HIER

Harvard Institute of Economic Research

Discussion Paper Number 1949

Political Jurisdictions in Heterogeneous Communities

by

Alberto Alesina, Reza Baqir and Caroline Hoxby

March 2002

Harvard University
Cambridge, Massachusetts

POLITICAL JURISDICTIONS IN HETEROGENEOUS COMMUNITIES

Alberto Alesina
Harvard University,
NBER, and CEPR

Reza Baqir
International Monetary Fund

Caroline Hoxby
Harvard University
and NBER

Latest Revision: February 2002*

Abstract

We investigate the number and size of local political jurisdictions are determined, by focusing on the tradeoff between the benefits of economies of scale and the costs of a heterogeneous population. We consider heterogeneity in income, race, ethnicity, and religion, and we test the model using American school districts, school attendance areas, municipalities, and special districts. Using cross-sectional and panel analysis, we find very little evidence of tradeoffs between economies of scale and ethnic or religious heterogeneity. However, we find evidence of a tradeoff between economies of scale and income heterogeneity and particularly strong evidence of a tradeoff between economies of scale and racial heterogeneity. To clarify the direction of causality between heterogeneity and jurisdictions, we exploit shocks to racial heterogeneity generated by the two World Wars.

*Initial version: November 1999. We thank Steve Levitt, Antonio Rangel, David Romer, two anonymous referees and participants in seminars at MIT, Stanford, Harvard, the World Bank, the National Bureau of Economic Research, and the MacArthur Network on Social Interactions and Inequality for very useful comments. Alesina gratefully acknowledges financial support from National Science Foundation.

1. Introduction

The largest country in the world, China, has 1.203 billion inhabitants; the smallest, Palau, has 16,661.[1] The largest county in the United States (Los Angeles, California) has 8,863,164 inhabitants; the smallest (Loving, Texas) has 107.[2] The largest school district in the United States has 1.4 million school-aged children; the smallest has two.[3] Given these fascinating differences, a question is what determines the optimal size of political jurisdictions.

The answer is different for various types of jurisdictions–countries, states, counties, school districts, *et cetera,* but in all cases, there is a tradeoff between the benefits of larger scale and the costs of a more heterogeneous population. Heterogeneity can be costly if different individuals have different policy preferences, so that they must compromise in order to share a jurisdiction. Heterogeneity is also costly if individuals prefer to interact with people like themselves, regardless of preferences over public policies.

Consider, for example, the problem of dividing an area into school districts. Large districts have economies of scale because they can provide libraries, sports facilities, and administration on a district-wide basis. On the other hand, in large districts, many families have to mix their children and agree on common educational policies. If families in an area are homogeneous, an increase in size may be purely beneficial (unless there is a point where diseconomies of scale set in). If, instead, an increase in size implies an increase in heterogeneity, there may be a tradeoff.

We test whether a tradeoff between economies of scale and heterogeneity helps to explain the number and size of local jurisdictions in the United States. We use counties as our basic areas because they almost

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[1] Source: CIA World Factbook 1996. The data refer to 1995. Palau is the smallest country with a full membership in the UN. Three others are smaller but do not have a UN seat.

[2] Source: 1990 Census of Population. Yellowstone National Park (which is a county) actually has the smallest population of any county in the United States, but its population is artificially limited.

[3] The largest districts in the United States are the New York City district (which includes all 5 boroughs), the Los Angeles Unified district, and the Chicago school district. There are approximately 50 school districts in the United States that have one to three students in a typical year. They include districts such as Maine's Isle au Haut district and Montana's Upper Crackerbox district.

never consolidate or break apart. Also, local jurisdictions rarely traverse county lines. Thus, a county may be divided into many or few jurisdictions, but it nearly always maintains its identity.

We consider municipalities, special districts, and school districts; and we also explore individual schools because we recognize that, within a jurisdiction, individuals can sort themselves into groups that are more homogeneous than the overall population of the jurisdiction. For instance, individual schools can be relatively homogeneous even in a district that has a heterogeneous student population.

We concentrate on heterogeneity in income, race, ethnicity, and religion. While other types of heterogeneity, such as age heterogeneity, may be relevant (and in fact, we include them in our estimation), we emphasize the results for the aforementioned types of heterogeneity. This is because a vast sociological and political literature argues that they are the main fault lines of preferences and political conflict in the United States.[4]

Our results suggest that people are willing to give up economies of scale in order to avoid being in a jurisdiction with significant racial or income heterogeneity. Strikingly, the trade-off between economies of scale and racial heterogeneity is more robust empirically than the trade-off between economics of scale and income heterogeneity. This result is striking because the one *obvious* reason for people to care about the population in their jurisdiction is that people with different incomes face different tax burdens but receive about the same level of local public goods.

Readers may find it hard to envision how local jurisdictions respond to heterogeneity because they can recall few, if any, jurisdictions being created in their area. However, refusal to consolidate is the main mechanism by which jurisdictions respond. Through consolidation, the number of local jurisdictions in the United States fell twelve-fold between 1900 and 2000. In most states, a heterogeneous area could end the twentieth century with a large number of jurisdictions simply by refusing to consolidate. In addition, the creation of some new jurisdictions (particularly special districts) may account for some limited response.

[4] See, for instance, Wilson (1996), Hacker (1995), and Huckfeld and Kohfeld (1989).

Our paper is related to four strands of literature. One is recent work on the endogenous formation of political jurisdictions. In particular, Alesina and Spolaore (1997) argue that the trade-off between size and heterogeneity is an important explanation of the number and size of nations; Bolton and Roland (1997) focus instead on income differences. The second strand of literature studies the effects of racial heterogeneity on local policies, particularly policies that involve redistribution. Luttmer (2001) and Alesina, Glaeser, and Sacerdote (2002) describe how racial divisions affect redistributive policies in the United States. Cutler, Elmendorf, and Zeckhauser (1993), Poterba (1997), and Goldin and Katz (1998) find evidence that suggests that racial heterogeneity affects local policies toward public education. Alesina, Baqir, and Easterly (1999) argue that, in racially fragmented areas, individuals are less willing to pool their fiscal resources to provide public goods. Glaeser, Scheinkman, and Shleifer (1995) provide evidence that racial heterogeneity affects city growth. The third strand is the literature on the formation of local governments in the United States. Burns (1996), for instance, argues that land developers (who presumably had an interest in maximizing the value of their land) were important in the creation of jurisdictions. Finally, our paper can be seen as a test of the Tiebout (1956) model, in which households sort themselves among local jurisdictions according their preferences for local public goods and taxes. Previous tests of the Tiebout model have always taken the number of jurisdictions as given, but this is a restriction not envisioned by Tiebout, who assumed that adjustment would occur both through household mobility and through endogenous jurisdiction formation.

The paper is organized as follows. In Section 2, we model the hypothesis that there is a trade-off between economies of scale and heterogeneity. Our empirical strategy and data are described in Section 3. In Section 4, we present our results on school districts and attendance areas. Section 5 contains results on municipalities and special districts. Section 6 discusses cross-state differences based upon different legislation. The last section provides final comments and conclusions.

2. The Theory

2.1 A Simple Model of Jurisdictions[5]

Consider a political jurisdiction that has a population of size *M*, an even integer. With an eye to the empirical work that follows, let us call this jurisdiction a "county." There are *T* types of individuals, and *T* is an even integer. Each type is located at a distant *h* from each other. The mass of individuals for each type is denoted Δ, so that $M=\Delta T$. Without loss of generality, the left-most and right-most individuals are located at a distance of *h/2* from the borders of the county. For now, we consider only one spatial dimension in order to keep the model simple, and we interpret the distance between individuals as a general measure of their difference--which may be ideological, geographic, taste-based, or income-based. Individuals actually differ on multiple dimensions simultaneously, but under certain conditions partial analysis of a single dimension of a multidimensional model would yield similar results.[6] Later, we introduce differences in population density and thus allow for heterogeneity along two dimensions simultaneously: the spacial dimension and another (such as preferences). In our empirical work, we move towards even greater realism by considering *several* types of heterogeneity and the partial effect of each.

The assumption that each individual's location is fixed is natural if location represents tastes, ideology, or income. It is less natural if location represents geography because individuals can move in response to changes in jurisdictional boundaries. In our empirical work, we worry about such endogenous mobility, treating it as a causality problem. For now, we maintain the assumption that location is exogenous.

Each individual has utility given by:

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[5] This model extends the one by Alesina and Spolaore (1997).

[6] See, for instance, Epple and Platt (1998). Researchers have used a few approaches to maintain clarity: unidimensional heterogeneity (most common), partial analysis of single dimensions in multidimensional models, or strong restrictions on the correlations among variables on which people differ. Calibrated computational models are useful for prediction, but do not yield clear intuition.

$$U_i = g(A - a l_i) + y - t_i \quad \ldots \quad g>0,\ a>0,\ A>0\ . \tag{1}$$

In equation (1), l_i is the distance of individual *i* from the public good, *y* is income, and t_i is the tax is the tax paid by individual *i*. Thus, y-t_i is private consumption. The utility function is linear for convenience; the linearity does not affect the qualitative nature of the results. Equation (1) shows that the utility an individual derives from the public good is decreasing with his distance from it.[7] For example, a county might contain a white population that prefers a traditional school located in the suburban area, an Hispanic population that prefers a school with bilingual education that is located in urban area, and a black population that prefers a school that teaches black history and is located in the urban area.

We are interested in the number of school districts, say, into which this county splits. Each school district provides a public school, and residents of a district attend the school and pay taxes to finance it.[8] Thus, a school and two borders characterize a school district.[9] (Below, we discuss the possibility of multiple schools in a district.) The cost of each school is given by:

$$k = \bar{k} + k_1 S\ , \tag{2}$$

where *k* is cost, $\bar{k}$ is fixed cost, k_1 is variable cost, and *S* is the population of the school district ($S \leq M$). Since there is a fixed cost, average costs are decreasing in the district's size. This is a simple way of introducing economies of scale.[10] By the budget constraint of each school district we have:

$$\int_S t_i = \bar{k} + k_1 S\ . \tag{3}$$

Result: *A social planner maximizing the sum of individual utilities would locate the school in*

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[7] The individual who is located at the public good has utility equal to gA. The farthest possible individual has utility equal to *g (A-a [h (T - 1/2)]*.

[8] For simplicity, assume that each household uses the school to the same degree. For instance, assume that each household has a child.

[9] It is immediate to show that disjoint school districts would not be equilibrium.

