. But if respondents know the socially correct response, then this approach will also provide a biased estimate of true attitudes towards ethnic groups. When studying labour market outcomes, the problem arises from unobservable characteristics of ethnic minorities. When analysing social attitudes, the problem stems from unobservable biases in the reporting of ethnic attitudes.[1]

In both cases, field experiments can help solve the unobservables problem by creating a context in which all other factors except ethnicity are held constant. In a context where the subject is unaware that he or she is participating in an experiment – or in which it is difficult for the subject to provide a socially acceptable response – it is more likely that the outcome will provide an accurate measure of racism than with more traditional approaches. The strengths of field experiments of this type are that they are randomized experiments that establish causality and provide strong evidence for the existence of discrimination. Explanations of employer *motives* generally call for other methods.[2] So too do explanations as to why some particular ethnic groups might be discriminated against more than others.

In this article, we present the results of a field experiment that we conducted in order to estimate discrimination against ethnic minorities in Australia, a country whose immigration policy based on a points system has been admired and adopted by other countries, including New Zealand and the UK. Unlike many field experiments, looking only at a single minority group, we take a broader focus: comparing attitudes to Anglo-Saxon Australians with attitudes to Indigenous Australians (the original inhabitants of the continent), Italian Australians (a relatively established migrant group), Chinese Australians (a more recent migrant group), and Middle Eastern Australians (another recent migrant group). By comparing across these groups, we hope to shed light on how the process of immigrant assimilation might change over time. However, we would not wish to push too hard the use of our experiment as a measure of how time in the country matters for discrimination rates, for there are other conjectures as to how stereotypes are formed. For instance, Eagly and Kite (1987, p. 452) hypothesise that individuals form stereotypes of people from particular countries based not so much on direct forms of interaction but rather

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[1]We define an ethnic group as comprising individuals who are perceived as having a common heritage consisting of a common language, culture and ancestry.

[2]As Arrow (1998, p. 96) notes, without explicit measures for the individual's marginal productivity, it is impossible to distinguish between taste-based and statistical forms of discrimination. While in our experiment all applicants attended school in Australia, and we hold constant their education and experience, it is likely that stereotypes about productivity still remain. For example, employers might view ethnic minority workers as less productive because of poor language skills that are not manifest in the application. This might be so even though such beliefs receive little support in, for example, the HILDA data. Among HILDA respondents who were born in Australia, but whose parents were born overseas, 98–99% report speaking English 'very well' (the highest category in the survey). Since we cannot give in our fictional CVs precise measures of the applicant's productivity, we are unable in this study to separately identify the extent of statistical discrimination.

on 'newsworthy events that draw these nations to their attention', often unfavourably. This might explain some of our results below (for example, for people from the Middle Eastern countries), although we cannot formally test this in our analysis.

With one in four residents born overseas, Australia is often regarded as something of a poster child for its ability to absorb new migrants into its social and economic fabric.[3] Skilled migrants are selected through a points system, which gives preference to applicants with high qualifications and workers in high-demand occupations.[4] Perhaps because of this, most research has found little discernable impact of migrants on the labour market conditions of Australian natives.

Yet recent events suggest that the Australian melting pot may not be so successful after all. In the late 1990s, Pauline Hanson's One Nation Party, with its policy of reducing Asian immigration to Australia, polled well in a number of federal and state elections. At the time of the 2000 Sydney Olympics, many journalists drew attention to the poor social indicators among Indigenous Australians. And in 2005, anti-Muslim riots on Sydney's Cronulla Beach drew international attention. As a series of reports have shown, some minority groups in Australia suffer extreme forms of persecution at work and in public places (see e.g. Walker, 2001; Kabir and Evans, 2002; Poynting and Noble, 2004; VicHealth, 2007; Berman, and The Victorian Equal Opportunity & Human Rights Commission, 2008).

Moreover, the fact that firms specializing in helping migrants find work in Australia counsel clients to disguise their identity also raises concern. For example, a commercial firm that specializes in assisting migrants find work in Australia advises its clients 'If the job absolutely specifically requires second language skills then include your proficiency with that language only. Otherwise do not write anything about your other language skills. Especially never write anything about your English language proficiency'. Jobseekers are also told 'never include your country of birth', and 'shorten and or anglicise names where possible and appropriate' (see http://www.migrantjobsservices.com.au, checked 18 June 2009).

Against this background, our experiment aims to estimate ethnic discrimination by employers. To do this, we conduct a correspondence discrimination study. In audit or correspondence studies, fictitious individuals who are identical in all respects apart from the one of interest (typically gender or ethnicity) apply for jobs. Audit studies, relying on actor pairs who apply for jobs, have been criticized on numerous grounds including whether or not the applicants from different groups actually appear identical to employers. In response to these criticisms, correspondence studies substitute fictitious online or paper applications for fictitious personal candidates, thereby reducing potential heterogeneity in unobservables.

In our correspondence study conducted over 6 months in 2007, we randomly submitted over 4,000 fictional applications for entry-level jobs, varying only the name as an indicator of ethnicity. In terms of number of applications submitted, ours is one of the largest correspondence studies ever conducted. This allows us to look at multiple ethnic groups, and to see if our effects differ by the gender of the fictitious applicant, the type of job advertised, and the city in which the job is located. Relative to other work on discrimination, our

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[3]The 2006 Census indicates that 28% of the foreign-born in Australia are from 'Anglo' countries, namely the UK, New Zealand, South Africa, USA, Ireland and Canada (listed in order of numerical importance).
[4]See Hatton (2005).

correspondence study is novel in that we compare across multiple ethnic groups.[5] This allows us to learn more about the assimilation process than is possible with studies that focus on just one minority. In addition, we are the first to test discrimination against an Indigenous group compared with immigrant minority groups. Indeed, to our knowledge we are the first to consider discrimination against an Indigenous group.

The rest of the article is structured as follows. In section II, we present background information on the share of Australians falling into the four ethnic categories studied in this article, and review the available evidence on labour market outcomes and attitudinal surveys. In section III, we discuss the experiment and the various discrimination hypotheses that our research proposes to test. In section IV, we present the results of our experiment, and compare our findings with those from other similar studies. The final section concludes.

II. Background

We briefly outline the characteristics of the ethnic groups that are the focus of this study by reviewing the literature on their population share, employment outcomes, and levels of surveyed discrimination. Figure 1 depicts the share of Australian residents in each of the four ethnic minority groups, based upon data from the Australian census, which was conducted in 1901, 1911, 1921, 1933, 1947, 1954, and every five years from 1961 onwards. Until the 1960s, the share of Australians reporting their ethnicity as Indigenous was about 1% of the population. Since then, the share has risen steadily, and was over 2% in 2006. This change has been driven by two factors: higher fertility rates, and a growing willingness of respondents to self-identify as Indigenous.

For Italian, Chinese and Middle Eastern Australians, our estimates are based upon country of birth (thereby ignoring second-generation immigrants). As the graph shows, Australia experienced a large influx of Italian migrants immediately after World War II.
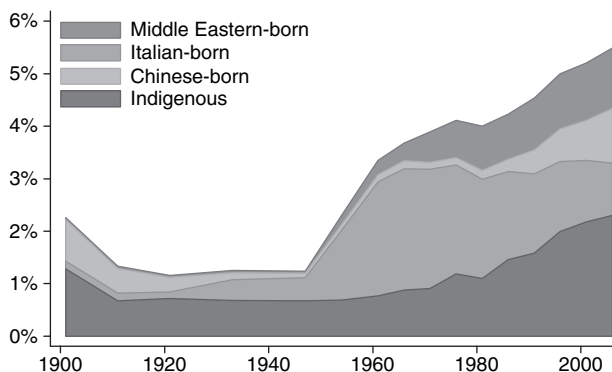
Figure 1. What share of the population do our minority groups comprise?

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[5]While a comparison across three ethnic groups – black, white and Latino – was conducted by Pager, Western and Bonikowski (2009), theirs was an audit study, in which they recruited college-educated individuals to role-play and apply for 340 entry-level jobs in New York City. Since we conducted our correspondence study, Oreopoulos (2009) carried out a similar field experiment with 6,000 CVs in Canada.

