Neighborhood Segregation and Black Entrepreneurship

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Eric Fesselmeyer[a], Kiat Ying Seah[b,*]

[a]*Department of Economics and IRES, National University of Singapore*
[b]*Department of Real Estate and IRES, National University of Singapore*

Abstract

We examine the causal effect of neighborhood segregation on black entrepreneurship. We address neighborhood sorting by analyzing city averages and omitted variable bias by instrumenting for segregation using historical railroad configurations. We find that segregation has a significant positive effect: a 10 percentage point increase in the dissimilarity index decreases the racial gap by about 3.3 percentage points. To minimize the effect of cross-city sorting, we use a narrower sample constructed from outcomes of young adults and find a similar effect. Our findings are important because historically, entrepreneurship has been an avenue out of poverty, and entrepreneurship has been promoted as a way to decrease welfare and unemployment.

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*Corresponding author. Email: sky@nus.edu.sg, Tel: (65) 6516 3562

1. Introduction

We consider the effect of segregation on black entrepreneurship – a relationship that has been studied previously but, to the best of our knowledge, not in a manner that renders a causal estimate.[1] Understanding the racial gap in entrepreneurship is important because entrepreneurship is a source of wealth and employment as well as a critical channel of upward mobility (Fairlie and Robb (2008), Quadrini (1999)). Racial disparities in business ownership could exacerbate wealth inequality along racial lines, and engender persistent intergenerational economic stagnation for minorities.

Neighborhood segregation does not necessarily lead to lower black entrepreneurship rates especially if there are positive spillovers that result from within-group mixing among income classes (Higgs (1977)) or from market segmentation whereby black entrepreneurs serve the needs of black customers that are not pursued by white-owned businesses (Brimmer (1997)). However, if racial segregation results in a lack of positive role models or a deficient provision of local public goods, then it is plausible that segregation could curb black entrepreneurship.[2]

Establishing the causal effect of segregation on entrepreneurship is complicated by two primary concerns. First, individuals may self-select into neighborhoods. For example, more enterprising blacks may choose to locate in less segregated neighborhoods. To mitigate this concern, following Cutler and Glaeser (1997) and Card and Rothstein (2007), we average outcomes at the city level for non-blacks and blacks and take the difference to elimi-

[1] See, for example, Massey and Denton (1993) and Bogan and Darity (2008). Cutler and Glaeser (1997), Card and Rothstein (2007), and Ananat (2011) examine the effect of segregation on other black outcomes such as employment status, test scores, and income.

[2] Wilson (1996) observed that "Segregation in ghettos exacerbates employment problems because it leads to weak informal employment networks and contributes to social isolation of individuals and families, thereby reducing their chances of acquiring the human capital skills, that facilitate mobility in a society. Since no other group in society experiences the degree of segregation, isolation, and poverty concentration as do African-Americans, they are far more likely to be disadvantaged..." (pg. 24)

nate any city-wide variables that affect the two groups equally. To account for possible city-level unobservables that affect the groups differently, we include city characteristics in the specification of the remaining error term. The second concern is that omitted variable bias could arise from unobservable city-level attributes that affect both segregation and mean economic outcomes. We instrument for segregation using the Railroad Division Index (RDI) of Ananat (2011). Ananat argues that the extent to which a city was subdivided by nineteenth-century railroad tracks, which subsequently served as natural enclave boundaries, influenced how segregated a city became when large inflows of blacks moved during the Great Migration.

Addressing these concerns, we find strong evidence that greater neighborhood segregation increases relative black entrepreneurship. A 10 percentage point increase in the dissimilarity index, an index that measures the level of neighborhood segregation, increases the rate of black entrepreneurship by 3.3 percentage points relative to the rate of non-blacks. To minimize the influence of cross-city sorting, we also estimate the segregation effect using a narrower sample constructed from the outcomes of young adults. This narrower sample mitigates the influence of sorting since young adults have a shorter window to change cities, and the likelihood of such moves is conceivably low. Using this sample we find that a 10 percentage point increase in the dissimilarity index increases the rate of black entrepreneurship by 2.8 percentage points relative to the rate of non-blacks.

