The Effect of Ethnic Residential Segregation on Wages of Migrant Workers in Australia

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July 2009

PRELIMINARY DRAFT – DO NOT QUOTE

Abstract. This paper investigates the effects of ethnic residential segregation on wages of migrant workers in Australia. The empirical analysis uses data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey in combination with regional information from Australian Census data. We account for the non-random sorting of individuals into neighborhoods by instrumenting for neighborhood attributes and considering regional fixed effects. Post code areas in which immigrants can gain additional points when entering Australia through the point system are used as an instrument for endogenous location choices. Our findings reveal that ethnic residential segregation has a significantly positive effect on wages of migrant workers and therefore provide support for the external validity of existing quasi-experimental evidence on refugees.

JEL-Classification: F22, R21, R23

Keywords: International migration, segregation, regional labor markets, neighborhood effects

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the MIAESR. We are grateful to Thomas Bauer and Deborah Cobb-Clark for very helpful comments on an earlier draft of this paper. We gratefully acknowledge the support of the Australian Group of Eight (Go8) and the German Academic Exchange Service (DAAD).
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Introduction

A better understanding of the factors that are responsible for a successful integration of current and future immigration cohorts is a prerequisite for effective immigration and integration policies. One factor that has been studied extensively over the last years is ethnic residential segregation (i.e. the clustering of foreign-born populations into ethnic "enclaves"), which can help explain why different groups of immigrants are more or less well integrated. Existing studies of ethnic or racial residential segregation have produced rather mixed results. Cutler and Glaeser (1997), for example, find negative associations between segregation and outcomes for young African-Americans. Edin et al. (2003) provide quasi-experimental evidence on refugees in Sweden and find that living in enclaves improves labor market outcomes for less skilled refugees.

In this paper, we investigate the effect of ethnic residential segregation on wages of skilled and unskilled migrants. While empirical evidence on the effects of ethnic residential segregation is available for the US and some European countries, one cannot simply assume that findings for the US and Europe are applicable in other immigration countries. This paper addresses this issue by analyzing the effect of ethnic residential segregation on wages of migrant workers in Australia. We take advantage of the opportunity to combine household-based data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey with regional information from the 2001 and 2006 Censuses of the Australian Bureau of Statistics.

When analyzing the effects of ethnic residential segregation, the sorting of individuals into neighborhoods has to be taken into account. To address this identification problem, existing studies have usually focused on subgroups of foreign-born populations such as refugees or young immigrants. This paper provides evidence on a representative sample of foreign-born workers without imposing such restrictions. In our empirical analysis, we account for the non-random sorting of individuals by instrumenting for neighborhood attributes and considering regional fixed effects. Post

code areas in which immigrants who enter Australia through the point system can gain additional points are used as an instrument for endogenous location choices.

Australia is one of the traditional immigration countries and immigration has been a cornerstone of its economic, social and cultural development. Historically, Australia favored immigration from Europe, leaving little scope for immigration from other continents. The immigration policy moved away from selecting immigrants on the basis of national origin in 1973 (Antecol et al., 2003). In recent decades, Australia has placed a high weight on accepting economic migrants using numerical testing to judge the admissibility of skilled immigrants (Birrell, 1990). In response to an increased demand for high-skilled labor, Australia has adopted initiatives to expand the opportunities for skilled workers to immigrate. Like Canada and New Zealand, Australia has increased the number of visas for permanent migrants selected under the points system leading the number of skill-based immigrants to Australia to triple between 1995 and 2005 (AGDIC, 2006). These immigration policies have shaped the foreign-born population in Australia in terms of their skills and settlement intentions.

Although empirical evidence on the earnings assimilation of immigrants to Australia suggests that the earnings disadvantage disappears over the settlement process (Chiskwick and Miller, 1985; MillerNeo, 2003), less is known about the earnings disadvantage within skill and age groups. Specifically, average income levels of native and immigrant households in Australia are about the same, although immigrants are on average older and better educated than natives.[1] Given this relative educational and demographic advantage, one would expect that average immigrants earn more than average natives. However, such an earnings advantage is not observed, suggesting that immigrants seem to be less integrated into the Australian labor market than is often recognized.