[10] Diseconomies of scale may set in for districts of very large size. We have not provided for such diseconomies. Otherwise, the linearity of equation (2) does not affect the qualitative nature of the results.

the middle of each school district and would choose the following number N of equally sized school districts:

$$N = \frac{T}{2}\sqrt{\frac{gah}{\bar{k}}} \quad if \quad \frac{T}{2}\sqrt{\frac{gah}{\bar{k}}} > 1, \tag{4}$$

$$N = 1 \qquad otherwise\ .$$

The proof of this result is a straightforward generalization of Proposition 1 of Alesina and Spolaore (1997).[11] Since individuals have linear utility, the social planner is indifferent to the distribution of taxes; obviously an income tax would produce the same tax burden for everyone since income is the same. Note that in order to equalize utilities amongst individuals, the social planner would choose to draw the borders of the school district between two adjacent individuals; this also implies that every individual strictly belongs to one and only one school district. Several comments are in order.

(1) The optimal number of school districts is increasing in the benefits of the public good (captured by the parameter *g*). In more colorful terms, the more people like schooling, the more they are willing to pay to avoid having a school that is far away, in terms of distance or tastes.

(2) The optimal number of school districts is increasing in the disutility of distance (captured by the parameter *a*). That is, the more people dislike sharing the same public goods with others who have different preferences, the larger the optimal number of jurisdictions and the smaller their

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[11] For instance, in the simplest case (homogeneous Δ and homogeneous incomes), the proof is as follows. A social planner would locate the school in the middle of each district to minimize the average (and, thus, total) distance from the school. If Δ is the same throughout the county, there is a uniform distribution of individuals, and the districts will be of equal size. Thus, in a district with population *S*, the average distance from the public good is: $\bar{l} = \frac{h}{4} S$. The social planner's problem is to maximize $T(g(1 - a\bar{l}) + y - \frac{\bar{k}}{S} - k_1$, subject to $\bar{l} = \frac{h}{4} S$ and $N = \frac{T}{S}$. Because utility is linear, the social planner is indifferent to the distribution of taxes. If we make the simplifying assumption that everyone has the same income so that everyone pays the same tax: $t = \bar{k}\sqrt{\frac{gah}{4\bar{k}}} + k_1$. The solution is given by equation (4). The proof proceeds along similar lines for less simple assumptions. Below, we discuss a solution when Δ is not uniform.

size.

(3) The higher is $\bar{k}$ (which captures the importance of economies of scale), the lower is the optimal number of jurisdictions and the larger their size. Each additional person makes per-person costs fall greatly in a jurisdiction with a small population, but an additional person has little effect on per-person costs in a jurisdiction with a large population. More precisely, the importance of economies of scale declines with the population of a jurisdiction, and the decline is nonlinear in the population.

(4) The higher is heterogeneity (captured by the parameter h), the larger is the number of school districts. That is, the more heterogeneous are the ideologies or tastes of a given population, the larger is the number of districts. If one interprets h as a measure of distance, then the greater is the geographic dispersion of the population, the larger is the number of districts.

(5) The total number of jurisdictions is increasing in the total size of the population, measured by $M = T\Delta$.

(6) Consider the case in which the parameter values are such that the county has only one school district. Suppose that heterogeneity increases. The optimal number of school districts may still be one. This is, of course, because the change in parameter values may be insufficient to push the county past the threshold that makes two school districts optimal. The integer problem is similar. The smaller is the population of a county, the less likely is a given change in heterogeneity to pass the threshold where creating a new district is optimal.

An interesting question is whether Proposition 1 is reproduced by a decentralized equilibrium, in which households choose how many districts to have in their county without the help of a social planner. The answer depends on voting rules and on the availability of interpersonal transfers. Alesina and Spolaore (1997) show, however, that even if the optimal number of jurisdictions cannot be sustained by a voting mechanism, the equilibrium number of jurisdictions has the comparative statistics discussed above. Interestingly, a strand of the literature argues that, indeed, there are too many local governments in the US (Rusk (1999)).[12]

2.2. On the Assumption that Geographic and Preference Heterogeneity Can be Measured Along a Single Dimension

So far, we have mapped all types of heterogeneity into a single dimension to keep the model transparent. However, we must relax this restriction in one particular way in order to derive predictions with empirical relevancy. This is because population density is extremely variable in the U.S.

Note that, holding total population constant, equation (4) implies that the number of jurisdictions decreases as density increases. In fact, if one substitutes *T* for (*M/Δ*) and notes that density *d=(Δ/h)*, one gets:

$$N = \frac{M}{2}\sqrt{\frac{g\,a}{d\,\bar{k}}} \qquad (5)$$

It is important to see the intuition of equation (5): holding *M* and *T* constant, an increase in *d* means a reduction of *h*–that is, individuals live closer to each other. This reduces the costs of distance making it less costly for people to share the same jurisdiction.

In the simplest version of the model presented above, the line captures both geography and preferences. Thus, a reduction in *h* implies both an increase in density and reduction in heterogeneity of preferences. This is where the single dimension becomes troubling: empirically, population density and heterogeneity of preferences are not inversely correlated, as imposed by the model. In fact, just the opposite is true: they are positively correlated because cities have higher density and greater heterogeneity. A related problem is that, within a U.S. county, it is common to find very different levels of population density (a city in one corner, a rural area in another). Thus, while the simplest version of

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12 Actually, *within* jurisdictions, we expect house prices to differ to compensate individuals who are arbitrarily located farther from the public good, given the number of jurisdictions. We do not need to invoke this result because we characterized counties as line segments–thus, for an optimal number of jurisdictions, there are optimal boundary lines. If we had characterized counties as circular lines, individuals would fight over *where* boundaries should be drawn for a given number of jurisdictions. We would then need to allow house prices to differ to quell such disputes.

the model imposes for tractability a perfect correlation between geographical and ideological distance, we must relax this restriction to get reasonable empirical predictions.

Let us break the correspondence between preference heterogeneity and geographical distance by breaking each county into J parts, each part having density Δ_j and T_j types of individuals for $j=1,...,J$. Total population is $M = \sum_{j=1}^{n} M_j = \sum_{j=1}^{J} \Delta_j T_j$. Assume $\Delta_j < \Delta_{j'}$ if $j<j'$, and assume h is constant throughout the county. Thus, a lower subscript identifies more sparsely populated parts of the county. If one ignores the integer problem, the optimal number of jurisdictions for the entire country would be to choose a different N_j for each part of the country with different density.

The solution is:

$$N = \sum_{j=1}^{J} N_j = 2\sqrt{\frac{g\,a\,h}{\bar{k}}}\left(\sum_{j=1}^{J} T_j \sqrt{\Delta_j}\right) \qquad (6)$$

Equation (6) has the same basic comparative statics as equation (4), the solution in the simpler case. However, equation (6) suggests that, in evaluating the effect of preference heterogeneity, it is important to allow for the geographic distribution of population within the county. This equation guides our investigation, and we derive our estimating equation directly from it.

2.3 Discussion and Extensions

2.3.1 More than One School in a District

So far, we have identified a jurisdiction with a public good--that is, each district has exactly one school. More generally, if heterogeneity increases, households can build another school within their district. Building a new school and creating a new district are very different choices; the former choice is "cheaper," in terms of institutional transaction costs, but it does not allow different groups of people in the district to independently control or finance their schools. Legally, all schools in a district must have the same contract with teachers, the same per-pupil spending, and so on.

How could we extend the model to allow a district to have multiple schools? Building a new school should have a lower fixed cost than creating a new school district, but building a new school limits the diversification among different groups (compared to creating a new district). If we interpret the line of the model as an ideological spectrum, we can capture these phenomena by assuming that two schools in the same district cannot be too far from each other. That is, multiple schools in a district have to be closer to the ideological middle than they would optimally be if they were schools in separate districts. In short, if heterogeneity increases, residents have two choices: the more radical (but more expensive) choice of creating a new district and the less independent (but cheaper) choice of building a new school. We examine both choices in our empirical analysis.

2.3.2. Multiple Public Goods

A school district or special district provides only one type of public good, but municipalities typically provide several public goods, such as policing, fire protection, and roads. The model captures the determination of municipalities if the public good is interpreted as a bundle of local goods and services. The mere fact that municipalities provide multiple public goods suggests that there is a tradeoff between economies of scope and heterogeneity that is similar to the tradeoff between economies of scale and heterogeneity. If there were no economies of scope, it would be optimal to have a special district for each local public good. Note, however, that different types of public goods imply very different level of interpersonal interaction, from the very high level of interaction in schools, to very low level in garbage collection. Thus, one should expect the effect of, say, racial preferences to be stronger for jurisdictions providing public goods with higher levels of interpersonal contacts. Below we present evidence consistent with this observation.

2.3.3 What Explains Preferences for Homogeneity?

There are two reasons why individuals might prefer homogeneity. One is that individuals who share an ethnic background, race, income, or religion may have more similar preferences over public policies than those do not. The other reason is that people may actually have similar preferences as people in other groups do, but they may nevertheless prefer to interact with people in their own group. [13] So, for instance, a white person may prefer a mainly-white school not because the curriculum is different from mainly-black schools, but simply because he prefers to interact with individuals of his own race. Our model fits either source of preferences equally well. In writing the exposition of the model, we emphasize the first reason (similar preferences) because it is simpler to envision. However, if we make *h* a measure of the disutility of interacting, the model can embody the second reason: imagine people from different ethnic or income backgrounds having more or less disutility of interacting depending on how close their ethnicities or incomes were. Norwegian-Americans and Danish-Americans, for instance, might be closer on the line than Norwegian-Americans and Chinese-Americans. Empirically, it is difficult to distinguish between the two reasons that people might have for preferring homogeneity. However, we provide some evidence based on the different results for schools (where people must interact regularly) and school districts (where joint decisions must be made but interaction may be slight).

2.3.4 Diseconomies of Scale

In the model, there are no diseconomies of scale, but some people believe, based on anecdotal evidence, that jurisdictions with very large populations are unwieldy and do suffer from diseconomies. It is unclear whether people who make such claims are really considering scale only, holding constant the heterogeneity of the population. In our investigations, we found little evidence of diseconomies of scale, so we do not pursue the issue further.

2.3.5 Housing Prices

Our model does not have strong implications for house prices across counties. Allow households to move and consider a county that is shocked by an exogenous increase in population heterogeneity. House prices might initially fall because residents are forced to tolerate heterogeneity that they would prefer not to tolerate. The initial house price reaction would, however, depend on: how the exogeneous

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[13] For a discussion of this second hypothesis and empirical evidence on segregation in the US see Cutler, Glaeser and Vigdor (1999)

influx of people was distributed over the initial jurisdictions, how many jurisdictions there initially were, and the costs of adjusting the jurisdictions to the newly heterogeneous population. As the number of jurisdictions adjusted to cope with the increased heterogeneity, house prices would gradually move back towards their original level. They might never reach it if the new equilibrium implied smaller and thus "more expensive" jurisdictions. If we had very long panels of house prices, we might be able to observe such phenomena; as it is, the predicted change would be too small and heterogeneous to sort out.[14]

3. Empirical Strategy

3.1 From Theory to Testing

Our empirical strategy is guided by equation (6) above, which we reproduce here in logs:

$$\ln N = \frac{1}{2}\ln h + \frac{1}{2}\ln g + \frac{1}{2}\ln a - \frac{1}{2}\ln \bar{k} + \ln \sum_{j=1}^{J} T_j \sqrt{\Delta_j} \tag{7}$$

This expression suggests that the number of jurisdictions should depend upon three types of variables: i) measures of the size and density of the county; ii) measures of fixed costs; iii) measures of preferences for public goods; and iv) measures of heterogeneity of preferences, which are our focus.