2. Model

The outcome of individual i of racial group j living in city c is determined by

$$Y_{ijc} = X_{ijc}\alpha + R_{ijc}\delta + \epsilon_{ijc}, \tag{1}$$

where

$$Y_{ijc} = \begin{cases} 1 & \text{if the individual is an entrepreneur} \\ 0 & \text{if the individual is employed by others} \end{cases}$$

X_{ijc} is a vector of observed individual characteristics, and R_{ijc} is the fraction of blacks in i's neighborhood. δ is the parameter of interest. It measures the effect of neighborhood segregation on entrepreneurship. The error ϵ_{ijc} has two components. One component is common to individuals in racial group j living in city c, u_{jc}. The other component is an individual-specific error with mean 0 for each racial group living in each city, ξ_{ijc}.

Following Cutler and Glaeser (1997) and Card and Rothstein (2007), we average outcomes of each racial group to the city level which removes ξ_{ijc} from the model and eliminates the effect of non-random sorting of households into neighborhoods within a given city. Taking the average of (1), we have

$$Y_{jc} = X_{jc}\alpha + R_{jc}\delta + u_{jc}, \tag{2}$$

Here, Y_{jc} is the entrepreneurship rate of group j in city c, X_{jc} are the mean characteristics of racial group j living in city c, and R_{jc} is the average fraction of black neighbors in group j living in city c.

We then take the difference between racial groups within a city to eliminate any city-wide variables that affect the two racial groups equally:

$$\Delta Y_c = \Delta X_c\alpha + \Delta R_c\delta + \Delta u_c, \tag{3}$$

where $\Delta Y_c = Y_{2c} - Y_{1c}$, $\Delta X_c = X_{2c} - X_{1c}$, and $\Delta u_c = u_{2c} - u_{1c}$. ΔR_c is the dissimilarity index, a measure of the level of segregation in city c.

To account for any possible unobserved differences between non-blacks and blacks at the city level, we include city characteristics in the specification of Δu_c. That is,

$$\Delta u_c = F_c\psi + \nu_c$$

where F_c are city characteristics and ν_c contains the remaining unobserved differences between non-blacks and blacks in city c.

The model to be estimated is then

$$\Delta Y_c = \Delta X_c \alpha + \Delta R_c \delta + F_c \psi + \nu_c \tag{4}$$

As mentioned previously, omitted variable bias could still be present. We address this by instrumenting for neighborhood segregation following Ananat (2011). There is also the possibility of cross-city sorting. We address this in a robustness test by estimating the model on a sample created from outcomes of young adults, following the approach of Cutler and Glaeser (1997).

3. Data

Our data comes from four sources. Data on entrepreneurship and individual characteristics are from the 5-percent Public Use Microdata Sample Files (PUMS) of the 2000 Census. City characteristics for 2000 were downloaded using American FactFinder. The 2000 dissimilarity index was downloaded from the archived web page of Jacob Vigdor.[3] Our instrument for the dissimilarity index, the Railroad Division Index (RDI), and 1910 and 1920 city characteristics are from Ananat (2011).[4]

3.1. 2000 Census Data

Using the 2000 Census data, for our primary analysis, we computed entrepreneurship rates and average characteristics by Metropolitan Statistical Area (MSA) and by racial group using US-citizen heads of household ages 18 to 65 who were not in school or the armed forces. A person is an entrepreneur if the PUMS class-of-worker variable indicates that the person worked for their own enterprise, and is not an entrepreneur if the person worked for someone else as an employee. Our dependent variable is the difference in mean entrepreneurship rates of non-blacks and blacks. For ease of

[3] `http://trinity.aas.duke.edu/~jvigdor/segregation`

[4] The data was downloaded from the AEA webpage (`https://www.aeaweb.org/articles?id=10.1257/app.3.2.34`).

exposition, we will henceforth refer to this dependent variable as the *racial gap*.