From the late-1970s, the share of Australians who are Italian-born has steadily declined. By contrast, immigration from China and the Middle East only began to expand in the 1970s and 1980s. By 2006, the share of Australians born in Italy, China and the Middle East was about 1% each.

Since our experiment will focus on ethnicity rather than country of birth, a more appropriate comparator might be ancestry. However, the Australian census has not consistently asked respondents about their ancestry. Therefore, it is only possible to look at recent data, and not to construct a time series of ancestry shares. We focus here on respondents' first answer to the ancestry question in the 2006 census (it was possible to give multiple ancestries). The ancestries that are relevant to our analysis are Italian (4%), Chinese (3%) and Arab (1%). By comparison, the most common ancestries are Australian (27%) and British (35%). It is not possible to distinguish Indigenous ancestry. While the country of birth figures suggest that Italians, Chinese and Middle Easterners are about equally represented among first-generation migrants, the ancestry data indicate that Italians are substantially more numerous among second-generation (and higher generation) migrants.

Table 1 shows how these four minority groups perform in the Australian labour market.[6] We estimate three outcome measures – participation, log annual hours and log hourly wages – with the omitted group being Australian-born non-Indigenous respondents. For this analysis, we require a large dataset with good information on employment participation and hourly wages. Although the census samples are relatively large, earnings and hours are coded in bands, leading to very imprecise measures of hourly wages.[7] We therefore opt to use the 2001–06 Household, Income and Labour Dynamics in Australia survey (HILDA), pooling all six waves and clustering standard errors at the person level. The sample is restricted to those who are aged 21–64, with non-missing information for all covariates.

Indigenous respondents are coded according to whether or not they self-identified as Aboriginal or Torres Strait Islander (HILDA respondents are not asked whether their parents are Indigenous). Respondents are coded as Italian, Chinese or Middle Eastern if they – or either of their parents – were born in one of those countries/regions.[8] We exclude first-generation or second-generation migrants from other regions, so that the omitted group comprises respondents who were born in Australia and whose parents were both born in Australia. Because our field experiment focuses on three large Australian cities, we similarly restrict the HILDA sample to those living in major cities. Across this particular

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[6]Naturally, we are not the first to use standard surveys to analyse migrant performance in the Australian labour market. For studies that have looked at various aspects of the labour market performance of migrants in Australia, see eg. Cobb-Clark (2003); Mahuteau and Junankar (2008).

[7]An alternative approach would have been to simply look at unemployment rates, using data on country of birth from the August 2006 *Employee Earnings and Hours* Survey (representative of all employees in the labour force), and data on ethnicity from the August 2006 census. The unemployment rates by country of birth in 2007 were: born in Australia 4.0%, born in Italy 3.7%, born in China 7.2%, and born in North Africa/Middle East 9.5%. The unemployment rate by ethnicity in 2006 was 5.0% for non-Indigenous people, and 15.6% for Indigenous people.

[8]We include Hong Kong and Taiwan as part of China. Countries defined as Middle Eastern are Algeria, Egypt, Libya, Morocco, Sudan, Bahrain, Iran, Iraq, Israel, Kuwait, Lebanon, Oman, Syria and Turkey. Because of the way we code ethnicity, the categories are not mutually exclusive. Dropping respondents who are in more than one minority ethnic category makes no tangible difference to the results.

TABLE 1

Observed labour market differences by ethnicity

Dependent variable	[1]	[2]	[3]	[4]	[5]	[6]
	Employed		Log annual hours		Log hourly wage	
Indigenous (self-identified)	−0.102**	−0.066	−0.055	−0.019	−0.069	−0.010
	[0.044]	[0.046]	[0.051]	[0.054]	[0.044]	[0.033]
Italian (by birth or parentage)	−0.052*	−0.005	−0.005	0	−0.060**	−0.029
	[0.031]	[0.026]	[0.033]	[0.035]	[0.027]	[0.025]
Chinese (by birth or parentage)	−0.119***	0.013	−0.107**	−0.08	−0.028	0.033
	[0.041]	[0.035]	[0.054]	[0.060]	[0.060]	[0.052]
Middle Eastern (by birth or parentage)	−0.137***	−0.032	−0.089	−0.063	−0.001	−0.01
	[0.042]	[0.030]	[0.068]	[0.066]	[0.037]	[0.033]
Control for education, experience, and English proficiency?	No	Yes	No	Yes	No	Yes
Person-year observations	19,515	19,515	13,832	13,832	13,832	13,832
Individuals	4,979	4,979	3,989	3,989	3,989	3,989
R^2 or Pseudo R^2	0.05	0.25	0.09	0.13	0.04	0.19

Notes: Robust standard errors, clustered at the individual level, in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels respectively. All regressions control for survey year indicators, a quadratic in age, and a gender dummy. Employment results are marginal effects from a probit model, while results for annual hours and hourly wages are OLS coefficients. Experience is actual labour market experience, education is years of education, and English proficiency is measured by indicators for the four options on a self-assessed scale (very well, well, not very well, not at all). Those who do not speak a language other than English are assumed to speak English very well. Sample is major city respondents aged 21–64 in columns 1 and 2, and employed respondents aged 21–64 in columns 3–6.
Source: HILDA survey, waves 1–6.

sample, 2% of respondents are Indigenous, 6% are Italian, 3% are Chinese and 4% are Middle Eastern.[9]

In columns 1, 3 and 5 of Table 1, we include only a parsimonious set of controls – a survey year indicator, a gender indicator and a quadratic in age. In this specification, all the coefficients are negative, and five are statistically significant at the 95% level. Specifically, Indigenous respondents are 10 percentage points less likely to be employed, Chinese respondents are 12 percentage points less likely to be employed, and Middle Eastern respondents are 14% less likely to be employed. Conditional on being employed, Chinese respondents work 11% fewer hours, while Italian respondents earn wages that are 6% lower. Note that for the other three minority groups, the hourly wage coefficients are negative but statistically insignificant. If employers (or customers or co-workers) have a distaste for associating with workers from ethnic minorities, or if there is statistical discrimination, we would expect to see lower wages being offered for these groups. Yet this is not observed in the HILDA data. This may reflect the fact that the Australian minimum wage is one of the highest in the developed world (Leigh, 2007). Other features of the Australian employment system also lead to wage rigidity – for example, 17% of employees have their wages set by industrial awards, while a further 39% have their wages set through

[9]Cell sizes are still reasonably large. For example, in the employment regressions, the restricted HILDA sample still includes 432 person-year observations for Indigenous respondents, 1,085 Italian observations, 666 Chinese observations and 713 Middle Eastern observations.

registered collective agreements (ABS, 2009).[10] Given this institutional framework, the principal margin on which employers can adjust is likely to be through hiring (Becker, 1971). We would therefore expect to see lower employment rates for ethnic minorities. This is indeed what is observed in column 1.

But what happens when additional observables are added to the specification? In columns 2, 4 and 6 of Table 1, we include controls for years of actual labour market experience, years of education, and self-assessed English proficiency. In this specification, the coefficients tend to be closer to zero, and none are statistically significant at the 95% level. However, the standard errors in Table 1 are sufficiently large that we cannot rule out modest ethnic differences in employment and wages, even controlling for observable productivity differences. Moreover, there are potentially important productivity differences that are unobservable, including school quality, interpersonal skills, and work ethics. To the extent that these are correlated with a respondent's ethnicity, they could help explain (or confound) estimates of labour market discrimination. In addition, any observed negative effects of immigrant status on the outcomes reported in Table 1 might reflect discrimination at one or more of the different stages in the employment process, ranging from selection for interviews, to the hiring decision conditional on being interviewed, to the level of wages actually offered. In principle, the level of discrimination in the pre-interview stage – which is what we estimate in our field experiment described in section III below – could be negatively or positively correlated with discrimination in hiring decisions and wage offers.