Let's begin with the first set of variables. The term $T_j \sqrt{\Delta_j}$ suggests that the model calls for both measures of density in the county and measures of total population in parts of the county with different population density. Consider a linear approximation of equation (7), using a multivariate Taylor expansion. Define $\Psi = \ln \sum_{j=1}^{J} T_j \sqrt{\Delta_j}$.

$$\begin{aligned} \ln N = {} & const + \frac{1}{2}\ln h + \frac{1}{2}\ln g + \frac{1}{2}\ln a - \frac{1}{2}\ln \bar{k} \\ & + \sum_{j=1}^{J} \Psi_{T_j} T_j + \sum_{j=1}^{J} \Psi_{\Delta_j} \Delta_j + \sum_{j=1}^{J} \Psi_{\Delta_j T_j} \Delta_j T_j \\ & + \sum_{j=1}^{J} \Psi_{T_j T_j} T_j^2 + \sum_{j=1}^{J} \Psi_{\Delta_j \Delta_j} \Delta_j^2 + \ldots \end{aligned} \tag{8}$$

[14] Similar considerations would apply to a discussion of rents and wages as a function of racial fractionalization. One could build on Roback (1982) to address this issue.

In equation (8), Ψ_{T_j} is the derivative of $\Psi(\bullet)$ with respect to T_j, and so on. The last five terms in equation (8) show that the model calls for measures of the population living in parts of the county with different density (remember that $M_j=T_j\,\Delta_j$, so holding Δ_j constant, T_j measures total population of *j)*. The model also calls for a measure of density, Δ_j (remember that holding *h* constant, density $d=\frac{\Delta_j}{h}$). In our regression, we include an array of population and population density variables that correspond to the five terms in equation (8). Think of the population and population density variables describing the basic conditions for jurisdictional creation in a county. In other words, variables like preferences and fixed costs may make the number of jurisdictions differ from what we would predict based on population and population density alone.

As a proxy for fixed costs ($\bar{k}$) we use natural boundaries for jurisdictions: streams. Hoxby (2000) shows that areas with more streams have more jurisdictions, all else equal. In addition, we include state indicator variables to proxy for fixed costs generated by different state laws and regulations. As proxies for the *level* at which the county's population desires the public good (*g* in the model), we include the county's mean income, share of adults with a high school education, share of adults with a college education, and share of people who are age 65 or older. In some specifications, we also include the industry employment shares (the share of employment associated with each industry). It is far from obvious that industry composition affects the preferred level of public goods, but we use the industry employment shares to test whether the results are sensitive to including county characteristics that *may* affect public goods. Finally, our main variables of interest are measures of the fragmentation of preferences (*h* in the model), which we proxy with racial and ethnic fragmentation indices, religious fragmentation indices, and measures of income inequality.

3.2 Causality

We have presented the model as though an area's population is exogenously determined and the number of jurisdictions responds endogenously. The model, however, really only says that a certain number of jurisdictions is optimal, given a population's heterogeneity. So, if the model were correct and households were mobile across areas, households might move to areas that were divided up optimally. Endogenous mobility would affect how one thought about the mechanism through which the trade-off worked. We do not think, however, that endogenous mobility is likely to be the mechanism behind the trade-off because there is no guarantee that an area with a large number of jurisdictions would attract migrants who have the "right" mix of heterogeneity for the number of jurisdictions. For instance, an area with many (and therefore expensive) jurisdictions might appeal disproportionately to white, high income households, but their migration would make the area less heterogeneous, thereby working “against” finding a correlation between fractionalization and number of jurisdictions.

We attempt to resolve the issue of causality by two means. First, we assure ourselves that the relationship is associated with *changes* in jurisdictions by looking at panel evidence: are changes in population heterogeneity associated with changes in the number of jurisdictions? If we were to see the jurisdictions remaining stable while population heterogeneity changed to fit the existing jurisdictions, it would suggest that endogenous mobility was the key phenomena. However, showing that changes in jurisdictions go hand-in-hand with changes in population heterogeneity is only necessary, not sufficient, for causality. For sufficient evidence, we need changes in heterogeneity that are credibly exogenous. We find such changes in two "natural experiments": sudden changes in some counties' racial heterogeneity that occurred when Northern war industries drafted black workers from the South to replace their former supply of white workers. The supply of white workers decreased both because white men served in the military and because the wars shut off the flow of white immigrants.

3.3 Data

We consider three types of jurisdictions: school districts, municipalities, and special districts. We also consider school attendance areas within districts. Our variables are generally measured at the county level, and the key dependent variables are the numbers of jurisdictions (of a given type) in a county. Because we need stable areas that are capable of being divided into jurisdictions, we exclude counties from our sample that are clearly inappropriate. The excluded counties are those that have changed boundaries since 1950 and those in states that define counties as the smallest jurisdiction for school districts, municipal operations, and so on. In practice, we especially lose counties in Hawaii (which has a statewide school district), Alaska (which has had unstable county-like units), and counties in Virginia and other states that contain independent cities. Independent cities perform county functions, yet they cannot be divided into lower level jurisdictions and they can take over territory in their surrounding counties.[15] Fewer than 10 percent of U.S. counties are inappropriate for our analysis.

Table 1 lists our variables and their sources. The only variables that are not straightforward are the indices of heterogeneity. We use the Gini coefficient as our main measure of income heterogeneity. The mean county in our sample has a Gini coefficient of 0.407 and the standard deviation of 0.031. We experimented with other measures (such as income deciles, the Theil index, and the coefficient of variation), and we obtained very similar results.[16]

We define an index of racial heterogeneity to be the probability that two randomly drawn individuals in a county belong to different races, where the races are the five categories used in the 1990 Census of Population. Formally:

$$Race = 1 - \sum_i (group_i)^2 \tag{9}$$

where $group_i$ denotes the share of the population who identify themselves as race *i*, where *i={white non-Hispanic, black non-Hispanic, Asian and Pacific Islander, Native American, and Hispanic}*. Table 1 shows that the mean county in our sample has a heterogeneity index of 0.188 with a standard deviation of 0.176.

Because there is no one best way to measure racial heterogeneity, we experimented with other indices than the one described above. We replaced the racial heterogeneity index with separate percent

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15 An independent city can expand and take over parts of is not

16 For instance, we experimented with income decile ratios, heterogeneity indices akin to our racial heterogeneity index, Theil's index of income inequality, and the coefficient of variation.

black and percent Hispanic variables (which are the major sources of variation in the racial heterogeneity index), but we found that percent black and percent Hispanic have effects that are so similar that we lose little information by using a single index of racial heterogeneity. In theory, our heterogeneity index does not distinguish between counties that are 80 percent white and 20 percent black and "reverse" counties that are 20 percent white and 80 percent black. In practice, however, whites have a majority or plurality in 98 percent of the counties in our sample. Therefore, making whites a larger share would nearly always *lower* heterogeneity. The reader should keep in mind that, for all intents and purposes, "more heterogeneity" means "fewer whites" in American data.

We define analogous indices of ethnic heterogeneity within the white and Hispanic populations of the United States. (Ethnic groups within the black, Asian, and Native American populations are too small to be usable.) Specifically, we define an index of white (Hispanic) ethnic heterogeneity as the probability that two randomly drawn white (Hispanic) individuals in a county belong to different primary ancestry groups.[17] To make the results interpretable, it is necessary that we attempt to define primary ancestry groups that have roughly equal distinctness as *groups*. For instance, if a family were the only Botswanan-Americans in a city, it is likely that they would not stay distinct but instead seek out people from other countries in the southern tip of Africa that share some political history with Botswana. Thus, we collapse small ancestry groups within the white and Hispanic populations based on the language and geographic proximity of their mother countries. For instance, the Scottish are aggregated with the English into the British. Such aggregations are not a science, but they are necessary and all major ethnic groups in the U.S. (such as the Irish, Italians, Germans, Polish, Cubans, Mexicans, and Puerto Ricans) have their own categories. The mean county has a white ethnic heterogeneity index of 0.728 (with a standard deviation

[17] Individuals are classified by their primary ancestry. We use the following ancestry/ethnic groups for whites: British, Irish, French, Italian, German, Greek, Portuguese, Swiss/Austrian, Benelux (Belgian, Dutch, Luxembourgian), Scandinavian, Russian/Ukrainian, Hungarian, Polish, other Eastern European, Arab, and other white. We use the following ancestry/ethnic groups for Hispanics: Mexican, Cuban, Puerto Rican, South American, and other Central American.

of 0.088) and a Hispanic ethnic heterogeneity index of 0.379 (with a standard deviation of 0.197).

We define analogous indices of religious heterogeneity using data on adherence to 17 major Judeo-Christian denominations defined by the Survey of Churches and Church Membership.[18] The mean county has a religious heterogeneity index of 0.631 (with a standard deviation of 0.181).

Our 1990 demographic data are mainly from the Census of Population. The exception is the data on religious adherence, which are from the 1990 Survey of Churches and Church Membership. Our 1990 data on school districts and schools come from the School District Data Book, which combines administrative data from the United States Department of Education with a school district-level tabulation of the 1990 Census of Population. Our 1992 municipality and special district data come from the Census of Governments, which contains the number of municipal governments and special districts in each county. Municipalities are general purpose governments; they include cities and most towns, boroughs, and villages.[19] Special district governments are units that have substantial administrative and fiscal independence from general-purpose local governments. Most special districts perform a single function or a very limited number of functions.[20] Examples include fire protection, housing development, water supply, drainage, garbage, and flood control. It is worth noting that the procedures for creating a special district are considerably less demanding than those for creating a municipality or school district.

For our panel analyses, we use data that are as similar as possible to the 1990/92 data used for the cross-sectional analysis. For the general panel analysis, we chose 1960 as the year to compare with 1990 because a period of 30 years is sufficient for jurisdictions to have changed. Also, it is possible to get data

[18] Baptist, Catholic, Christian Scientist, Eastern/Byzantine Rite Catholic, Congregationalist/related Reformed Christian, Episcopalian, Friends, Jewish, Lutheran, Mennonite/Amish, Methodist, Mormon, Orthodox, Presbyterian, Seventh Day Adventists, Unitarian/Universalist, miscellaneous conservative, evangelical Christian.

[19] According to the Bureau of the Census, municipalities are "political subdivisions within which a municipal corporation has been established to provide general local government for a specific population concentration in a defined area."