[1]Weekly gross wages of both native- and foreign-born workers are on average about $800, although 49% of the foreign-born and only 39% of the native-born workers have received higher education and average foreign-born workers are three years older than average native-born workers (own calculations based on HILDA).

Given the existing evidence for other immigration countries, it seems likely that ethnic residential segregation has an effect on wages of immigrant workers in Australia, although the direction of this effect is quite unclear. Against this background, we investigate whether ethnic residential segregation affects skilled and unskilled migrant workers differently. After controlling for non-random sorting, the results of our empirical analysis reveal a significantly positive effect of residential segregation on wages of migrant workers in Australia. These results are robust across several empirical applications and in line with the quasi-experimental literature on the effects of residential segregation on wages of refugees (Edin et al., 2003; Damm, 2009).

The paper proceeds as follows. Section 2 describes the data used for the empirical analysis. Section 3 provides a discussion of the empirical strategy. The estimation results are presented in Section 4. Section 5 concludes.

Data

We utilize the opportunity to combine household-based panel data with economic and social information of the neighborhood. Specifically, data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey are combined with regional information from the 2001 and 2006 Censuses at a Statistical Local Area (SLA) level (Australian Bureau of Statistics, 2006).[2]

The HILDA Survey is a broad social and economic longitudinal survey which began in 2001, with particular attention paid to economic and subjective well-being, labour market dynamics and family dynamics. The panel includes about 20,000 individuals in about 8,000 households. Interviews are conducted annually with all adult members of each household. As the HILDA Survey has a longitudinal design, most questions are repeated each year. In addition, specific questionnaire modules are included each wave, focusing on questions that will not be covered every year

[2]SLAs have about the same size as post code areas. They represent the smallest geographical region available in both data sets. About 14,000 persons live in an average SLA.

(such as family background and personal history, household wealth, retirement and plans for retirement, etc.). The In-Confidence Release of the HILDA survey includes information about post code and SLAs of the household's residence.[3]

Since the Australian Census of Population and Housing contains information about the whole population of Australia, it is our main resource for reliable regional characteristics on the statistical local area and statistical subdivision (SSD) level. The Basic Community Profiles of the Censuses include a variety of neighborhood characteristics, such as age distributions, migrants (including country of birth and year of arrival), children and child care, dwelling structure, earnings, education, employment, family formation and dissolution, home ownership, etc.

In the empirical analysis, a cross-section of native- and foreign-born workers observed in 2006 is employed. We restrict our sample to migrant workers aged between 18 and 65 years. We use the logarithm of weekly gross wages as dependent variable in our wage regression. We further consider a set of individual socioeconomic and demographic characteristics in our empirical analysis. Specifically, the right-hand side of our regression includes a quadratic function of age and indicator variables for migrant workers, gender, part-time employment, levels of educational attainment and metropolitan areas. After excluding all observations with missing values on one of the variables used in the analysis, our sample includes 2,997 migrant workers. Table 1 presents descriptive statistics of all variables used in the empirical analysis.

There are many ways to measure the different dimensions of segregation (Massey and Denton, 1988; Echenique and Fryer, 2005; Simpson, 2007). The Australian Census provides information about the size of the foreign- and native-born population within SLAs. We use this information to define the most straightforward measure

[3]The data used in this paper were extracted using the Add-On package PanelWhiz v2.0 (Nov 2007) for Stata. PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The PanelWhiz generated DO file to retrieve the HILDA data used here and any Panelwhiz Plugins are available upon request. Any data or computational errors in this paper are our own. Haisken-DeNew and Hahn (2006) describe PanelWhiz in detail.

of segregation, i.e. the share of migrants in the SLA. Additionally, we employ the dissimilarity index proposed by Duncan and Duncan (1955), which is the most commonly used index of segregation. The dissimilarity index (DI) is defined as

$$DI \quad = \quad 0.5 \times \left| \frac{M_{SLA}}{M_{SSD}} - \frac{N_{SLA}}{N_{SSD}} \right|,$$

where M denotes the number of migrants and N is the number of natives in the respective region. The dissimilarity index takes on values from 0 ("no segregation") to 1 ("complete segregation") and may be interpreted as the proportion of the migrant population which would have to move areas to be distributed in the same way as natives.