We also estimated the model using a sample based on 18 to 25 year olds. This is meant to minimize the effect of cross-city sorting since young adults have had only a short period in which to change residence. Moreover, we assign individuals to their MSA of residence five years before being interviewed to capture the effect of segregation when peer influences are presumably strongest. This subsample contains fewer observations since some MSAs do not contain observations from any young black individuals.

3.2. Dissimilarity Index

To measure the level of segregation within a MSA, we use the standard dissimilarity index:

$$\text{Dissimilarity Index} = \frac{1}{2}\sum_{i=1}^{N}\left|\frac{\text{black}_i}{\text{black}_{total}} - \frac{\text{nonblack}_i}{\text{nonblack}_{\text{total}}}\right|$$

Here, i identifies a census tract within an MSA. The dissimilarity index measures the fraction of blacks that would have to move to a different census tract in order for the proportion black in each neighborhood to equal the proportion black in the metropolitan area as a whole. If blacks were evenly distributed throughout the city, the index would be zero. If blacks and non-blacks were fully segregated, i.e., each census tract consisted of either no blacks or all blacks, then the index would be one. (In the analysis below, the index is on a 0-100 scale.)

3.3. Railroad Division Index (RDI)

We instrument for the dissimilarity index using the Railroad Division Index (RDI) of Ananat (2011). The RDI measures the extent to which a metropolitan area is subdivided by railroad tracks laid in the 19th century. It is computed as

$$RDI = 1 - \sum_i \left(\frac{\text{AREA}_{\text{neighborhood}i}}{\text{AREA}_{\text{total}}} \right)^2$$

An undivided city would have a single contiguous neighborhood and an RDI value of 0. A city that was infinitely subdivided by railroad tracks so that each subdivision had an area of near 0 would have an RDI value of 1.

Our identification strategy assumes that RDI in the 19th century does not predict the gap in non-black and black entrepreneurship in 2000, except through its effect on segregation. The primary motivation for this instrument, as argued by Ananat (2011), is that railroad tracks define spatial boundaries and highly subdivided cities tended to become more significantly segregated during the Great Migration (around 1915 to 1950). Our first-stage regression results in Table A.2 in the Online Appendix do indeed show that RDI significantly predicts 2000 segregation levels. There are two primary reasons however why our identification strategy could fail. First, RDI could be correlated with historical city characteristics which may have impacted later entrepreneurship.[5] Second, the instrument may have had a direct impact on the early demographics and economic characteristics of each city.

Table 1 contains the results of six regressions measuring the relationship between RDI and various city characteristics in 1910, one decade after the end of major railroad construction and before the Great Migration. It shows that RDI is not related to any of these characteristics, indicating that railroad configuration was not driven by local economic or social characteristics.[6]

To address the possibility that subsequent to the first wave of the Great

[5]For example, the configuration of 19th century railroad tracks may be correlated with the connectedness of a city or the early industrial base and this could generate early selection and migration patterns that affect later entrepreneurship opportunities. We thank an anonymous referee for pointing this out.

[6]These findings are similar to those in Ananat (2011). We re-estimated her regressions since our sample includes a smaller set of cities as entrepreneurship rates are not available for all the cities used in her analysis.

Migration, people may have sorted themselves non-randomly based on RDI, we examined six human capital characteristics of cities as well as population density (to account for early urbanization economies) in 1920. The results in Table A.1 in the Online Appendix show that RDI is not correlated with these early city population characteristics that might also affect later entrepreneurship rates.[7]

3.4. Summary Statistics and other covariates

Our primary sample consists of 98 MSA-level observations. On average, the entrepreneurship rate was 12% for non-blacks compared to 4% for blacks, resulting in a racial gap of around 8 percentage points. The average metropolitan area had a dissimilarity index value of 52 and an RDI value of 0.72.

In the full regression, we include average non-black/black differences in age and college degree attainment. Additionally, we include the following city characteristics: average track length per 100 square km,[8] population, black population, Hispanic population, land area, natural log of median income, and manufacturing share of employment.