[20] Of the 31,555 special districts reported in 1992, 92 percent performed a single function. School districts are not included in special districts.

from 1960 that are very similar to the 1990 data. We use data from 1960 Census of Population, the 1962 Census of Governments (which includes data on school districts), and the 1950 Survey of Churches and Church Membership (there is no 1960 church membership survey). In 1960, the white, black, and Native American racial groups were similarly defined, but only people of Japanese, Chinese, or Filipino descent were classified as Asians. Asians of other ancestries were often classified as "other race," and we know their ancestry only if there they were foreign-born. Only Hispanics who were foreign-born can be classified as Hispanic. So, racial heterogeneity indices for 1960 under-represent heterogeneity generated by Hispanics and slightly under-represent heterogeneity generated by Asians.[21]

For our analysis of the changes in population heterogeneity that occurred during the World Wars, we rely on the Censuses of Population for data on the race and foreign nativity of the population. For data on religion, we rely on the Census of Religious Bodies up to 1936 and then on the 1950 Survey of Churches and Church Membership. (There is no 1940 survey, so we use 1936. The United States Bureau of the Census discontinued religious censuses in 1936.) There is no source prior to 1950 that contains the detail on jurisdictions that the Census of Governments contains. Therefore, for data on the number of school districts in each county, we rely on the Education Directory published by the United States Office of Education. We were unable to find data on each county's number of general purpose and special governments, so we do not analyze such jurisdictions for the World War periods.

4. Results on School Districts

4.1 The Cross-Sectional Relationship between Heterogeneity and School Districts

In this section showing cross-section results, we attempt to establish the pattern and strength of

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[21] In addition, only one measure of educational attainment is available (rather than two). It is the percent of adult population with at least 12 years of schooling. Some of the 1960 industries are more aggregated---for instance, wholesale and retail trade are combined into one trade industry in 1960. In addition, the income categories for calculating the Gini coefficients are more aggregated. We do not have administrative data within school districts for 1960, so all of the panel analysis is at the county level.

the relationship between population heterogeneity and the number of jurisdictions. We do not, however, insist on a particular direction of causality, so readers should interpret the cross-sectional results as evidence of *association*.

Table 2 displays our basic results on the number of school districts in each county. The table is structured so that the four left-hand columns use heterogeneity indices based upon the entire population of each county, while the remaining columns use heterogeneity indices based on the school aged population. The school-aged population is important because it determines whom a student could actually meet in school. The composition of a county's school-aged children may differ from that of its entire population if the county systematically attracts or repels families with school aged children or has a composition that is shifting over time. For instance, very urban and very rural counties tend to repel families with school-aged children, presumably because amenities for children are low. The specifications shown in the table always include racial, income, and religious heterogeneity, as well as the variables for which the model clearly calls (population variables, population density variables, and proxies for g and $\bar{k}$). We show specifications with and without ethnic heterogeneity variables so that readers can see for themselves how racial and ethnic heterogeneity interact. Also, we show specifications with and without employment-by-industry shares to demonstrate that omitted variables are not an obvious source of the results.

The measure of racial heterogeneity has a statistically significant effect on the number of school districts in all specifications. Recall that a two standard deviation change in the racial heterogeneity index is 0.36 (0.38 for school-aged children). Thus, if we focus on the specification with the most control variables, we interpret the coefficient on the racial heterogeneity index as follows: a two standard deviation (36 percent) increase in the probability that a person will encounter a person of another race in his county raises the number of school districts in his county by 10 percent, all else equal. The corresponding coefficient for school-aged children suggests that there is an 8 percent increase in school districts for a two standard deviation increase in the probability of an interracial encounter.

The ethnic heterogeneity indices and industry employment shares change the estimated effect of racial heterogeneity only slightly.

The coefficient on white ethnic heterogeneity is statistically significantly different from zero in only one specification (with no industry shares) and the coefficient on Hispanic ethnic heterogeneity is never statistically significantly different from zero. We conclude that ethnic heterogeneity (as opposed to racial heterogeneity) has little effect on the number of school districts in a county.

Our measure of income heterogeneity (the Gini coefficient) has a positive effect on the number of school districts in a county. Two standard deviations in the Gini coefficient is 0.06, so the interpretation of the coefficient in the most generous specification is as follows: a two standard deviation increase in a county's income heterogeneity raises its number of school districts by 8 percent, all else equal. The effect of income inequality changes only slightly when ethnic heterogeneity and industry employment shares are included.

The index of religious heterogeneity is never statistically significantly different from zero. Looking at the other variables for which the model has predictions, we note that population has strong, positive relationship with the number of school districts in a county. The relationship between population and the number of districts is most important when the population is added to areas with a low population density (less than 1,000 people per square mile), next most important when the population is added to areas with a medium (between 1,000 and 10,000 people per square mile) or a high (between 10,000 and 50,000 people per square mile) population density. Adding population to an area with a very high population density (more than 50,000 people per square mile) has no effect. This is probably because it is impractical to divide up a small area into multiple jurisdictions. New York City, for instance, might have to have a jurisdiction for each block or even for parts of a skyscraper if we did not take its population density into account! Counties with more streams have more districts, probably because streams were natural barriers that affected how a county was initially divided into districts.

The remaining demographic variables are either proxies for *g* (indicators of how much people desire the local public good) or variables that are intended to reduce the possibility of omitted variables bias. Mean household income is positively associated with the number of school districts. This suggests that higher income families are willing to pay the extra cost associated with having more districts in order to have districts that are more local. The share of adults with at least a high school education has no statistically significant effect and the share of adults with a college education has a surprising negative effect. We surmise that college education may be difficult to interpret because it is strongly collinear with mean household income. The share of the population who are age 65 or older has a statistically significant positive effect. We had no expectations for this variable because there is no consensus in the existing literature about the effect of the elderly on local public goods.[22]

4.2 Results for School Attendance Areas.

Increasing the number of districts in a county is costly, but a demand for separation may be partially satisfied by increasing the number of school attendance areas. In particular, if people in a district have similar preferences for public goods and merely wish to avoid interacting, separate school attendance areas are preferable to separate districts because they are cheaper and just as effective. If people have heterogeneous preferences, school attendance areas are only a partial solution because they allow only modest differences in preferences to be expressed: major curricular and hiring decisions are made at the district level. Moreover, separate school attendance areas do *not* prevent the redistribution of income through the financing of local public goods. If avoiding redistribution were the only motivation for multiple jurisdictions, income heterogeneity would affect only the number of districts, not the number of attendance areas controlling for the number of districts.

In short, if the number of school attendance areas responds to heterogeneity *controlling for the number of districts*, it is likely that a heterogeneous population has heterogeneous preferences or an unwillingness to interact, not merely an urge to avoid redistribution. We can get similar evidence by looking

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[22] Poterba (1996) suggests that the elderly reduce local public goods, especially education. Goldin and Katz (1998) show an opposite result, though on significantly earlier and different data.

within districts: does a district with a more heterogeneous population divide itself up into more attendance areas, all else equal?

Tables 3a and 3b investigate these hypotheses. Table 3a shows regressions identical to those in Table 2, except that the dependent variable is the number of school attendance areas and we control for a county's number of school districts. That is, once the effects of heterogeneity are accounted for in the number of districts, is there remaining pressure on school attendance areas? We use heterogeneity variables based on the school-aged population because the school-aged are the key to student encounters.

The results in Table 3a show that, even after accounting for the effect of population heterogeneity on the number of school districts, greater population heterogeneity is associated with a greater number of school attendance areas. This suggests that avoiding redistribution is not the only reason why heterogeneity is associated with more jurisdictions. Moreover, all of the types of heterogeneity affect the number of school attendance areas, suggesting that heterogeneity raises the number of attendance areas even when it is too meager to raise the number of districts. This is what we expect, given the much higher costs of creating a district. A two standard deviation increase in each of the heterogeneity variables raises the number of school attendance areas by the following amounts (given the number of districts): racial heterogeneity, 7 percent; white ethnic heterogeneity, 5 percent; Hispanic ethnic heterogeneity, 7 percent; income heterogeneity, 5 percent; religious heterogeneity, 16 percent. We focus on the coefficients in the right-hand column because the specification includes the greatest number of controls.

Table 3b shows within-district evidence that confirms the results of Table 3a. A district has more attendance areas if it has greater racial, white ethnic, Hispanic ethnic, or income heterogeneity, all else equal. The coefficients in the right-hand column can be interpreted as follows. If a school district were to have a two standard deviation (34 percentage point) increase in the probability of interracial encounters, its number of attendance areas would increase by approximately 8 percent. A two standard deviation change in within-district income heterogeneity would raise the number of attendance areas by about 20 percent. Two standard deviation increases in white and Hispanic ethnic heterogeneity would raise the number of attendance areas by, respectively, 6 percent and 28 percent. However, the effects of white and Hispanic ethnic heterogeneity may be picking up some of the effect of religious heterogeneity, which is omitted from the specification because religious data are not available at the district level. (A few other changes in the specification are also necessary because the data are at the district level.)[23]

In short, it appears that not only racial and income heterogeneity, but also religious and ethnic heterogeneity raise the number of school attendance areas, for a given number of districts. We suspect that racial and income groups have sufficiently different preferences or sufficiently great unwillingness to interact that they affect districts. The trade-offs generated by ethnic and religious heterogeneity are apparently too weak to affect districts, but strong enough to affect attendance areas.

4.3 Jurisdictions and the Actual Experience of Homogeneity

We have argued that population heterogeneity may cause a county to have more jurisdictions so that people can experience less heterogeneity than they would in random encounters with their county's population. If this argument is correct, we ought to find that, in counties with more jurisdictions, people actually *do* experience more homogeneity. We investigate this hypothesis by forming ratios of actual to possible heterogeneity experienced. First, we use the ratio of the probability that a person would randomly encounter a person of a different race in his *school district* to the probability that he would randomly encounter a person of a different race in his *county*. We also use the ratio of the probability that a person would encounter a person of different poverty status in his school district to the probability that he would encounter a person of different poverty status in his county. We define two analogous ratios based on the comparison of *school attendance areas* to counties. The ratios based on attendance areas necessarily focus on school-aged people because we depend on administrative data for racial composition and poverty status

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[23] The streams variable is not available at the district level; it is omitted. Also, there is relatively little variation in population density within districts, so the population and population density variables what is appropriate for the simple version of the model, in which Δ is homogeneous.

(actually, eligibility for free lunch).[24]

Table 4 shows the results of regressing the ratios of actual to possible heterogeneity on a county's number of school districts and school attendance areas. The regressions also include the other explanatory variables in Table 2 because those variables might make people live homogeneously even if they did not affect jurisdictional formation. We find strong evidence that people actually do experience disproportionate homogeneity when they live in a county with a greater number of jurisdictions. The availability of more school attendance areas has a very strong effect on the homogeneity a person experiences; the availability of more school districts has a significant, but weaker effect.