Can we learn more about employers' 'tastes for discrimination' by examining reports of Australians' attitudes to these minority groups? One way to address this is to use surveys asking Australians if immigration from particular regions should be reduced. According to a telephone survey of randomly selected representative voting-age Australians conducted in the first quarter of 2007, around 12% of Australians thought immigration from Europe should be reduced, 23% thought immigration from Asia should be reduced, and 38% thought immigration from the Middle East should be reduced (Issues Deliberation Australia, 2007). Surveys on attitudes to intermarriage find similar results (Dunn, 2003; Forrest and Dunn, 2007). These findings certainly seem to suggest that, for whatever reason, there is prejudice in Australia against particular ethnic groups. This could manifest itself in taste-based discrimination by employers, workers or customers. Next we consider whether or not there is discrimination in hiring, as measured by the initial stage of the process – callback for an interview.

III. The correspondence discrimination experiment

The basic notion underlying correspondence discrimination studies is that an estimate of the extent of hiring discrimination can be determined by conducting an experiment in which fictional CVs, carrying ethnically identifiable names, are sent to employers. By comparing the callback rates for different ethnic groups, the researcher can estimate the degree of ethnic discrimination in a particular context.

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[10]Registered collective agreements are defined by the ABS as 'An agreement between an employer (or group of employers) and a group of employees (or one or more unions or employee associations representing the employees). A collective agreement sets the terms of employment (pay and/or conditions) for a group of employees, and is usually registered with a Federal or State industrial tribunal or authority.'

According to a comprehensive review of the literature (Riach and Rich, 2002), correspondence discrimination studies were initially conducted by British sociologists in 1969 (Jowell and Prescott-Clarke, 1970). Since then, researchers have applied the technique to Australia, Canada, France, the Netherlands, Sweden and the United States. In audit studies, researchers have also trained pairs of actors to show up for job interviews, apply for rental housing, and negotiate to purchase used cars (for a recent survey, see Pager (2007)). Using written CVs, the correspondence discrimination technique has been used to measure discrimination on the basis of gender, age, obesity, having a criminal record, facial attractiveness and sexual orientation. As noted above, in-person audit studies have been criticized on several bases, including the possibility that the actors may not in fact appear identical to employers.[11] In response to these criticisms, correspondence studies replace fictitious personal candidates with fictitious online or paper applications, thereby reducing potential heterogeneity in unobservables. This is the approach we follow in this article. However, correspondence studies are still vulnerable to the critique of Heckman and Siegelman (1993), who show that if the distribution of unobservable productivity-relevant attributes of the various groups differ, the correspondence studies may produce over or under-estimation of discrimination.[12]

During the 6 months from April 2007 to October 2007, we applied for over 4,000 jobs using a major online job-finding website. We applied for jobs in Australia's three largest cities – Sydney, Melbourne and Brisbane. For each job-category, we created four fake CV templates, obtained from a broad Internet search for similar CVs and tailored to the particular job. Applicants' names appeared in large type at the top of the CV, and were randomized across CV types. Note that we have a total of five ethnic groups. To ensure that the four applicants at each firm were from four different ethnic groups, we randomized and then 'balanced'; that is, if a firm's random draw included two people from the same ethnic group, we did another random draw. We continued to make random draws until each firm had four applicants from different ethnic groups.

Such a large sample size provides sufficient statistical power to look not only at differences across five ethnic groups (Anglo-Saxon, Indigenous, Chinese, Italian and Middle Eastern), but also to see whether such effects differed by gender, city and job type. For example, we still have around 280 individuals per cell when looking at differences by ethnicity and city. However, our results are fragile once we go to three-level tabulations (e.g. ethnicity by job type by gender), so we do not show such results in our tabulations. Booth and Leigh (2010) focus specifically on issues of gender.

In selecting appropriate occupations for this study, we focused on jobs that did not require any post-school qualifications, and for which the application process was relatively

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[11]Heckman (1998) and Heckman and Siegelman (1993) present a number of additional critiques of the methodology used in correspondence and audit studies. Since these primarily deal with studies that use actors, we do not address them here, but one response may be found in Pager (2007).

[12]Neumark (2010) shows that, if correspondence studies explicitly include variations in applicant quality, an unbiased estimate of discrimination can be uncovered. Neumark (2010) applied his technique to the correspondence study of Bertrand and Mullainathan (2004), and showed that their measured discrimination was actually an *under*-estimate. Our experiment was designed and undertaken before Neumark's paper was written, and we were unable to follow his approach since employers in our experiment did not respond to differences in applicant quality in a systematic fashion across job types (eg. higher-educated applicants received more callbacks in some job types, and fewer callbacks in others).

straightforward (to ensure that we could complete a sufficient number of applications to have good statistical power).

Conjectures

While our primary goal is to establish the extent of discrimination and how it varies across ethnic minorities in Australia, we also wished to test a number of related conjectures. These are as follows.

First, we aim to test the conjecture that employers differentially discriminate in response to perceived customer preferences. To assess this, we deliberately select occupations for our analysis that involve face-to-face contact, and those that do not. The four occupations we select are: waitstaff, data entry, customer service and sales. Data entry involves no customer contact, and therefore customer discriminatory preferences should not play a role in the employer's callback decision. In contrast, waitstaff jobs entail a high degree of interpersonal contact. Hence for these jobs we would expect ethnic applicants to receive lower callback rates if customer discriminatory preferences matter.

Examples of the types of jobs falling within these occupational categories are as follows. Waitstaff jobs included positions at bistros, cafés, bars, restaurants and hotels. Data entry positions – also known as document processing officers or technical records officers – included jobs working for an airline, a radio station, a bank and a charity. Customer service jobs were a mix of telephone support and face-to-face positions (it was often difficult to distinguish these from the information available) and included staffing the front desk at a bowling alley, answering customer support calls at a private health insurance company, and staffing the front desk at a parking garage. Sales positions almost entirely involved in-person sales, and included jobs at a tiling store, a supermarket, an electrical goods store and a pizzeria.

Table 2 gives average wages and share female in these occupations, based on data from the Australian Bureau of Statistics' *Employee Earnings and Hours* survey, conducted in August 2006. The four jobs, more feminized than the non-managerial workforce as a whole, also have a slightly above-average share of employees from non-English-speaking backgrounds. Across the four jobs, workers are paid about three quarters of average wages.

TABLE 2

Characteristics of the jobs

	Wage($)	*Share female*(%)	*Share NESB*(%)
Waitstaff	18.90	80	17
Data entry	19.10	85	15
Customer service	21.60	68	17
Sales	18.50	69	16
All full-time non-managerial	*26.00*	*46*	*15*

Notes: NESB denotes respondents who were born in a non-English-speaking country. Since we only have access to the 2-digit occupation code, we classify the four occupations using ISCO-88 codes 51, 41, 42 and 52 respectively.
Source: Wage and share female from Australian Bureau of Statistics, *Employee Earnings and Hours* survey, conducted in August 2006. Share Non-English Speaking Background (NESB) from HILDA, pooling waves 1–6.

The second conjecture that we wished to test was whether or not employers in different Australian cities differentially discriminate against ethnic minority applicants. We therefore applied for jobs in Australia's three largest cities: Sydney, Melbourne and Brisbane. These cities differ in terms of their ethnic composition (with Sydney being the most ethnically diverse of the three), their immigration history, and in the prevailing rate of unemployment at the time of our study (with Brisbane having the tightest labour market).

Our third conjecture is whether or not racial-majority employers discriminate against minority groups. We explore this in two ways, to be explained in greater detail towards the end of this section. The first involves matching on the characteristics of the zipcode in which the employer is located. The second exploits the fact that, for many jobs, we know the name of the contact person listed on the advertisement, the person who responded to one or more of our applicants, and sometimes both.

Collecting the data

For each job category, we created four fictional CV templates that we used to apply for jobs. These were obtained from a broad Internet search for similar CVs, and tailored by us to the particular job. The CV template was augmented with the addition of an address (we selected four street-suburb combinations in middle-income neighbourhoods, and randomized the street number between 1 and 20). Two sample CVs are depicted in Figures A1 and A2.