4. Results

Table 2 contains estimates of our model. The top panel contains estimates from the full sample. The bottom panel contains estimates from the narrower sample computed using individuals 18 to 25 years of age.[9]

In both panels, columns (1) and (2) are OLS estimates of the model without covariates and with covariates, respectively. Columns (3) and (4)

[7]The Online Appendix also provides qualitative arguments, borrowed heavily from Ananat (2011), on why RDI is a valid instrument.

[8]Track length is included as a regressor in all regressions to ensure that RDI is not capturing the amount of railroad track in an area.

[9]Tables A.2, A.3, and A.4 of the Online Appendix contain the complete results of the first and second stage regressions.

contains IV estimates without and with additional covariates.

The OLS and IV estimates in the top panel shows that segregation has a negative effect on the entrepreneurship gap between non-blacks and blacks, with and without additional controls. That is, more segregated metropolitan areas have a smaller racial gap in the entrepreneurship rate. Both set of IV estimates are significant at at least the 5% level. The IV estimate of the effect of segregation in the full model reported in column (4) indicates that a 10 percentage point increase in the dissimilarity index decreases the racial gap by about 3.3 percentage points.

In the lower panel, we see that the estimates of the effect of segregation are reasonably similar when we restrict the sample to young adults, suggesting that cross-city selection may not be a significant problem in the wider sample. In the full specification in column (4), the IV estimate indicates that a 10 percentage point increase in the dissimilarity index causes a 2.8 percentage point decrease in the racial gap.

5. Conclusion

American cities are characterized by residential segregation, which the literature argues could lead to a positive or a negative effect on black entrepreneurship. Racial enclaves may create protected markets for black-owned businesses serving black consumers that are kept out of markets due to discrimination[10] (a positive effect) or they could reflect racism-motivated socio-economic isolation and deprivation (a negative effect). We find that, in fact, segregation decreases the racial gap in entrepreneurship. Blacks living in more segregated cities are more likely to be self-employed compared to others. *Prima facie*, our results seem to suggest that segregated neighborhoods are conducive to market segmentation in which black businesses serve predominantly black customers. Alternatively, our results could be a

[10]See the discussion on the origins and evolution of black businesses in Brimmer (1997).

reflection of the effectiveness of place-based affirmative action programs[11] as suggested by Boston (1999). Further research in this area is warranted.

[11] An example is the well-studied "Atlanta Plan" initiated in 1974 by Mayor Maynard Jackson. It paved the way for black entrepreneurs to break into city contracting through mandated set-aside funds to support minority-owned businesses. Total minority procurement increased from 0.13 percent in 1973 to 38.5 percent in 1978, the end of Jackson's first term (Boston (1999), p. 15.). The gain in minority procurement arguably created a momentum: Atlanta's black-owned businesses nearly doubled from 11,804 to 23,488 between 1987 and 1992. (Ibid, p. 18).

Table 1: 1910 City Characteristics Regressions

Outcome:	Area (Sq. miles /1000)	Pop (1000s)	Ethnic Dissimilarity Index	Ethnic Isolation Index	Percent Black (1000s)	1915 Street-cars per capita
RDI	-3.808	0.808	0.0986	0.033	0.0038	-0.132
	(12.004)	(1.446)	(0.186)	(0.070)	(0.010)	(0.183)
Track Length per sq. km.	-542.976	69.274	6.367	-14.997	9.426***	3.361
	(571.194)	(136.476)	(53.689)	(17.775)	(0.555)	(20.507)
Mean of Dep. Var.	14.502	1.628	0.316	0.056	1.469	179
Observations	57	98	48	48	98	13

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses.

Table 2: Entrepreneurship Regressions

	Ages 18 to 65			
	OLS		2SLS	
	(1)	(2)	(3)	(4)
Dissimilarity Index	-0.073**	-0.054	-0.246***	-0.331**
	(0.031)	(0.035)	(0.083)	(0.147)
First-stage F statistic			13.97	7.02
Additional covariates	No	Yes	No	Yes
R^2	0.083	0.116		
Observations	98	85	98	85

	Ages 18 to 25			
	OLS		2SLS	
	(1)	(2)	(3)	(4)
Dissimilarity Index	-0.070***	-0.131**	-0.100*	-0.275***
	(0.026)	(0.059)	(0.054)	(0.102)
First-stage F statistic			24.49	11.52
Additional covariates	No	Yes	No	Yes
R^2	0.064	0.154		
Observations	84	74	84	74

Notes: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the non-black/black difference in the average rate of entrepreneurship by MSA. In columns (3) and (4), Dissimilarity Index is instrumented with the Railroad Division Index of Ananat (2011). Additional covariates include non-black/black differences in average age and education, and total population, black population, Hispanic population, log median income, manufacturing share of employment, land area, and track length. Robust standard errors are in parentheses.