For instance, the coefficients in first two columns of Table 4 suggest that people who live in a county with twice as many districts, as else equal, reduce their probability of interracial encounters by 2.6 percent and their probability of cross-poverty status encounters by 0.8 percent (of whatever their base probabilities were). Unsurprisingly, the number of attendance areas in a county does not affect the disproportionate homogeneity that people experience in their school *districts*. However, the number of attendance areas does affect the homogeneity that students experience at school. Indeed, students' actual experience of homogeneity is much more affected by the number of attendance areas in their county than by the number of districts. The coefficients in the third and fourth columns of Table 4 show that students who live in a county with twice as many districts, as else equal, reduce their probability of interracial encounters at school by only 0.8 percent and do not reduce their probability of cross-poverty encounters at school. In contrast, students who live in a county with twice as many *attendance areas* reduce their probability of interracial encounters at school by 3 percent and their probability of cross-poverty encounters by 4 percent.

In short, it is the number of attendance areas and not districts that strongly affect the homogeneity that a student experiences at school. In other words, students in a very heterogeneous district can attend schools that are nearly as homogenous as students in a very homogeneous district, so long as their district is

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[24] A student is eligible for free lunch if his family is within 125 percent of the federal poverty line. This is the best proxy for poverty status that is available in administrative data from schools.

broken into numerous attendance areas. The fact that attendance areas so strongly affect the heterogeneity a student experiences implies that parents are somewhat unwilling to have their children interact across race and poverty lines (or that parents care about the school policies that can reflect the preferences of local parents, holding district policies constant). It is worth noting that previous researchers like Clotfelter (1998), who have not considered attendance areas, have misleadingly argued that the number of *districts* in an area is the key to the heterogeneity that students experience at school. This is incorrect.

The fact that the number of *districts* responds to population heterogeneity (Table 2), even though student homogeneity is achieved mainly through attendance areas (Table 4), indicates that both motivations for avoiding heterogeneity are probably operative: People avoid making joint decisions with people who have different preferences *and* people avoid interacting with people outside their group.

4.4 Panel Evidence: Changes Over Time in the Number of School Districts

We now attempt to clarify the direction of causality–does population heterogeneity affect the number of jurisdictions or is it the other way around? At a minimum, jurisdictions must change if they are responding to heterogeneity. We investigate whether jurisdictions change with population heterogeneity using a long panel based on 1960 and 1990 data. Over this period, *increases* in the number of school districts in a county were extremely rare. What we mainly test, therefore, is whether consolidation was slower in counties that were more heterogeneous.[25]

Table 5 shows estimates of the effect of changing county characteristics on changes in the number of districts between 1960 and 1990. Specifically, Table 5 shows estimates from a first-differenced version of the equation estimated in Table 2. The first-differenced specification not only clarifies whether jurisdictions are actually changing, it also ensures that many idiosyncratic features of counties are no longer

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[25] Consolidations and secessions are legally easy only when they benefit both potential jurisdictions. Thus, many districts can find a district to be a partner and share fixed costs, but few parts of districts that would want to secede can secede, since secessions would usually hurt at least a substantial minority of the population of the area that would be seceded from. See the final section of the paper for a description of the legal environment for consolidation and secession.

omitted variables. Any county characteristic that is fixed over time drops out, so this specification is a good test for coincidental correlation between heterogeneity and a large number of jurisdictions.[26]

The first row of Table 5 suggests that counties that experienced increasing racial heterogeneity between 1960 and 1990 were more likely to resist district consolidation over that period. The coefficient on the change in racial heterogeneity is approximately 1, which implies that a county that experienced an increase of two standard deviations in racial heterogeneity lost 36 percent *fewer* districts between 1960 and 1990 than a county that experienced no change in racial heterogeneity.

In addition, between 1960 and 1990, it appears that a county that experienced a two standard deviation increase in white ethnic heterogeneity lost 6 percent fewer districts and a county that experienced a two standard deviation increase in income heterogeneity lost 11 perfect fewer districts. Changes in Hispanic ethnic and religious heterogeneity do not appear to affect a county's number of school districts.

4.4 Exogenous Shocks to Racial Heterogeneity: Two World Wars

The panel results are less likely to be affected by omitted variable problems than the cross-section results. They also confirm that jurisdictions are actually changing. To resolve the causality issue, however, we need changes in counties' population heterogeneity that are credibly exogenous.

In an attempt to fulfil this need, we turn to historical events that generated credibly exogenous changes in certain counties' racial heterogeneity: the South-North migration of blacks to feed labor-needy war industries during World War I and World War II. This "Great Migration," on which historians have written extensively, was directly driven by the needs of the war industry. In fact, firms that produced war-related products sent trains to the South in order to transport quickly workers who had been recruited.

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[26] Another way to use panel data from 1960 to 1990 is to determine whether counties that had "too many" districts in 1960 (based on their characteristics then) experienced more consolidation between 1960 and 1990. The answer to this question is "yes." We ran the regressions shown in Table 2 with 1960 cross-section data and obtained residuals. We then regressed each county's change in its number of districts between 1960 to 1990 on the residuals. We obtained coefficients that suggest that a county that had 10 percent "too many" districts in 1960 was likely to lose about 7 of those 10 percent between 1960 and 1990.

The internal migrations of blacks during the World Wars are good natural experiments in racial heterogeneity because their timing and extent were driven largely by European political events. Also, they dramatically affected a small and easily identified group of Northern counties that happened to have pre-existing concentrations of war industry firms.

The affected counties were a peculiar subset, even among largely urban Northern counties with substantial manufacturing. For instance, in Ohio, three counties experienced substantial black migration during World War I: Mahoning (Youngstown area), Cuyahoga (Cleveland area), and Franklin (Columbus area). Several similarly urban, manufacturing-based counties did not experience nearly as much migration: Hamilton (Cincinnati area), Summit (Akron area), Lucas (Toledo area), Montgomery (Dayton area), and Stark (Canton area). Using county-level data from the decennial Censuses of Population, we selected a group of affected counties that were urban and that experienced an increase of at least 2 percentage points in the black share of their population between 1910 and 1920 (for the World War I experiment) or between 1940 and 1950 (for the World War II experiment). An increase of 2 percentage points corresponds to the 90th percentile of the change in counties' percent black, for both the 1910-20 and 1940-50 decades. Although 2 percentage points may appear to be a small change, blacks picked residential locations in the vicinity of war-industry establishments. Thus, some areas of each affected county experienced substantial increases in racial heterogeneity. Also, the changes were more rapid than the decennial dates of the census suggest. The vast majority of the war-related migration occurred in the four years between 1914 and 1918 and in the six years between 1939 and 1945. Counties affected by World War I migration were concentrated in Ohio, Indiana, Pennsylvania, and Michigan. Counties affected by World War II migration were more dispersed and were also located in California, Washington state, Illinois, New Jersey, and Missouri.

For each War, we selected a group of comparison counties by matching each affected county with the county from its state that minimizes differences in initial ln(population), initial percent urban, and initial percent black. Specifically, we minimize the sum of the squares of the differences in these three variables. We match on these initial conditions because the analysis of the previous sections has shown that state, population size, population density, and racial heterogeneity are important determinants of a county's number of jurisdictions. If one comparison county matched to more than one affected county, then we included the next best match in the comparison group. We checked that all of the comparison counties were, in fact, plausible comparisons. We also checked that all of the affected counties did, in fact, have a war industry present. We had to drop only one affected area because no plausible comparison could be found in its state: New York City.

We end up with 13 affected counties for World War I and 34 affected counties for World War II. For each war, we have an equal number of comparison counties. Using the Educational Directory published at approximately biennial intervals by the United States Office of Education, we calculated the number of school districts in each affected and comparison county in 1910, 1920, 1940, and 1950. We match the Educational Directory data to the county-level Census of Population data. Unfortunately, there is no similar source of accurate information about general purpose jurisdictions and special districts from 1910 to 1950.

Using these data, we perform a simple analysis parallel to the panel analysis of the last section. Specifically, we regress the change in each county's log(number of districts) on the change in its log(population), change in its percent black, change in its percent foreign born, and change in its religious heterogeneity index. We use percent black instead of the racial heterogeneity index because virtually all of the variation in the index would be generated by the change in percent black anyway.[27] We include the change in the percent foreign born to pick up increased ethnic heterogeneity caused by immigrants moving towards war industries, but in fact there is little variation in this variable because immigration to the United States slowed to a trickle during each World War. There is also little variation in the ten-year changes in the religious heterogeneity index. The Census did not ask about income prior to 1950, so we cannot include a measure of income inequality. Between 1910 and 1950, most counties were losing school districts, so a county would have had a relative gain in its number of school districts if its districts were stable or

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[27] The counties in question have negligible Native American and Asian populations, and the Hispanic classification was not used in the 1910-50 Censuses of Population.

consolidated less than those of comparable counties.

Table 6 reports our regression results. The left hand column shows the results of the World War I decade regression. The number of school districts in a county is not statistically significantly affected by the change in the log(population), the change in percent of the population that is foreign, or the change in the religious heterogeneity index. The change in the percent of the population that is black, however, does have a statistically significant effect on the number of school districts: a 1 percentage point increase in the percent black raises the number of districts by approximately 15.7 percent, all else equal.[28] The magnitude of this effect is important. The first quarter of the 20th century was a period of rapid consolidation of school districts; thus, merely by resisting consolidation more than others, counties experiencing increased racial heterogeneity ended up with a substantially larger number of school districts than counties that had looked similar in 1910.

The two right hand of Table 6 displays the results for the World War II experiment. Again, the change in the log(number of school districts) is not statistically significantly affected by the change in log(population), the change in percent foreign born, or the change in the religious heterogeneity index. However, a 1 percentage point change in percent black increases a county's number of school districts by approximately 3.2 percent between 1940 and 1950. This estimate is statistically significantly different from zero at the 0.01 level, despite the small sample.[29] It is likely that the World War II effects have a smaller magnitude than the World War I effects simply because the pace of school district consolidation decelerated over the 20th century and was thus substantially slower between 1940 and 1950 than between 1910 and 1920.

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[28] Because this is a first-differenced regression, it is doubtful that including state fixed effects would be appropriate. However, if they are included as a specification test, we find that the estimate is nearly identical: a 1 percentage point increase in percent black raises the number of districts by 15.0 percent.

[29] The result from a regression with state fixed effects is very similar: a 1 percentage point change in percent black increases a county's number of school districts by approximately 2.8 percent.

5. Results for Municipalities and Special Districts

We now turn to municipalities and special districts because they are interesting in their own right and because we want to see whether the school district results are general. Also, special districts often involve minimal personal interaction so they may help us understand whether people value homogeneity because they dislike interacting with people from other groups.

5.1 The Cross-sectional Relationship between Heterogeneity and Jurisdictions

Table 7 reports our basic regressions on municipalities and special districts. The specification is identical to the one used for the school district regressions in Table 2, and the table is organized the same way that Table 2 is. For each dependent variable, the first two specifications do not include industry employment shares and the third and fourth specifications do include them.