The ethnicity of the applicant was denoted by an ethnically distinguishable name, which appeared in large print at the top of the CV. For each ethnic group, we identified five female first names, five male first names, and five last names, which were combined randomly to create the job applicant's name. Ideally, we would have obtained access to a large database of Australians, containing names and self-identified ethnicity. However, we were unable to locate a suitable public database, and sample surveys such as the HILDA survey (or Indigenous databases such as those held by the Australian Institute of Aboriginal and Torres Strait Islander Studies) turned down our requests to tabulate lists of common names. We therefore chose our Anglo-Saxon, Italian, Chinese, and Middle Eastern names by consulting the website http://www.behindthename.com, and our Indigenous names by consulting the indexes of various books listing Indigenous artists.[13] The full list of names used in this study is provided in Table A1.

The job-finding website that we used had an online application process. For each advertised position, we submitted four applications, ensuring as described above that each of the four applications was from a different ethnic group.[14] Each application included a short covering letter, plus a fake CV. For each sex-cell, we set up an email address plus a separate phone line with an answering machine. (All answering machines had a message left by a person with a regular Australian accent. We did this because applicants were supposed to

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[13]Since our CVs suggest that the job applicants are aged in their twenties, it is unlikely that employers would have thought that female applicants with non-Anglo names were actually Anglo respondents who had taken on a non-Anglo last name by marriage.

[14]A referee pointed out that our results hold when there is an Anglo-Saxon applicant with similar merits applying for the same position. If there was not an applicant with an Anglo-Saxon name, the callback rates for the ethnic minorities would probably have been higher. We would also point out that if there had been more than one Anglo-Saxon applicant with similar merits applying for the same position the callback rate could well have been lower.

differ only with regard to their ethnicity, and we wanted to guard against the possibility that a prospective interviewer would simply hang up if they heard a foreign-sounding voice.) Employers could invite the applicant back for an interview by either sending an email or making a telephone call.

IV.   The results

Table 3 sets out the callback rates from the experiment. In Panel A, we show results pooling men and women. For Anglo-Saxon-sounding names, the mean callback rate was 35%.[15] However, names connoting the four minority groups received a lower callback rate, with Indigenous applicants obtaining an interview 26% of the time, Chinese 21% of the time, Italian 32% of the time and Middle Eastern 22% of the time. For Indigenous, Chinese and

TABLE 3

Callback rates by soundingness of name and applicant gender

	Callback rate (%)	Ratio (Anglo-Saxon rate/Minority) rate)	Difference (Anglo-Saxon rate − Minority rate)	P-value on difference
Panel A: Male and female applicants				
Anglo-Saxon ($N=837$)	35	NA	NA	NA
Indigenous ($N=848$)	26	1.35	0.09	0.0000
Chinese ($N=845$)	21	1.68	0.14	0.0000
Italian ($N=835$)	32	1.12	0.04	0.0940
Middle Eastern ($N=845$)	22	1.64	0.14	0.0000
Panel B: Female applicants				
Anglo-Saxon ($N=422$)	38	NA	NA	NA
Indigenous ($N=442$)	31	1.23	0.07	0.0311
Chinese ($N=374$)	21	1.82	0.01	0.0000
Italian ($N=410$)	37	1.03	0.01	0.7858
Middle Eastern ($N=434$)	25	1.52	0.13	0.0001
Panel C: Male applicants				
Anglo-Saxon ($N=403$)	33	NA	NA	NA
Indigenous ($N=426$)	22	1.51	0.11	0.0003
Chinese ($N=403$)	22	1.54	0.12	0.0002
Italian ($N=461$)	28	1.21	0.06	0.0686
Middle Eastern ($N=435$)	19	1.76	0.14	0.0000
Does ethnic discrimination differ by applicant gender?	$\chi^2(4)=6.68$ P-value $=0.15$			

Notes: To test whether ethnic discrimination differs significantly by applicant gender, we run the probit regression Interview(0, 1) $= \alpha + \beta I^{\text{Female}} + \gamma I^{\text{Ethnicity}} + \lambda(I^{\text{Female}} \times I^{\text{Ethnicity}}) + \varepsilon$

The dependent variable is a dummy for receiving an interview, while I^{Female} and $I^{\text{Ethnicity}}$ are, respectively, indicators for being female and being in each of the four minority ethnic categories. The chi-squared test above is a test for the joint significance of the four λ coefficients.

[15]We also tested for differences between Catholic and Protestant names, but found no mean difference between the two groups. Because Catholic respondents were identified both by name and by having a Catholic school on their CV, we were concerned that they might not make an appropriate control group for the purpose of focusing on ethnicity. We therefore dropped Catholic CVs from the sample for the current analysis.

Middle Eastern applicants, the difference is highly statistically significant at the 1% level, but the Anglo vs. Italian difference is only statistically significant at the 10% level (see last column of Table 3, where the *P*-value on the difference is 0.940).[16]

The middle column of Table 3 expresses the difference as a ratio. This is useful because it provides an intuitive metric for the level of discrimination in terms of the number of additional job applications that a minority applicant must submit to get the same number of callbacks as an Anglo applicant. These ratios indicate that, in order to get as many interviews as an Anglo applicant, an Indigenous person must submit 35% more applications, a Chinese person must submit 68% more applications, an Italian person must submit 12% more applications, and a Middle Eastern person 64% more applications.

Panels B and C separate the analysis into female and male applicants. The results in Panel B indicate that female Italian applicants are not discriminated against (relative to female Anglo applicants), but otherwise the minority groups *all* have significantly lower callback rates (see the *P*-values in the last column). Notice that the difference between callback rates for Indigenous and Anglo females is statistically significant at the 3% level, while for Chinese and Middle Eastern relative to Anglo females it is statistically significant at the 1% level. Panel C shows that, relative to Anglo applicants of the same sex, discrimination is generally worse for minority men than for minority women (the exception being those with Chinese-sounding names) and for all groups except Italian the difference is statistically significant at the 1% level.[17] However, when we formally test whether ethnic discrimination differs by gender, we cannot reject the hypothesis that the level of discrimination is the same for men and women of the same ethnic group. In Booth and Leigh (2010), we explore gender differences in more detail and find that, overall, female candidates are more likely to receive a callback than male candidates (the differences are largest for waitstaff and data entry occupations).

One way to benchmark our results is to compare the number of additional applications that a minority candidate must submit in order to expect the same number of interviews. Another is to think about the kind of labour market that minority applicants face.[18] In effect, we can ask the question: *what would the prevailing unemployment rate have to be for an Anglo person to face the same job-finding task as a member of a minority group?*

To answer this, we exploit the fact that the unemployment rate differs across time, and across the three cities in our experiment. Using only Anglo-Saxon respondents, we run a simple probit regression of whether a given respondent gets an interview on the prevailing unemployment rate in that month and city. The coefficient from this regression is -0.065 (standard error 0.033), suggesting that a 1-point increase in the unemployment rate reduces the probability of an Anglo-Saxon applicant getting an interview by 6.5%. On average, the prevailing unemployment rate during our analysis was 4.3%.

However, the analysis in the previous paragraph, taken together with the results in Table 3, suggests the following. First, Indigenous applicants faced the same difficulties

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[16]Although all applicants attended school in Australia, and we are able to hold constant their education and experience, it is possible that stereotypes about productivity still remain. However, as noted below, we find little evidence that second-generation immigrants have inferior English-speaking skills.

[17]We are inclined not to make much of the larger effect for Chinese women, since many non-Chinese would probably have difficulty distinguishing between male and female Chinese first names.

[18]Another approach would be to benchmark the magnitude of our effects against the benefit of more education. However, returns to education did not differ systematically within jobs. We return to this issue below.

in obtaining an interview as an Anglo applicant when the unemployment rate was 5.6%. Second, Chinese applicants faced the same difficulties in obtaining an interview as an Anglo applicant when the unemployment rate was 6.4%. Third, Italian applicants faced the same difficulties in obtaining an interview as an Anglo applicant when the unemployment rate was 4.8%. Fourth, Middle Eastern applicants faced the same difficulties in obtaining an interview as an Anglo applicant when the unemployment rate was 6.4%.