Online Appendix

A.1. More discussion on the Railroad Division Index (RDI)

The assumption of our identification strategy is that RDI in the 19th century does not predict the gap in non-black and black entrepreneurship in 2000, except through its effect on segregation. The primary motivation for this instrument is that railroads tend to define spatial boundaries and a highly subdivided city tended to become more significantly segregated during the Great Migration (around 1915 to 1950). In the main part of the paper, we argue that there are two ways in which the instrument could be rendered invalid. For one, the railroad track configuration could be correlated with historical MSA characteristics which may have affected later entrepreneurship; secondly, subsequent to the Great Migration, individuals could have sorted themselves non-randomly into cities and this self-selection could have affected the industrial base of a city and persisted through generations to affect later entrepreneurship rates.

We addressed the validity of the RDI instrument through a battery of tests showing that RDI is not related to early (1910) MSA characteristics in Section 3.3 of the main text. In this appendix, we address the possibility that subsequent to the first wave of the Great Migration, people could have sorted themselves non-randomly based on RDI. Specifically, we examined 6 human capital characteristics of cities in 1920 as well as population density to account for early urbanization economies. These tests are essentially replicating the validity tests in Ananat (2011) but with a smaller subset of cities as we do not observe entrepreneurship rates for all cities. Like Ananat (2011), the tests control for the length of railroad track per square kilometer so that the RDI represents configuration of the track conditional on total track and not simply the amount of railroad track. Conditioning on track length mitigates the possibility that the density of railroad tracks might be correlated with city outcomes, such as its industrial composition or physical

attractiveness.

As Table A.1 shows, the RDI estimates in 6 of the 7 regressions are insignificant, similar to Ananat's results, except we get a slightly larger RDI t-statistic for the literacy rate regression, with a p-value of .096. Overall, these results provide evidence that railroad division is not correlated with any demographic or economic city-level attributes that could have contributed to later entrepreneurship rates.

Additionally, we wish to point out two historical facts that were important in considering the validity of the RDI instrument. One, the bulk of the railroad tracks were laid before 1900 making it unlikely that railroads tracks were meant to segregate blacks and that the creation (and demand) for segregation in cities other than the South was fueled by the Great Migration. Railroad placements were largely due to terrain considerations to avoid topographic challenges that could lead to increased cost (Atack and Passell (1994), p. 444). In addition, to ensure that railway investments did not benefit other cities, railroads were deliberately constructed to be incompatible with other cities' railroads (Taylor and Neu, 1956). The national connectedness of the railway systems between cities only came about when Congress imposed a standard gauge after the Civil War. These points were given in Appendix A of Ananat (2011).

Table A.1: 1920 City Characteristics Regressions

Outcome:	% Black	% Literate	Labor Force Participation	% Empl. Trade	% Empl. Manufact.	% Empl. Railroads	Log of Pop. Density
RDI	0.015	0.054*	0.031	-0.085	0.177	-0.078	0.0098
	(0.010)	(0.032)	(0.024)	(0.099)	(0.143)	(0.072)	(0.481)
Track Length per sq. km.	9.019***	0.198	-3.653**	-0.889	18.294*	1.481	-22.158
	(0.638)	(0.887)	(1.715)	(2.718)	(11.252)	(2.345)	(19.803)
Mean of Dep. Var.	1.644	95.777	41.768	6.280	46.706	0.382	2.388
Observations	98	98	98	98	98	98	42

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in parentheses.