The first row shows that racial heterogeneity in a county is a statistically significant predictor of both the number of municipalities and the number of special districts. For the number of municipalities, the effect of racial heterogeneity becomes stronger in magnitude when the industry employment shares are included. As before, we emphasize the coefficients in the most inclusive specifications (the fourth and eighth columns). These coefficients imply that an increase of two standard deviations in the racial heterogeneity index raises the number of municipalities by 9 percent and raises the number of special districts by 20 percent.

White ethnic heterogeneity has, if anything, a negative impact on the number of municipalities but the effect is only marginally significant at the 5 percent level when employment share variables are included in the estimating equation. White ethnic heterogeneity has a statistically insignificant effect on special districts, and Hispanic ethnic heterogeneity has a statistically insignificant effect on both municipalities and special districts. The effect of income heterogeneity on the number of municipalities is, if anything, positive, but it becomes marginally statistically insignificant when industry employment shares are included in the specification. An increase of two standard deviations in the Gini coefficient raises the number of municipalities by about 7 percent. (Results for alternative measures of income heterogeneity are similar to results for the Gini coefficient.) The effect of income heterogeneity on special districts is statistically insignificant when industry employment shares are included. Religious heterogeneity has no effect on the number of municipalities but increases the number of special districts by a statistically significant amount: an increase of two standard deviations in the religious heterogeneity index raises the number of special districts by about 14 percent.

The results for the other explanatory variables are much as expected. Population has a very strong positive relationship with the number of municipalities and special districts, especially if population is added to areas with low to medium population density. (Adding population to areas with very high population density does *not* increase the number of municipalities or special districts.) There are more municipalities and special districts in counties with more streams, and the state fixed effects are strongly statistically significant in all regressions. Also, there are more municipalities and special districts in counties with higher mean household income, although theis effect is statistically insignificant in the municipality regressions when industry employment shares are included. Counties with greater shares of retirees have more municipalities and more special districts.[30]

Because the industry employment shares have a strong effect in the regressions reported in Table 7, we explored these variables further and found that they may be picking up the importance of private, local businesses (that is, businesses like retail trade that are small enough for locality to matter.) In fact, if we include the log of the number of private businesses in the county, the industry employment shares lose a great deal of statistical significance. Perhaps, as Burns (1994) argues, the demand for governments is more likely to be implemented when there are businessmen who have a large enough stake in jurisdictional structure to

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[30] When we compare school districts and counties, it is obvious that the provision of public schooling is delegated to the districts. We cannot make such a neat division of responsibility for the types of public services that municipalities and special districts provide. Some counties provide public services that are delegated to municipalities or special districts in other counties. Although state fixed effects are likely to pick up much of the variation in the division of responsibility, we wanted to see whether the results in Table 7 were sensitive to the division of responsibility. The Census of Governments puts public services into 17 categories. For each category, we constructed indicator variables for whether the county (i) owned and operated the public service, (ii) owned the service but contracted out for the operation, (iii) neither owned nor operated but contracted out for the provision of the service; or (iv) did not provide the service. We then ran regressions like those in Table 7, except that we included these indicator variables. The coefficients on the measures of heterogeneity were robust to this change in the specification.

organize secession campaigns or campaigns of resistance to consolidation.

5.2 Panel Results

A necessary condition for causality going from heterogeneity to jurisdictional structure is that the number of jurisdictions actually change. As before, we determine whether this necessary condition is satisfied using first-differenced versions of the estimating equations. The results are shown in Table 8. For municipalities, the estimated coefficient on the racial heterogeneity index is strongly statistically significant and implies that an increase of two standard deviations in racial heterogeneity raises the number of municipalities by about 7 percent. This effect is reassuringly close to the cross-sectional estimates of Table 7. In addition, an increase of two standard deviation in income heterogeneity raises the number of municipalities by about 3 percent. Increases in white ethnic heterogeneity are also associated with increased numbers of municipalities. Overall, the municipality results are consistent across Tables 7 and 8 (cross-section and first-differences).

The same cannot be said for the special districts results. Recall that the cross-section results in Table 7 suggested that special districts were increasing in racial heterogeneity and religious heterogeneity, but unaffected by other types of heterogeneity. The first-differences results in Table 8 show that changes in special districts are *not* associated with changes in racial heterogeneity and are *negatively* associated with changes in religious heterogeneity. Changes in special districts are not associated with changes in ethnic or income heterogeneity. In short, the first-differences results imply that the cross-section results are largely coincidental: arrangements for special districts are idiosyncratic and special districts are coincidentally associated with some forms of heterogeneity in the cross-section. We conclude that special districts are not systemically affected by population heterogeneity, and we surmise that the lack of effect may be due to the low-interaction nature of special districts. Public services like fire control, water supply, drainage, garbage collection, and flood control do not, by their nature, require interaction among the service recipients. We might also argue that people do not differ much in their demand for such services. However, it is clear that interaction is lacking while we know that preferences must vary somewhat. If the lack of interaction is the reason that special districts do not change with population heterogeneity, it suggests that an unwillingness to mix with different people is part of the reason for the link between heterogeneity and school districts, school attendance areas, and municipalities.

6. The Role of State Legislation

Finally, we are interested in getting inside the black box: *how* does jurisdictional structure respond to population heterogeneity? To answer this question, we briefly explore our estimated state fixed effects. In most states, a supermajority of the voters in *each* (potential) jurisdiction must vote for a consolidation or secession ("mutual consolidation"). Getting a supermajority is costly if a minority of voters in either (potential) jurisdiction opposes the change. There is not much variation among states' secession laws, but there is variation among states' consolidation laws. States with "strong annexation" laws allow one jurisdiction to annex another, so long as the annexing jurisdiction gets support from the majority of *its* voters. "Weak" annexation laws provide for a similar process, but require the annexing jurisdiction to provide substantial evidence that the target jurisdiction is dependent on its (the annexing jurisdiction's) businesses or infrastructure. "Mutual annexation" is a very weak form of annexation in which annexation can be initiated by only one jurisdiction, but must be completed by majority voting in both jurisdictions. We classified states as strong annexation, weak annexation, mutual annexation, or mutual consolidation states.

In addition, state effects may be explained by laws that governed how land was sold and how local jurisdictions were set up when the state was still a territory or colony. In particular, if land was sold so that individual landowners tended to acquire diffuse acreage, then large jurisdictions were set up because they allowed a landowner with diffuse acreage to deal with only one local jurisdiction. Conversely, if land was sold so that individual landowners tended to acquire compact acreage, then small jurisdictions were created. We distinguish between four types of laws: the proprietor system, the direct purchase system, the laws that prevailed in Louisiana Purchase states, and the Homestead Act. Under the proprietor system, proprietors (developers) bought large pieces of land, which they repackaged and sold as compact landholdings to individuals. Under the direct purchase system, an individual could buy acreage directly from the (colonial) government. This system encouraged individuals to find the best land available and produced landholdings that straggled over large areas. Most Louisiana Purchase territories had a system similar to the direct purchase system, although some land was repackaged by developers. Under the Homestead Act, individuals could satisfy the homestead requirement by buying adjacent parcels, thus creating compact holdings.

Our law variables explain about 30 percent of the variation in the state fixed effects estimated in Table 2. (Fixed effects from the municipal regressions in Table 7 work similarly). For instance, we found that counties located in states with strong, weak, and mutual annexation laws have, respectively, 2.1 fewer districts, 1.7 fewer districts, and 0.2 fewer districts than counties in states with mutual consolidation laws. We found that proprietor system and Homestead Act states had, respectively, 10.7 and 7.7 more districts per county than Louisiana Purchase states.[31] The effect of the direct purchase laws was not statistically significantly different from that of Louisiana purchase laws.

In short, we have some idea of *how* local jurisdictional structure responds to heterogeneity. Counties began with different "basic" numbers of local jurisdictions because of different geography and different initial laws; heterogeneity created pressure for secession or (more often) resistance to consolidation; and the incidence of actual secessions and consolidations varied with the political cost of these activities.

7. Conclusions

The tradeoff between economies of scale and heterogeneity is an important determinant of the number and size of local political jurisdictions in the United States. Racial heterogeneity consistently has a significant positive effect on the number of local jurisdictions. That is, there is strong evidence that people are willing

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[31] All of the effects described thus far in this paragraph are statistically significantly different from zero at the five percent level.

to sacrifice economies of scale in order to avoid racial heterogeneity in their local jurisdiction. Most of the evidence supports the existence of tradeoff between income heterogeneity and economies of scale, but the tradeoff is less robust to altering the specification than is the tradeoff with racial heterogeneity. We find little evidence of a tradeoff between economies of scale and religious heterogeneity, white ethnic heterogeneity, or Hispanic ethnic heterogeneity, except *within* school districts where forming additional attendance areas is very inexpensive.

We provide both cross-section and panel evidence. Since 1960, there has been strong pressure on jurisdictions to consolidate, but we find that less consolidation took place in counties that more diverse racially. We attempt to confirm the direction of causality by examining counties that received positive shocks to racial heterogeneity in the two World Wars. We find that such counties were significantly less prone to consolidate their jurisdictions than counties that appeared similar at the beginning of each war decade. Both the timing and location of war-related shocks to racial heterogeneity are credibly exogenous, so the tests of the 1910-20 and 1940-50 decades strongly suggests that spurious correlation and endogenous location choices do not account for our results.

We find evidence that people avoid heterogeneity because they do not want to interact with different people, but we also find evidence that people avoid heterogeneity because different people prefer different public goods. Our evidence is not nearly decisive enough to allow us to apportion the blame neatly, but we conclude that both explanations are probably operative.

Our most striking result is the importance of racial heterogeneity relative to income heterogeneity. It is conventional to assert that households sort themselves among jurisdictions on the basis of income, if for no other reason that than they wish to avoid redistribution through the financing of local public goods. However, heterogeneity of preferences and avoidance of interaction receive very little attention from analysts of local public goods. Indeed, the vast majority of models of local jurisdictions assume that households care *exclusively* about the income of other residents in their jurisdiction. Our work suggests that diverse preferences and avoidance of interaction play at least as important a role as income, perhaps even a more important role. Moreover, our results suggest that race and ethnicity are important determinants of these preferences.