In summary, we have found clear evidence of discrimination in selection for interviews for entry-level jobs in Australia. Of course, the audit discrimination technique only observes the first stage of the employment process – selection for an interview – and hence we cannot comment on the second stage of receiving a job offer. Nonetheless, our results provide clear evidence of ethnic discrimination at the callback stage. This contrasts with the pooled cross-sectional estimates summarized in Table 1, based on survey data and combine the various stages of the employment process. Thus employment in that table involves selection for callback *and* selection for an employment offer at the interview stage. But this regression approach may not provide an accurate answer, as we noted in the Introduction. If an individual's ethnicity is correlated with some unobserved productive trait, differences in economic outcomes are likely to reflect more than just discrimination. In contrast to those regression results based on survey evidence, our field experiment is a randomized experiment. As such, it is better able to establish causality, and it provides strong evidence for the existence of discrimination at the callback stage. Next we attempt to tease out more information about the reasons for such discrimination and to test the conjectures outlined in the previous section.

Is there evidence of customer discrimination?

We constructed our experiment so that some of the jobs for which we applied required no customer contact, and therefore customer discriminatory preferences should play no role in the employer's callback decision. In contrast, others entail a high degree of interpersonal contact. A test for whether or not customer preferences might matter involves testing if the degree of ethnic discrimination differs across the four job types in the survey. These are waitstaff, data entry, customer service, and sales. If customer discrimination is important, then one should expect to see substantially more discrimination in jobs that involve the highest degree of interpersonal contact (waitstaff) than those involving no customer contact (data entry).

These results are presented in Table 4. Across the four jobs, we observe the greatest amount of discrimination against minority applicants seeking waitstaff jobs. A Chinese and Middle Eastern person seeking a job as a waiter or waitress must submit fully twice as many applications in order to get as many interviews as an Anglo-Saxon applicant. However, there is only slightly less discrimination in data entry jobs, and a formal test cannot reject that the degree of discrimination is the same in both occupations. This suggests that relatively little of the observed discrimination can be attributed solely to customer-based discrimination.

Curiously, the one job in which the level of discrimination appears to be lower is customer service, in which there is no statistically significant discrimination against any of the minority ethnic groups. This is also the one occupation in which those with more

TABLE 4

Callback rates by soundingness of name and job type

	Callback rate (%)	Ratio (Anglo-Saxon rate / Minority rate)	Difference (Anglo-Saxon rate − Minority rate)	P-value on difference
Panel A: Waitstaff				
Anglo-Saxon ($N = 223$)	50	NA	NA	NA
Indigenous ($N = 215$)	29	1.70	0.20	0.0000
Chinese ($N = 200$)	25	1.99	0.25	0.0000
Italian ($N = 211$)	39	1.27	0.10	0.0288
Middle Eastern ($N = 214$)	22	2.27	0.28	0.0000
Panel B: Data entry				
Anglo-Saxon ($N = 222$)	34	NA	NA	NA
Indigenous ($N = 209$)	21	1.60	0.13	0.0031
Chinese ($N = 199$)	19	1.82	0.15	0.0004
Italian ($N = 213$)	29	1.18	0.05	0.2472
Middle Eastern ($N = 207$)	20	1.71	0.14	0.0011
Panel C: Customer service				
Anglo-Saxon ($N = 196$)	26	NA	NA	NA
Indigenous ($N = 215$)	28	0.91	−0.02	0.5836
Chinese ($N = 215$)	23	1.12	0.03	0.5196
Italian ($N = 201$)	32	0.79	−0.07	0.1337
Middle Eastern ($N = 220$)	25	1.02	0.01	0.9048
Panel D: Sales				
Anglo-Saxon ($N = 196$)	31	NA	NA	NA
Indigenous ($N = 209$)	27	1.16	0.04	0.3369
Chinese ($N = 231$)	18	1.71	0.13	0.0018
Italian ($N = 210$)	26	1.19	0.05	0.2717
Middle Eastern ($N = 204$)	20	1.59	0.12	0.0081
Does ethnic discrimination differ between waitstaff and data entry?	$\chi^2(4) = 3.55$ P-value = 0.47			

Notes: To test whether ethnic discrimination differs significantly by job, we run the probit regression
Interview(0, 1) = $\alpha + \beta \mathbf{I}^{\text{Waitstaff}} + \gamma \mathbf{I}^{\text{Ethnicity}} + \lambda(\mathbf{I}^{\text{Waitstaff}} \times \mathbf{I}^{\text{Ethnicity}}) + \varepsilon$
The dependent variable is a dummy for receiving an interview, while $\mathbf{I}^{\text{Waitstaff}}$ and $\mathbf{I}^{\text{Ethnicity}}$ are, respectively, indicators for applying for a waitstaff job and being in each of the four minority ethnic categories. The chi-squared test above is a test for the joint significance of the four λ coefficients. We run this test with waitstaff and data entry positions only.

education were significantly more likely to receive an interview (a pattern that did not hold in other occupations, as we discuss below). This suggests that there could potentially be less discrimination in higher-skill occupations than in the low-skill jobs analysed here.

Are there differences in discrimination across cities?

Our second conjecture was that employers in the major Australian cities differentially discriminate against ethnic-minority applicants. The three largest cities – Sydney, Melbourne, and Brisbane – differ in terms of their immigration history and ethnic composition. For

example, Melbourne has the largest proportion of immigrant Italians and Sydney of Chinese and Middle Eastern immigrants. The cities also differed slightly in their unemployment rates at the time of our study (with Brisbane having the tightest labour market). To what extent do levels of discrimination differ across the three cities in our experiment?

In Table 5, we present results tabulated separately for Brisbane, Melbourne and Sydney. In general, the patterns are quite similar. In each of the cities, discrimination is highest against Chinese and Middle Eastern applicants, followed by Indigenous applicants, followed by Italian applicants. However, the point estimates are suggestive of non-trivial differences. For example, if they are to get as many interviews as an applicant with an Anglo name, Chinese applicants must put in 57% more applications in Brisbane, but 92% more applications in Sydney. In addition, there is a statistically significant degree of

TABLE 5

Callback rates by soundingness of name and city

	Callback rate (%)	Ratio (Anglo-Saxon rate / Minority rate)	Difference (Anglo-Saxon rate − Minority rate)	P-value on difference
Panel A: Brisbane				
Anglo-Saxon ($N = 269$)	42	NA	NA	NA
Indigenous ($N = 281$)	30	1.41	0.12	0.0030
Chinese ($N = 283$)	27	1.57	0.15	0.0002
Italian ($N = 286$)	33	1.28	0.09	0.0261
Middle Eastern ($N = 280$)	28	1.51	0.14	0.0005
Panel B: Melbourne				
Anglo-Saxon ($N = 282$)	27	NA	NA	NA
Indigenous ($N = 272$)	18	1.48	0.09	0.0154
Chinese ($N = 278$)	17	1.61	0.10	0.0039
Italian ($N = 282$)	29	0.93	−0.02	0.5722
Middle Eastern ($N = 284$)	16	1.64	0.10	0.0026
Panel C: Sydney				
Anglo-Saxon ($N = 286$)	38	NA	NA	NA
Indigenous ($N = 295$)	31	1.25	0.08	0.0537
Chinese ($N = 284$)	20	1.92	0.18	0.0000
Italian ($N = 267$)	34	1.14	0.05	0.2450
Middle Eastern ($N = 281$)	21	1.80	0.17	0.0000
Does ethnic discrimination differ by city?	Sydney vs. Melbourne $\chi^2(4) = 4.59$ P-value $= 0.33$	Sydney vs. Brisbane $\chi^2(4) = 4.47$ P-value $= 0.35$	Brisbane vs. Melbourne $\chi^2(4) = 5.00$ P-value $= 0.29$	

Note: To test whether ethnic discrimination differs significantly by city, we run the probit regression Interview$(0, 1) = \alpha + \beta I^{City} + \gamma I^{Ethnicity} + \lambda (I^{City} \times I^{Ethnicity}) + \varepsilon$
The dependent variable is a dummy for receiving an interview, while I^{City} and $I^{Ethnicity}$ are, respectively, indicators for being in a particular city and being in each of the four minority ethnic categories. The chi-squared test above is a test for the joint significance of the four λ coefficients. We run this test three times, for each of the three city-pair combinations.

discrimination against Italians in Brisbane, but no evidence of discrimination against Italians in Melbourne.[19] To the extent that such differences exist, they could be due to the tightness of the labour market, the ethnic mix of the city, or differences in social norms. However, when we formally test the hypothesis that discrimination is equal across the three cities, we are unable to reject it for any of the three city-pair combinations. (Focusing on individual ethnicities, the only significant difference is the degree of discrimination against Italians in Brisbane and Melbourne).