Table A.2: First-stage Regression Results

	Ages 18 to 65		Ages 18 to 25	
	(1)	(2)	(3)	(4)
Railroad Division Index	35.127***	25.649***	48.949***	33.866***
	(9.398)	(9.678)	(9.892)	(9.977)
Track length (per 100 square kms)	18.323*	13.343	15.594	12.417
	(10.306)	(9.163)	(9.642)	(8.077)
Age (differenced)		1.257		-4.882***
		(0.874)		(1.663)
College degree (differenced)		5.473		20.297***
		(18.355)		(5.600)
Black population (10000s)		0.380**		0.266**
		(0.149)		(0.132)
Hispanic population (10000s)		-0.016		0.002
		(0.048)		(0.042)
Population (10000s)		-0.027		-0.026
		(0.033)		(0.029)
Land area (square miles/1000)		-0.350		-0.450
		(0.455)		(0.399)
Manufacturing share		0.427*		0.589**
		(0.237)		(0.227)
Log(median income)		8.678		14.638*
		(9.617)		(7.711)
Constant	24.942***	-63.530	15.018**	-128.702
	(6.750)	(95.678)	(7.209)	(77.949)
R^2	0.186	0.386	0.288	0.564
Observations	98	85	84	74

Notes: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the Dissimilarity Index. Robust standard errors are in parentheses.

Table A.3: Ages 18 to 65 Sample: OLS and Second-stage Regression Results

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Dissimilarity Index (0 - 100 scale)	-0.073**	-0.054	-0.246***	-0.331**
	(0.031)	(0.035)	(0.083)	(0.147)
Track length (per 100 square kms)	0.481	1.804	5.312**	7.289***
	(2.360)	(2.258)	(2.317)	(2.646)
Age (differenced)		0.162		0.434
		(0.339)		(0.490)
College degree (differenced)		7.821		7.601
		(6.425)		(7.912)
Black population (10000s)		0.029		0.122*
		(0.024)		(0.066)
Hispanic population (10000s)		0.013**		-0.002
		(0.006)		(0.011)
Population (10000s)		-0.006		-0.007
		(0.005)		(0.006)
Land area (square miles/1000)		-0.045		-0.195**
		(0.073)		(0.086)
Manufacturing share		0.081		0.252**
		(0.065)		(0.120)
Log(median income)		-2.658		-0.769
		(3.079)		(3.848)
Constant	11.806***	34.473	20.374***	26.449
	(1.826)	(30.590)	(4.220)	(38.671)
R^2	0.083	0.116		
Observations	98	85	98	85

Notes: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the non-black/black difference in the average rate of entrepreneurship by MSA. In columns (3) and (4), Dissimilarity Index is instrumented with the Railroad Division Index of Ananat (2011).

Table A.4: Ages 18 to 25 Sample: OLS and Second-stage Regression Results

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Dissimilarity Index (0 - 100 scale)	-0.070***	-0.131**	-0.100*	-0.275***
	(0.026)	(0.059)	(0.054)	(0.102)
Track length (per 100 square kms)	2.036*	3.164*	2.819*	5.970***
	(1.113)	(1.697)	(1.622)	(2.085)
Age (differenced)		-0.688		-1.350
		(0.825)		(0.840)
College degree (differenced)		2.284		5.257
		(2.921)		(3.299)
Black population (10000s)		-0.018		0.015
		(0.041)		(0.052)
Hispanic population (10000s)		-0.013		-0.020*
		(0.012)		(0.011)
Population (10000s)		0.008		0.008
		(0.010)		(0.010)
Land area (square miles/1000)		-0.107**		-0.193***
		(0.051)		(0.070)
Manufacturing share		0.169*		0.296**
		(0.085)		(0.115)
Log(median income)		-0.877		0.804
		(2.097)		(2.509)
Constant	5.239***	14.395	6.687***	2.786
	(1.215)	(20.432)	(2.515)	(24.104)
R^2	0.064	0.154		
Observations	84	74	84	74

Notes: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the non-black/black difference in the average rate of entrepreneurship by MSA. In columns (3) and (4), Dissimilarity Index is instrumented with the Railroad Division Index of Ananat (2011).

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