Empirical Strategy

Our empirical analysis departs from a wage regression of the form

$$\ln w_{ijt} \quad = \quad \beta_1 X_{it} + \beta_2 Z_{jt} + \gamma S_{jt} + \alpha_j + \alpha_t + \varepsilon_{ijt}, \tag{1}$$

where w_{ijt} denotes the hourly wage rate of migrant i in region j at time t, X_{it} is a set of individual-specific characteristics (such as education, occupation and age), S_{jt} denotes an index of segregation and α_j and α_t represent regional and time fixed effects, respectively. ε_{ijt} is an error term with $E(\varepsilon_{ijt}) = 0$ and $(\beta_1, \beta_2, \gamma)'$ is a parameter vector to be estimated. Since the segregation indices employed in our analysis are measured at two different levels of aggregation (SLA and SSD), we estimate equation (1) at the SLA level when investigating the exposure index and at the SSD level when examining the dissimilarity index. In our empirical analysis, we are mainly interested in an unbiased estimate of the coefficient γ, i.e. the effect of segregation on wages of migrant workers. The identification of this effect is empirically demanding for two reasons. First, non-random sorting of migrant

workers into regions of their own ethnic group may yield a biased OLS estimate of γ. This problem is even more severe if migrants of the same ethnicity possess similar skills. For example, the OLS estimate of γ will be downward biased if low-skilled migrant workers tend to move to locations with a high share of low-skilled migrant workers of the same ethnicity. Second, wage rates within regions could be correlated with levels of segregation. Specifically, the OLS estimate of γ would be downward biased if low-wage regions are those with high levels of segregation.

We employ two strategies to address these problems. First, we account for the non-random sorting of individuals into neighborhoods by instrumenting for neighborhood attributes. Specifically, post code areas in which immigrants can gain additional points when entering Australia through the point system are used as an instrument for endogenous location choices. Since this instrument is suitable at the SLA level rather than the SSD level (it turns out to be weak at the SSD level), we use Australian Census data for 2001 and 2006 to interact our instrument with a lagged exposure index. Second, we estimate a model with regional fixed effects to control for time-invariant regional characteristics.

Results

The estimates of the different models are presented in Tables 2 and 3. Table 2 includes the estimates at the SLA level (using the exposure index as a model regressor), while Table 3 includes the estimates at the SSD level (using the dissimilarity index as a model regressor). Four different models were estimated to obtain the results in each table: (i) OLS; (ii) OLS with regional fixed effects; (iii) IV regression using post code regions of the point system as an instrument for segregation; (iv) IV regression using an interaction between post code regions of the point system and lagged exposure indices as an instrument for segregation.

The OLS estimates in both tables reveal that the segregation indices (both at SLA and SSD level) have no significant effect on migrants' wages. Ideally, we would

include both regional fixed effects and instrument variables in the same model to control for non-random sorting and unobserved regional characteristics at the same time. Unfortunately, a simultaneous consideration of regional fixed effects and instrument variables is not possible because our instruments are measured at a regional level. However, after estimating OLS (without instruments) and controlling for regional fixed effects, we find that the segregation effects are still insignificant. As a consequence, we may estimate IV regression models without regional fixed effects to derive unbiased estimates of the segregation effects. These models suggest that the segregation indices are significantly positive, when controlling for non-random sorting.

When looking at the magnitude of the effects, we find a wage elasticity of about 0.2. Specifically, the elasticity of the exposure index of the IV1-model (which is our preferred model at the SLA level) is given by[4]

$$\Delta w\% \quad = \quad 1\% \cdot \overline{S} \cdot \widehat{\gamma} = 0.301 \times 0.704 = 0.21.$$

The corresponding elasticity of the dissimilarity index of the IV2-model (which is our preferred model at the SSD level) is

$$0.0204 \times 8.642 = 0.18.$$

Conclusions

Overall, the estimates provide evidence for a positive effect of residential segregation on wages of migrant workers in Australia. This result is in line with the quasi-experimental literature on the effects of residential segregation on wages of refugees (Edin et al., 2003; Damm, 2009).

[4]See also Table 1.