Does discrimination vary with employer characteristics?

Our third conjecture was that ethnic-*majority* employers discriminate against *minority* groups. To test this, we investigate if the level of discrimination varies systematically with employer characteristics. We explore this in two ways. First, we match on the characteristics of the zipcode in which the employer is located, using data from the 2006 census. This has the great advantage of precision, and we might expect that employers who are located in areas with a high minority composition might have chosen to locate there, or might themselves be non-Anglo, or might instead have had greater exposure to other minorities. While we cannot distinguish between these various conjectures, we nonetheless think it is worth investigating this avenue to see if we can establish any links between employer location and ethnic discrimination.

The results of this exercise are shown in Table 6 where the sample is the 2,701 applicants for which we know the zipcode of the employer and the dependent variable the callback probability. In column 1, we interact the applicant's ethnicity with a measure of the share of respondents born overseas in the zipcode. The interaction coefficients are generally positive, suggesting that discrimination is lower when there are more migrants in a neighbourhood. This interaction is significant (at the 10% level) for Middle Eastern applicants. However, the magnitude of the effect is quite small – suggesting that discrimination against Middle Eastern applicants is only wiped out when four-fifths of the zipcode is overseas-born.

In column 2, we interact the applicant's ethnicity with the share of people in the employer's zipcode that were born in that country. In column 3, we interact the applicant's ethnicity with the share of people in the employer's zipcode that have that ancestry. Although one main effect is significant (employers located in neighbourhoods with more Chinese residents have higher callback rates), the interaction effects are insignificant (we do not observe any systematic relationship between applicants' ethnicity and the share of their ethnic group in the employer's neighbourhood).

We next exploit the fact that for many jobs, we know the name of the contact person listed on the advertisement, the person who responded to one or more of our applicants, and sometimes both. Software known as OnoMap, developed by researchers at University College London, was used to impute the ethnicity of these individuals, providing a proxy measure of the ethnicity of the person who made the hiring decision. OnoMap assigns ethnicity based on first names and last names, exploiting large databases in which individuals'

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[19]Perhaps this is not surprising given that Melbourne has the largest concentration of Italians.

TABLE 6

Applicant ethnicity and employer neighbourhood characteristics

	[1] Overseas-born share	[2] Born in same country	[3] Same ancestry
Indigenous applicant	−0.167***	−0.090***	−0.090***
	[0.046]	[0.027]	[0.026]
Chinese applicant	−0.153***	−0.127***	−0.130***
	[0.048]	[0.028]	[0.028]
Italian applicant	−0.098*	−0.068**	−0.075**
	[0.052]	[0.028]	[0.035]
Middle Eastern applicant	−0.205***	−0.127***	−0.127***
	[0.042]	[0.024]	[0.025]
Indigenous applicant × Overseas born share	0.201		
	[0.140]		
Chinese applicant × Overseas born share	0.04		
	[0.142]		
Italian applicant × Overseas born share	0.137		
	[0.137]		
Middle Eastern applicant × Overseas born share	0.239*		
	[0.140]		
Overseas born share	0.005		
	[0.100]		
Indigenous applicant × Indigenous share		−1.578	−14.919
		[1.475]	[14.715]
Chinese applicant × Chinese share		−0.326	−0.165
		[0.379]	[0.270]
Italian applicant × Italian share		2.283	1.079
		[2.041]	[1.098]
Middle Eastern applicant × Middle Eastern share		−1.626	−0.585
		[1.717]	[0.762]
Indigenous share		0.328	1.11
		[0.409]	[0.809]
Chinese share		0.650***	0.441***
		[0.189]	[0.136]
Italian share		−1.879	−0.759
		[1.203]	[0.628]
Middle Eastern share		−0.219	−0.211
		[0.532]	[0.253]
Observations	2,701	2,701	2,701
Pseudo R^2	0.07	0.07	0.07

Notes: Table shows marginal effects from a probit model. Standard errors in brackets. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels respectively. All estimates include indicator variables for job type, city, and CV template. Share variables are the share born in a given country in column 2, and the share with a given ancestry in column 3.

true names and ethnicities are known. For more details of the coding algorithm, see Mateos, Webber and Longley (2007) and Mateos (2007).

The results of this exercise are shown in Table 7, in the form of probit regressions where the dependent variable is the callback rate. In the first three columns, we simply classify contact people and responding people as Anglo (i.e. with names in the OnoMap

TABLE 7

Applicant ethnicity and employer ethnicity

	[1] Contact non-anglo	[2] Responder non-anglo	[3] Contact or responder non-anglo	[4] Contact same ethnicity	[5] Responder same ethnicity
Indigenous applicant	−0.111***	−0.132***	−0.111***	−0.106***	−0.126***
	[0.025]	[0.036]	[0.025]	[0.024]	[0.033]
Chinese applicant	−0.178***	−0.236***	−0.169***	−0.169***	−0.225***
	[0.023]	[0.034]	[0.024]	[0.021]	[0.031]
Italian applicant	−0.065**	−0.054	−0.055**	−0.063**	−0.059*
	[0.027]	[0.038]	[0.027]	[0.026]	[0.035]
Middle Eastern applicant	−0.145***	−0.231***	−0.160***	−0.146***	−0.218***
	[0.024]	[0.034]	[0.024]	[0.022]	[0.031]
Indigenous applicant × Non-Anglo employer	0.044	0.033	0.085		
	[0.084]	[0.087]	[0.074]		
Chinese applicant × Non-Anglo employer	0.048	0.024	0.065		
	[0.087]	[0.085]	[0.073]		
Italian applicant × Non-Anglo employer	0.081	−0.003	0.077		
	[0.088]	[0.086]	[0.074]		
Middle Eastern applicant × Non-Anglo employer	−0.019	0.068	0.079		
	[0.078]	[0.085]	[0.073]		
Non-Anglo employer	−0.001	0.021	0.016		
	[0.053]	[0.060]	[0.048]		
Chinese applicant × Chinese employer				0.14	0.055
				[0.102]	[0.101]
Italian applicant × Italian employer				−0.178**	−0.244*
				[0.086]	[0.131]
Middle Eastern applicant × Middle Eastern employer				−0.125	−0.078
				[0.141]	[0.219]
Chinese employer				0.157	0.209***
				[0.101]	[0.077]
Italian employer				0.02	−0.001
				[0.039]	[0.043]
Middle Eastern employer				0.041	0.021
				[0.090]	[0.099]
Observations	2,335	2,319	3,313	2,335	2,319
Pseudo R^2	0.07	0.09	0.06	0.07	0.09

Notes: Table shows marginal effects from a probit model. Standard errors in brackets. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels respectively. All estimates include indicator variables for job type, city, and CV template. Employer ethnicity is imputed using the name of the contact in the job advertisement in columns 1 and 4, the name of the person who responded to candidates in columns 2 and 5, and either of those people in column 3 (if either is non-Anglo, the employer is coded as non-Anglo).