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Table 1
Descriptive Statistics for Counties

Variable	Mean	Std. Deviation
number of districts	5.444	7.730
number of schools	25.781	58.844
number of municipalities	6.498	6.649
number of special districts	10.904	17.026
racial heterogeneity index based on whole population	0.188	0.176
white ethnic heterogeneity index based on whole population	0.728	0.088
Hispanic ethnic heterogeneity index based on whole population	0.379	0.197
racial heterogeneity index based on school-aged population	0.215	0.188
white ethnic heterogeneity index based on school-aged population	0.697	0.107
Hispanic ethnic heterogeneity index based on school-aged population	0.306	0.212
Gini coefficient for household income	0.407	0.031
religious heterogeneity index	0.631	0.181
school-aged population (thousands)	17.620	57.700
population (thousands)	79.182	263.813
land area (thousands of square miles)	1.115	3.811
number of streams in county	70.114	95.281
mean household income (thousands)	29.389	6.867
percentage of adults with at least high school education	70.622	10.119
percentage of adults with at least college education (16 years)	12.812	6.090
percentage aged 65 or older	14.861	4.420
population density (thousands/square mile)	0.231	1.633
percentage of employment in agriculture	10.061	10.115
percentage of employment in mining and resources	2.625	5.576
percentage of employment in construction	7.129	2.674
percentage of employment in manufacturing	20.827	12.168
percentage of employment in transportation	6.582	2.504
percentage of employment in trade	18.614	3.652
percentage of employment in finance, real estate, insurance	3.847	1.658
percentage of employment in business services	2.713	1.539
percentage of employment in personal services	3.933	2.047
percentage of employment in entertainment	6.527	2.741
percentage of employment in health	2.299	0.814
percentage of employment in education	8.990	3.625
percentage of employment in other professions	3.077	1.201
percentage of employment in public administration	5.068	3.596

Notes: The table shows unweighted descriptive statistics for the data, in which an observation is a county. A county is in the sample if it is stable and *can* legally have lower level jurisdictions within it. The data are from the Census of Population and Housing, the Census of Governments, the School District Data Book, the Survey of Churches and Church Membership, and the United States Geological Survey.

Table 2
Effect of Population Heterogeneity on the Number of *School Districts* in a County
dependent variable: ln(number of school districts in a county)

	the population heterogeneity variables are based on...							
	entire population				school-aged children			
racial heterogeneity	0.292 (0.096)	0.282 (0.096)	0.285 (0.100)	0.290 (0.102)	0.265 (0.085)	0.233 (0.088)	0.219 (0.087)	0.208 (0.091)
white ethnic heterogeneity		-0.434 (0.163)		-0.275 (0.163)		-0.148 (0.136)		-0.054 (0.135)
Hispanic ethnic heterogeneity		0.080 (0.062)		0.060 (0.062)		0.001 (0.055)		0.001 (0.055)
Gini coefficient household income	1.574 (0.603)	1.444 (0.614)	1.478 (0.600)	1.286 (0.612)	1.582 (0.602)	1.398 (0.626)	1.540 (0.599)	1.329 (0.625)
religious heterogeneity	0.039 (0.086)	0.046 (0.089)	-0.026 (0.086)	-0.011 (0.088)	0.044 (0.086)	-0.050 (0.092)	-0.017 (0.086)	-0.06 (0.091)
ln(mean household income)	0.362 (0.104)	0.319 (0.105)	0.259 (0.129)	0.253 (0.131)	0.346 (0.104)	0.291 (0.108)	0.262 (0.129)	0.219 (0.135)
percent of adults with at least high school	-0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)	-0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)
percent of adults with at least college	-0.008 (0.003)	-0.008 (0.003)	-0.013 (0.004)	-0.013 (0.004)	-0.007 (0.003)	-0.008 (0.003)	-0.013 (0.004)	-0.011 (0.004)
percent of population age 65 or older	0.013 (0.003)	0.012 (0.003)	0.015 (0.004)	0.016 (0.004)	0.012 (0.003)	0.011 (0.003)	0.014 (0.004)	0.012 (0.004)
ln (number of streams)	0.028 (0.011)	0.026 (0.011)	0.044 (0.011)	0.044 (0.012)	0.027 (0.011)	0.024 (0.011)	0.042 (0.011)	0.042 (0.012)
population (in millions) living in low density areas	27.6 (1.23)	27.1 (1.23)	24.9 (1.25)	24.7 (1.25)	27.6 (1.23)	26.6 (1.24)	25.0 (1.25)	24.4 (1.26)
population (in millions) living in medium density areas	0.664 (0.249)	0.701 (0.248)	0.534 (0.253)	0.607 (0.252)	0.664 (0.249)	0.710 (0.247)	0.551 (0.252)	0.637 (0.252)
population (in millions) living in high density areas	1.000 (0.422)	1.010 (0.419)	0.942 (0.415)	0.936 (0.413)	0.995 (0.422)	0.885 (0.417)	0.939 (0.415)	0.837 (0.412)
population (in millions) living in very high density areas	-3.44 (4.86)	-3.35 (4.82)	-2.91 (4.78)	-2.65 (4.76)	-3.38 (4.86)	-3.07 (4.80)	-2.78 (4.78)	-2.43 (4.74)
12 other variables that describe population and pattern of population density	✓	✓	✓	✓	✓	✓	✓	✓
state fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
16 industry share variables			✓	✓			✓	✓
number of observations (counties)	2,718	2,670	2,718	2,670	2,718	2,546	2,718	2,546

Notes: Least squares estimates. Standard errors are in parentheses. An observation is a county in which the number of districts *can* change. There are fewer observations in regressions that include the Hispanic ethnicity index because some districts have missing information about the ancestry of the Hispanic population. Such information appears to be missing, however, at random. Data are from the School District Data Book and Survey of Churches and Church Membership. The 12 other variables that describe population and population density are: the squares of each of the population variables listed in the table (4 variables), the actual population density for the county in its low, medium, high, and very high density areas (4 variables), and the squares of the preceding 4 variables. The employment share variables are used for the following industries: agricultural; construction; mining; non-durables manufacturing; durables manufacturing; transportation; communication; retail trade; wholesale trade; business services; finance insurance and real estate; personal services; entertainment, health, education, and other professional services.

Table 3a
Effect of School Aged Population Heterogeneity on the Number of *School Attendance Areas* in a County, Controlling for the Number of School Districts

	dependent variable: ln(number of school attendance areas in a county)			
number of school districts in the county	0.491 (0.014)	0.471 (0.015)	0.451 (0.014)	0.437 (0.014)
racial heterogeneity based on school-aged children	0.329 (0.063)	0.262 (0.065)	0.225 (0.061)	0.188 (0.063)
white ethnic heterogeneity based on school-aged children		0.276 (0.099)		0.213 (0.093)
Hispanic ethnic heterogeneity based on school-aged children		0.232 (0.040)		0.175 (0.038)
Gini coefficient household income	1.080 (0.442)	1.139 (0.455)	0.810 (0.418)	0.774 (0.430)
religious heterogeneity	0.627 (0.063)	0.568 (0.067)	0.454 (0.060)	0.464 (0.063)
ln(mean household income)	-0.013 (0.077)	-0.033 (0.079)	-0.199 (0.091)	-0.225 (0.093)
percent of adults with at least high school	-0.001 (0.002)	-0.003 (0.002)	-0.000 (0.002)	-0.002 (0.002)
percent of adults with at least college	-0.004 (0.002)	-0.003 (0.003)	-0.011 (0.003)	-0.010 (0.003)
percent of population age 65 or older	-0.020 (0.002)	-0.022 (0.002)	-0.021 (0.002)	-0.022 (0.003)
ln(number of streams)	0.038 (0.008)	0.027 (0.009)	0.039 (0.008)	0.032 (0.009)
population (in millions)	20.400 (0.986)	19.500 (0.982)	18.400 (0.932)	17.600 (0.927)
population squared (in millions^2)	2.510 (0.183)	2.610 (0.180)	2.110 (0.176)	2.180 (0.173)
population density (in 10,000)	-0.146 (0.310)	-0.120 (0.303)	0.056 (0.290)	0.069 (0.283)
population density squared (in 10,000^2)	9.200 (3.560)	8.890 (3.480)	7.620 (3.330)	7.380 (3.260)
state fixed effects	✓	✓	✓	✓
16 industry share variables			✓	✓
number of observations	2,718	2,546	2,718	2,546

Notes: All notes from Table 2 apply.

Table 3b
Effect of School Aged Population Heterogeneity on the Number of School Attendance Areas *Within* a School District

	dependent variable: ln(number of school attendance areas in a school district)			
racial heterogeneity based on school-aged children	0.682 (0.042)	0.194 (0.048)	0.573 (0.040)	0.241 (0.058)
white ethnic heterogeneity based on school-aged children		0.647 (0.060)		0.264 (0.058)
Hispanic ethnic heterogeneity based on school-aged children		0.807 (0.028)		0.682 (0.021)
Gini coefficient household income	1.218 (0.032)	1.888 (0.208)	1.280 (0.131)	2.049 (0.206)
ln(mean household income)	0.003 (0.001)	0.065 0.045	-0.083 (0.036)	-0.152 0.051
percent of adults with at least high school	0.003 (0.001)	0.001 (0.001)	-0.000 (0.001)	-0.004 (0.001)
percent of adults with at least college	0.002 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.002 (0.001)
percent of population age 65 or older	-1.110 (0.108)	-2.073 (0.139)	-1,225 (0,105)	-2.040 (0.140)
population (in millions)	17.310 (0.617)	11.900 (0.208)	16.300 (0.202)	15.000 (0.204)
population squared (in millions^2)	-0.020 (0.212)	-15.300 (0.314)	-15.900 (0.305)	-14.300 (0.306)
population density (in 10,000)	1.953 (0.118)	1.624 (0.121)	1.225 (0.118)	0.773 (0.123)
population density squared (in 10,000^2)	-2.740 (0.220)	-2.170 (0.224)	-1.770 (0.216)	-1.090 (0.221)
state fixed effects	✓	✓	✓	✓
16 industry share variables			✓	✓
number of observations	14,718	12,265	14,718	12,265

Notes: An observation is a school district. All other notes from Table 2 apply.