Tables

Table 1: Summary Statistics for Estimation Sample

Variable	Mean	Std. Dev.	Min.	Max.	N
Hourly wage	21.29	15.18	0.48	479.40	2997
Age	40.5	11.4	18	65	2997
Female	0.464	0.499	0	1	2997
Postgraduate degree	0.137	0.344	0	1	2997
Diploma or bachelor	0.316	0.465	0	1	2997
Certificate I-IV	0.182	0.386	0	1	2997
Year 12	0.182	0.386	0	1	2997
Year 11 and below	0.184	0.387	0	1	2997
Part-time employed	0.255	0.436	0	1	2997
Exposure index	0.301	0.12	0.046	0.628	2997
Dissimilarity index	0.02	0.02	0	0.125	2997

Table 2: SLA Estimates, All Migrants, Exposure (SLA)

	OLS	FE	IV 1	IV 2
Age	0.042	0.044	0.042	0.042
	(5.84)	(4.87)	(5.70)	(5.60)
Age^2	-0.00045	-0.00048	-0.00045	-0.00045
	(-5.31)	(-4.43)	(-5.08)	(-4.98)
Female	-0.14	-0.16	-0.15	-0.15
	(-5.67)	(-5.13)	(-5.68)	(-5.65)
Part-Time	0.083	0.10	0.099	0.10
	(2.62)	(2.64)	(3.00)	(3.06)
Postgraduate degree	0.17	0.17	0.14	0.13
	(3.32)	(2.82)	(2.83)	(2.62)
Diploma or bachelor	0.15	0.14	0.11	0.100
	(3.70)	(2.96)	(2.80)	(2.37)
Certificate I-IV	-0.0069	-0.031	0.0036	0.0072
	(-0.19)	(-0.65)	(0.10)	(0.19)
Year 12	0.019	-0.0052	-0.00040	-0.0068
	(0.53)	(-0.12)	(-0.01)	(-0.18)
α_t	-0.039	-0.053	-0.029	-0.026
	(-1.86)	(-2.10)	(-1.31)	(-1.12)
Exposure index	0.049	0.089	0.70	0.93
	(0.48)	(0.06)	(3.44)	(2.76)
Constant	1.17	1.13	1.00	0.94
	(5.14)	(2.00)	(4.10)	(3.62)
N	2997	2997	2997	2995
F	20.8	13.3	20.5	19.9
R^2	0.17	0.34	0.15	0.14
Shea-Partial R^2			0.22	0.088
F(1st stage)			137.5	30.0

t statistics in parentheses

Standard errors are robust and clustered on SLA level.

All regressions control for individual occupation.

Table 3: SSD Estimates, All Migrants, Dissimilarity Index

	OLS	FE	IV 1	IV 2
Age	0.042	0.044	0.045	0.044
	(6.95)	(6.00)	(6.07)	(6.73)
Age^2	-0.00045	-0.00048	-0.00050	-0.00048
	(-6.43)	(-5.45)	(-5.39)	(-5.99)
Female	-0.14	-0.16	-0.14	-0.14
	(-5.35)	(-4.88)	(-5.20)	(-5.33)
Part-Time	0.082	0.10	0.094	0.090
	(2.67)	(2.56)	(2.91)	(2.89)
Postgraduate degree	0.17	0.17	0.14	0.15
	(2.98)	(2.51)	(2.16)	(2.48)
Diploma or bachelor	0.15	0.14	0.10	0.12
	(3.80)	(3.00)	(2.13)	(2.69)
Certificate I-IV	-0.0076	-0.031	0.00046	-0.0020
	(-0.21)	(-0.68)	(0.01)	(-0.05)
Year 12	0.020	-0.0052	0.0043	0.0092
	(0.58)	(-0.13)	(0.10)	(0.24)
α_t	-0.040	-0.054	-0.029	-0.032
	(-2.23)	(-2.42)	(-1.23)	(-1.53)
Dissimilarity index	0.11	-0.44	12.4	8.64
	(0.15)	(-0.11)	(1.87)	(2.16)
Constant	1.18	1.17	1.07	1.11
	(5.66)	(3.84)	(5.08)	(5.48)
N	2997	2997	2997	2997
F	24.3	20.4	19.4	22.8
R^2	0.17	0.34	-0.040	0.069
Shea-Partial R^2			0.023	0.033
F(1st stage)			5.42	10.3

t statistics in parentheses

Standard errors are robust and clustered on SSD level.

All regressions control for individual occupation.

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