Celtic or English categories), or non-Anglo (i.e. with names in the following OnoMap groups: African, East Asian & Pacific, European, Greek, Hispanic, International, Jewish & Armenian, Muslim, Sikh or South Asian). In columns 4–6, we classify employer names as being the same or different from the applicant's name (Italian applicants are matched to OnoMap's European and Greek groups, Chinese applicants are matched to OnoMap's East Asian & Pacific and South Asian groups, and Middle Eastern applicants are matched to OnoMap's Muslim group).[20]

We observe positive main effects for Chinese employers, who appear to have a higher callback rate. However, the only interaction effect we observe is for Italian employers, who appear to be significantly less likely to call back job candidates with Italian names. This is a surprising pattern, which suggests that a group with a relatively long history in Australia is actually less inclined to assist members of the same group.

How do our results compare with similar correspondence studies from other countries?

A survey by Riach and Rich (2002), supplemented with a literature review, returned 18 comparable correspondence studies (including ours), covering 34 minority ethnic groups. The results are set out in full in Table A2, and graphed in Figure 2. Of course there are problems in making such comparisons, not least the different minorities tested, the different histories of immigration in each country, the economic state of the countries and the like. Nonetheless this is a parsimonious way of making some comparisons. The first comparison is with the earlier Australian discrimination estimates from the correspondence study of Riach and Rich (1991), who ran an experiment in Melbourne between 1984 and 1988.
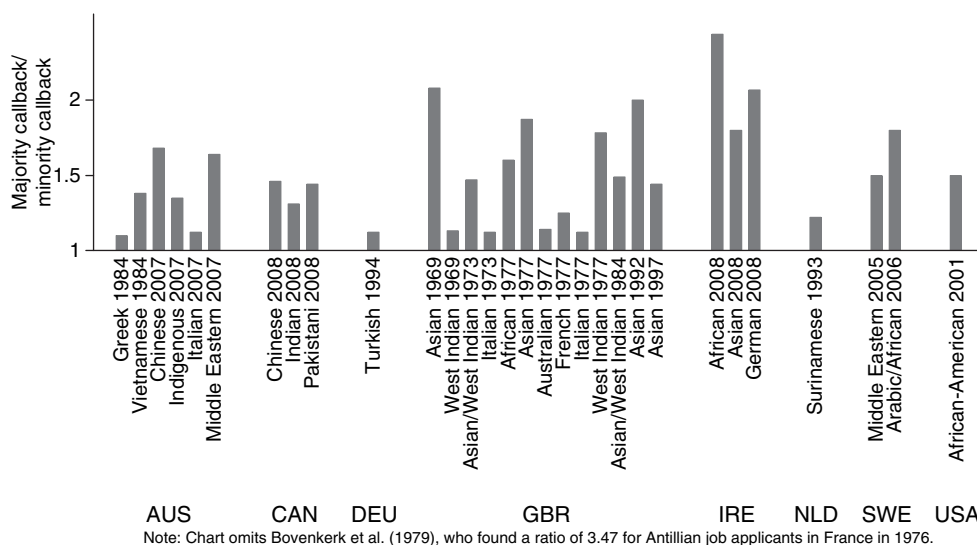

Note: Chart omits Bovenkerk et al. (1979), who found a ratio of 3.47 for Antillian job applicants in France in 1976.

Figure 2. Comparing our resuls with prior correspondence studies

[20]Matching more narrowly – e.g. matching Italian applicants to OnoMap's Italian names, and Chinese applicants to OnoMap's Chinese names – makes little difference to the results.

In that study, the two minority groups were Greeks and Vietnamese. Although our study does not analyse either of those two groups, it is possible that discrimination involves regional stereotyping. To the extent that this is true, it is notable that we observe little change in the level of discrimination against migrants from Southern Europe (comparing Greeks in 1986 with Italians in 2007), but a substantial increase in discrimination against migrants from South East Asia (comparing Vietnamese in 1986 with Chinese in 2007).[21]

Figure 2 also provides an international benchmark for our results, comparing only correspondence studies (ignoring studies that used actors to make contact in-person or via telephone).[22] For example, the level of callback discrimination against Indigenous Australians in 2007 was lower than the level of discrimination against African-Americans in the United States in 2001.[23] The level of discrimination against Chinese Australians in 2007 is higher than the discrimination against Asians in the UK in 1997 and against Chinese in Canada in 2008, but lower than against Asians in Ireland in 2008. The level of discrimination against Middle Eastern Australians in 2007 appears similar to the level of discrimination against Arabic and Middle Easterners in Sweden in 2005–07. And the level of discrimination against Italian Australians in 2007 is similar to the level of discrimination against Australians in the UK in 1977–78.

V.   Discussion and conclusion

The most common approach to estimating discrimination is through the use of surveys. However, such an approach may potentially provide biased estimates of the true extent of discrimination. For example, if earnings surveys do not contain good measures of productive characteristics such as school quality, and these characteristics are systematically correlated with both ethnicity and earnings, then their omission may bias estimates of labour market discrimination. Similarly, in the case of attitudinal surveys, there is a risk that survey respondents may proffer the socially acceptable answer rather than their actual belief.

To address these concerns, we conducted a large-scale correspondence discrimination experiment. This involved sending fake CVs to employers, to obtain an experimental measure of the relationship between job callbacks and the ethnic soundingness of the applicant's name. We find clear evidence of discrimination, with Chinese and Middle Easterners both having to submit at least 50% more applications in order to receive the same number of callbacks as Anglo candidates. Indigenous applicants also suffer a statistically significant level of discrimination, though the effects are smaller (for example, Indigenous applicants in Australia appear to fare a little better than African-Americans in the US job market). We observe virtually no discrimination against Italian applicants. To the extent that we can compare our results with earlier evidence for Australia, our results do not suggest that ethnic discrimination fell from 1986 to 2007.

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[21]However, if we restrict the 2007 sample to Melbourne applicants only, there is no apparent discrimination against Southern Europeans applying for jobs in Australia in 2007.

[22]So far as we are aware, ours is the most comprehensive survey to date of the available correspondence studies.

[23]In their correspondence study, Bertrand and Mullainathan (2004) found that the ratio of white callbacks to black callbacks was 1.5. This is a lower level of discrimination than the estimate from the in-person audit studies conducted by Pager (2003) (a callback ratio of 2.43, focusing only on those without criminal convictions), and Pager *et al.* (2009) (a callback ratio of 2.04).

Naturally, the use of field experiments to measure discrimination has its own limitations. For example, the way in which ethnicity is denoted may not necessarily be representative of the general population. In our experiment, we use names that were chosen on the basis that we judged them to be representative of the various ethnic groups. This allows us to conduct an experiment in which we only vary the names, but it has the limitation that our results will not necessarily generalize to individuals of the same ethnicity, but with an Anglicized name. Another limitation is that our experiment provides a precise estimate on the callback stage, but we are unable to speak of discrimination at the interview stage, nor on the job. Indeed, a drawback of the correspondence approach relative to the audit approach is that the pure correspondence approach does not allow one to explore discrimination at different stages of the application procedure (progressing from application, to invitation for an interview, to job offer, as was done by Bovenkerk, Gras and Ramsoedh, 1995, for Moroccan versus Dutch male applicants for semiskilled jobs). Hence our estimates are probably an underestimate of the extent of discrimination in the labour market. Moreover, as Pager *et al.* (2009, p. 793) note, the emphasis on jobs advertised through the online job site also probably understates the extent of discrimination, since firms wanting to discriminate may be more likely to use informal networks.

Yet in spite of these caveats, our findings are important, since our study is one of the first to compare multiple groups of immigrants in a country in which one in four individuals are born overseas. As noted at the start of section II, these groups range from earlier intakes of Italians to more recent intakes of Chinese and Middle Eastern individuals, as immigration policy in Australia has been progressively relaxed to admit immigrants from more diverse backgrounds. In a stark reminder of how far our country has yet to go, we have found clear evidence of discrimination against ethnic minorities – especially the more recently admitted groups–at the initial stage of the job-finding process. But what explains this prejudice? The higher rate of discrimination in the most customer-focused job (waitstaff) is consistent with some degree of customer-based discrimination. However, the fact that we observe discrimination in an occupation requiring no direct customer contact (data entry) suggests that customer discrimination is not the whole story. Other alternatives could include taste-based discrimination (on the part of co-workers or employers) or statistical discrimination. We have not been able to distinguish between these two broad hypotheses, in common with the vast majority of other studies investigating this issue with a variety of different methodologies. We suspect it is a bit of both: statistical discrimination in the face of uncertainty and the conservative tastes of the majority group revealed by attitudinal survey evidence.

In audit or correspondence studies, fictitious individuals who are identical in all respects apart from the one of interest apply for jobs. Audit studies have been criticized on numerous grounds including whether or not the applicants from different groups actually appear identical to employers. In response to these criticisms, correspondence studies substitute fictitious online or paper applications for fictitious personal candidates, thereby reducing potential heterogeneity in unobservables. This was the approach followed in this paper. However, correspondence studies are still vulnerable to the critique of Heckman and Siegelman (1993), who show that, if the distribution of unobservable productivity-relevant attributes of the various groups differ, the correspondence studies may produce over or under-estimation of discrimination. This is an important argument that we have not

been able to address in our study. Neumark (2010) shows that – if correspondence studies explicitly include variations in applicant quality, an unbiased estimate of discrimination can be uncovered. It is interesting to note that Neumark (2010) applied his technique to the correspondence study of Bertrand and Mullainathan (2004), and showed that their measured discrimination was actually an *under*-estimate. Since our experiment did not reveal systematic returns to applicant quality, Neumark's procedure is not open to us. However, in future work we hope to pursue this line of research.

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Appendix

TABLE A1

Ethnically distinctive names

Anglo first names	Female: Jennifer, Lisa, Kimberly, Sarah, Amy
	Male: Martin, Andrew, Phillip, Adam, Brian
Anglo last names	Abbott, Adams, Johnson, Mitchell, Robinson
Middle Eastern first names	Female: Fatima, Lala, Nadine, Anan, Hiyam
	Male: Ahmed, Hassan, Bilal, Mahmoud, Rafik
Middle Eastern last names	Hariri, Baghdadi, Chikhani, Kassir, Gemayel
Indigenous first names	Female: Betty, Winnie, Daisy, Dorothy, Peggy
	Male: Bobby, Jimmy, Tommy, Wally, Ronnie
Indigenous last names	Japanangka, Tjungarrayi, Djukukul, Tipungwuti, Puruntatameri
Chinese first names	Female: Ping, Ming, Xiu, Ya, Nuying
	Male: Tai, Hong, Yin, Peng, Hu
Chinese last names	Chen, Lin, Huang, Lee, Chang
Italian first names	Female: Maria, Anna, Rosa, Angela, Giovanna
	Male: Giuseppe, Giovanni, Antonio, Mario, Luigi
Italian last names	Rosso, Ferrari, Bianchi, Romano, Galeotti

TABLE A2

Comparison with other correspondence discrimination studies

Study	Country	Year(s) of test	Minority	Ratio (majority callbacks divided by minority callbacks)
Riach and Rich (1991)	Australia	1984–88	Vietnamese	1.38
			Greek	1.10
Booth *et al.* (This study)	Australia	2007	Indigenous	1.35
			Chinese	1.68
			Italian	1.12
			Middle Eastern	1.64
Oreopoulos (2009)	Canada	2008	Indian	1.31
			Chinese	1.46
			Pakistani	1.44
Bovenkerk *et al.* (1979)	France	1976–77	Antillian	3.47
Goldberg, Mourinho and Kulke (1996)	Germany	1994	Turkish	1.12
McGinnity *et al.* (2009)	Ireland	2008	African	2.44
			Asian	1.80
			German	2.07
				(continued overleaf)

TABLE A2

(*Continued*)

Study	Country	Year(s) of test	Minority	Ratio (majority callbacks divided by minority callbacks)
Bovenkerk *et al.* (1995)	Netherlands	1993–94	Surinamese	1.22
Carlsson and Rooth (2007)	Sweden	2005–06	Middle Eastern	1.50
Bursell (2007)	Sweden	2006–07	Arabic/African	1.80
Jowell and Prescott-Clarke (1970)	UK	1969	Asian	2.08
			West Indian	1.13
McIntosh and Smith (1974)	UK	1973	Asian /West Indian	1.47
			Italian	1.12
Firth (1981)	UK	1977–78	Asian	1.95
			West Indian	1.76
			Australian	1.14
			French	1.25
			African	1.60
Hubbuck and Carter (1980)	UK	1977–79	Asian	1.80
			West Indian	1.81
			Italian	1.12
Brown and Gay (1985)	UK	1984–85	Asian/West Indian	1.49
Esmail and Everington (1993)	UK	1992	Asian	2.00
Esmail and Everington (1997)	UK	1997	Asian	1.44
Bertrand and Mullainathan (2004)	US	2001–02	African-American	1.50

Notes: All studies dated before 2000 (except Goldberg *et al.* 1996) are summarized in Riach and Rich (2002). Note that Jowell and Prescott-Clarke (1970) changed not only the names but also the qualifications. For Bovenkerk *et al.* (1995), we take the average of the estimate for Surinamese males (1.27) and females (1.17). Estimates from Oreopoulos (2009) are based on respondents with Canadian qualifications and experience. Note that we summarize only estimates from correspondence studies, and *not* those in which actors contacted employers in person or by telephone.

Matthew O'Brien

Personal Detail:

15 Boundary Rd
Mortdale, Sydney
Tel: 91149283
E-mail: obrienluck@gmail.com

Personal Profile:

World class customer service agent with excellent communication & inter-personal skills. Consistently achieve quality, service and financial metrics. Committed to team success - able to multitask, and meet deadlines. Flexible and detail oriented with a commitment to understanding procedures. Demonstrate integrity & compliance - confidentiality in handling correspondence & customer files and code of ethics.

Skills:

-Accurate and rapid typing.
-Proficient in Microsoft Office/Word & the Internet.
-Knowledge of Excel, Access, Lotus Notes, IDT, IP Agent and other software applications.
-Word processing skills
-Performing administrative duties for Senior Management Personnel.
-Banking, processing procedures, product and services

Work Experience:

2005 - 2007
Service Specialist
Medibank Private, Sydney

2001 to 2005
Customer Service Representative
Optus, Sydney

1997 to 2001
Administrative Assistant
National Bank, Sydney

Highlights of Qualifications:

•Inbound call center, customer service and banking experience.
•Work effectively in a changing environment refocusing efforts with a positive attitude.
•Not afraid to think outside the box.
•Ensure customer care goals are achieved efficiently and effectively.
•Provide excellent customer service to both clients and providers quickly and accurately.
•Communicate unpleasant or negative information in a tactful manner.
•Establish and maintain control of inbound calls using a well organized structure.
•Resolve complex or basic inbound calls using sound business judgment.
•Promoting the company's products and services as a benefit to the client.
•Provide ongoing and comprehensive communication.

Education:

Certificate in Paralegal Studies
Completed Year 12

Diploma of Business Administration

Reference:

Available on request

Figure A1.

Dorothy Japanangka

6 Cavendish St
Stanmore, Sydney
Tel: 91149463
E-Mail: japanangka.f@gmail.com

Experience:

10/2004-03/2007
Food Prep Chef
University Union Court

Prepared food items for chef to use in recipes being served the following day.
Helped in other areas of the kitchen and in dining area as needed.

7/2003-10/2004
Hungry Jacks, Sydney

Prepared buns and burger meat, chicken etc for use in burgers during business
hours. Also washed dishes and assisted in garbage disposal.

8/2001 - 11/2002
Domino's Pizza, Sydney

Preparation of pizza toppings, pizzas and salad ingredients at various stages. Took
telephone orders. General cleaning of the store. I was promoted to a management position
which involved assisting with all operational tasks, scheduling, inventory, training of new
employees, book keeping and cash handling.

Skills:

Food Preparation and Serving Related First-Line Supervisors/Managers of Food
Preparation and Serving Workers.

Education:

Finished year 12
Strathfield South College

Bachelor of Arts
University of Technology, Sydney

References:

Please let me know if you need references.

Figure A2.