Table 4
Effect of the Number of School Districts and School Attendance Areas on the Heterogeneity that People Actually Experience

	dependent variable:			
	ratio of actual to possible racial heterogeneity, based on district data	ratio of actual to possible poverty heterogeneity, based on district data	ratio of actual to possible racial heterogeneity, based on school data	ratio of actual to possible racial heterogeneity, based on school data
ln(number of districts in county)	-0.026 (0.004)	-0.008 (0.002)	-0.008 (0.004)	-0.001 (0.005)
ln(number of school attendance areas in county)	0.001 (0.004)	0.001 (0.002)	-0.030 (0.005)	-0.040 (0.008)
Gini coefficient household income	-0.160 (0.091)	-0.025 (0.008)	-0.640 (0.122)	-0.074 (0.027)
religious heterogeneity	-0.038 (0.013)	0.006 (0.007)	-0.020 (0.018)	0.049 (0.022)
ln(mean household income)	0.001 (0.020)	0.036 (0.010)	-0.064 (0.025)	0.013 (0.032)
percent of adults with at least high school	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.0003)	0.001 (0.0003)
percent of adults with at least college	0.002 (0.001)	0.001 (0.001)	0.003 (0.001)	-0.002 (0.001)
percent of population age 65 or older	0.313 (0.056)	0.033 (0.031)	0.278 (0.072)	0.154 (0.107)
ln (number of streams)	-0.004 (0.002)	-0.001 (0.001)	-0.002 (0.002)	-0.000 (0.003)
population (in millions) living in low density areas	0.042 (0.221)	0.417 (0.119)	0.185 (0.278)	0.441 (0.549)
population (in millions) living in medium density areas	-0.069 (0.040)	0.028 (0.022)	-0.167 (0.049)	0.002 (0.134)
population (in millions) living in high density areas	-0.067 (0.064)	0.078 (0.035)	-0.237 (0.077)	-1.640 (0.519)
population (in millions) living in very high density areas	0.720 (0.739)	0.208 (0.399)	0.390 (0.880)	15.6 (10.2)
12 other variables describing population and population density	✓	✓	✓	✓
state fixed effects	✓	✓	✓	✓
16 industry share variables	✓	✓	✓	✓
number of observations (counties)	2715	2715	2294	1141

Notes: The **racial (poverty) segregation ratio based on district data** is the actual probability that a person meets a person of a different race (poverty status) in his school district, divided by the probability that he would meet a person of a different race (poverty status) if his district had the same composition as his county. The **racial (poverty) segregation ratio based on school data** is the actual probability that a student meets a student of a different race (free lunch eligibility) in his school, divided by the probability that he would meet a person of a different race (free lunch eligibility) if his school had the same composition as his county. Number of observations differs from Table 2 only because some districts and schools do not report their racial composition or free lunch eligibility. Other notes from Table 2 apply.

Table 5
Effect of Changes in Population Heterogeneity
on Changes in the Number of *School Districts* in a County between 1990 and 1960

	dependent variable: change in ln(number of school districts in a county), 1990 minus 1960			
change in racial heterogeneity	1.079 (0.159)	1.061 (0.159)	1.049 (0.163)	1.020 (0.162)
change in white ethnic heterogeneity		0.370 (0.049)		0.358 (0.049)
change in Hispanic ethnic heterogeneity		0.127 (0.071)		0.054 (0.071)
change in Gini coefficient household income	3.268 (0.556)	3.602 (0.556)	1.456 (0.592)	1.865 (0.597)
change in religious heterogeneity	-0.253 (0.116)	-0.082 (0.116)	-0.205 (0.115)	-0.036 (0.115)
change in ln(mean household income)	0.625 (0.085)	0.526 (0.086)	0.850 (0.093)	0.747 (0.094)
change in percent of adults with at least high school	-0.018 (0.002)	-0.015 (0.002)	-0.018 (0.002)	-0.015 (0.002)
change in percent of population age 65 or older	-1.464 (0.501)	-0.801 (0.501)	-0.223 (0.513)	0.218 (0.513)
change in the population (in millions) living in low density areas	3.450 (1.090)	3.200 (1.060)	2.010 (1.100)	2.260 (1.070)
change in the population (in millions) living in medium density areas	1.210 (0.427)	1.600 (0.419)	0.704 (0.430)	0.978 (0.423)
change in the population (in millions) living in high density areas	-0.488 (0.707)	-0.455 (0.690)	-0.727 (0.696)	-0.641 (0.681)
change in the population (in millions) living in very high density areas	2.860 (4.100)	1.930 (4.000)	2.650 (4.030)	1.930 (3.940)
12 other variables that describe change in population and pattern of population density	✓	✓	✓	✓
change in industry share variables			✓	✓
number of observations	2718	2670	2718	2670

Notes: An observation is a county in which the number of districts can change. All variables are first-differenced (1990 minus 1960). Data are from the School District Data Book, block files of the 1960 Census of Population, and Surveys of Churches and Church Membership. All other notes from Table 2 apply.

Table 6
Effects of Racial Heterogeneity Shocks Generated by World War Industry Demands
dependent variable: change in ln(number of school districts in a county) over the decade

	World War I "experiment" decade of change is 1910 to 1920	World War II "experiment" decade of change is 1940 to 1950
change in percentage of population that is black	0.157 (0.074)	0.032 (0.013)
change in percentage of population that is foreign born	-0.003 (0.042)	0.018 (0.016)
change in religious heterogeneity index	0.013 (0.032)	0.023 (0.018)
change in log(population)	-0.416 (0.429)	-0.083 (0.127)

Notes: Least squares estimates. Standard deviations in parenthesis. An observation is a county that either experienced a shock to racial heterogeneity because of war industry demands or is a county that was similar to a "shocked" county at the beginning of the decade. The comparison counties were chosen on the basis of their beginning-of-decade match on total population, percent urban, and percent black. There are 26 observations in the World War I regressions and 68 in the World War II regressions. Data are from the Census of Population, Census of Religious Bodies, *Education Directory*, and Survey of Churches and Church Membership.

Table 7
Effect of Population Heterogeneity on the Number of Municipalities and Special Districts in a County

	dependent variable:							
	ln(number of municipalities in a county)				ln(number of special districts in a county)			
racial heterogeneity	0.177 (0.099)	0.173 (0.100)	0.269 (0.105)	0.263 (0.106)	0.542 (0.107)	0.534 (0.108)	0.565 (0.114)	0.558 (0.115)
white ethnic heterogeneity		-0.548 (0.175)		-0.331 (0.176)		0.204 (0.188)		0.209 (0.190)
Hispanic heterogeneity		0.032 (0.066)		0.079 (0.066)		0.104 (0.071)		0.046 (0.072)
Gini coefficient household income	1.194 (0.549)	1.321 (0.561)	0.919 (0.598)	1.059 (0.611)	1.522 (0.583)	1.480 (0.593)	0.811 (0.635)	0.783 (0.649)
religious heterogeneity	-0.025 (0.091)	-0.013 (0.093)	-0.011 (0.091)	-0.021 (0.093)	0.465 (0.098)	0.456 (0.101)	0.387 (0.098)	0.396 (0.101)
ln(mean household income)	0.286 (0.120)	0.301 (0.122)	0.225 (0.153)	0.229 (0.157)	0.415 (0.129)	0.417 (0.131)	0.401 (0.166)	0.397 (0.169)
percent of adults with at least high school	0.008 (0.003)	0.010 (0.003)	0.010 (0.003)	0.012 (0.003)	-0.006 (0.003)	-0.007 (0.003)	-0.010 (0.003)	-0.010 (0.003)
percent of adults with at least college	-0.022 (0.004)	-0.023 (0.004)	-0.024 (0.005)	-0.025 (0.005)	0.004 (0.004)	0.003 (0.004)	0.003 (0.005)	0.004 (0.005)
percent of population age 65 or older	0.020 (0.003)	0.020 (0.003)	0.024 (0.004)	0.023 (0.004)	0.014 (0.004)	0.013 (0.004)	0.017 (0.004)	0.017 (0.004)
ln(number of streams)	0.033 (0.012)	0.033 (0.012)	0.065 (0.013)	0.063 (0.013)	0.081 (0.013)	0.079 (0.013)	0.081 (0.014)	0.082 (0.014)
population (millions) living in low density areas	22.903 (1.082)	22.587 (1.097)	21.446 (1.115)	21.259 (1.130)	19.881 (1.150)	19.501 (1.164)	17.567 (1.192)	17.481 (1.205)
population (millions) living in medium density areas	1.143 (0.240)	1.217 (0.240)	1.034 (0.249)	1.118 (0.250)	0.405 (0.255)	0.418 (0.255)	0.099 (0.266)	0.105 (0.266)
population (millions) living in high density areas	1.253 (0.467)	1.221 (0.465)	1.182 (0.459)	1.162 (0.458)	-1.115 (0.494)	-1.102 (0.492)	-1.090 (0.489)	-1.075 (0.488)
population (millions) living in very high density areas	24.514 (14.003)	24.197 (13.961)	16.978 (13.897)	17.297 (13.867)	7.872 (14.893)	7.726 (14.837)	-2.231 (14.855)	-2.103 (14.822)
12 other variables that describe population and population density	✓	✓	✓	✓	✓	✓	✓	✓
state fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
industry share variables			✓	✓			✓	✓
observations	2949	2901	2949	2901	2908	2863	2908	2863

Notes: Least squares estimates. Standard errors are in parenthesis. Notes from Table 2 apply.

Table 8
Effect of Changes in Population Heterogeneity
on Changes in the Number of Municipalities and Special Districts, 1960-1990

	dependent variable:							
	log-change in number of municipalities				log-change in number of special districts			
Change in:								
racial heterogeneity	0.213	0.211	0.186	0.185	0.072	0.058	-0.180	-0.180
	(0.063)	(0.064)	(0.064)	(0.065)	(0.188)	(0.192)	(0.192)	(0.196)
white ethnic heterogeneity		0.068		0.065		0.004		-0.004
		(0.016)		(0.016)		(0.048)		(0.048)
Hispanic heterogeneity		-0.067		-0.063		-0.089		-0.038
		(0.023)		(0.040)		(0.069)		(0.070)
Gini coefficient household income	0.367	0.433	0.364	0.426	0.603	0.602	1.345	1.407
	(0.182)	(0.185)	(0.188)	(0.192)	(0.556)	(0.565)	(0.572)	(0.583)
religious heterogeneity	0.033	0.065	0.015	0.045	-0.288	-0.286	-0.306	-0.302
	(0.035)	(0.036)	(0.035)	(0.037)	(0.108)	(0.112)	(0.109)	(0.113)
ln(mean household income)	0.113	0.095	0.143	0.123	-0.212	-0.209	-0.337	-0.339
	(0.027)	(0.029)	(0.032)	(0.034)	(0.085)	(0.089)	(0.100)	(0.104)
percent of population age 65 or older	-0.002	-0.002	-0.003	-0.002	-0.015	-0.016	-0.017	-0.017
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)	(0.005)
percent of adults with at least high school	0.003	0.004	0.002	0.003	0.008	0.008	0.011	0.011
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)
population (millions) living in low density areas	-35.489	-32.529	-31.285	-28.297	20.972	25.610	33.325	35.113
	(23.507)	(23.491)	(23.437)	(23.427)	(70.828)	(71.145)	(70.406)	(70.719)
population (millions) living in medium density areas	-35.225	-32.183	-31.204	-28.142	19.212	23.792	31.682	33.428
	(23.422)	(23.405)	(23.351)	(23.340)	(70.530)	(70.845)	(70.104)	(70.415)
population (millions) living in high density areas	-36.577	-33.579	-32.433	-29.410	19.366	24.004	32.021	33.790
	(23.463)	(23.446)	(23.392)	(23.382)	(70.677)	(70.994)	(70.253)	(70.566)
population (millions) living in very high density areas	-35.659	-32.846	-31.403	-28.557	24.003	28.627	35.727	37.525
	(23.429)	(23.412)	(23.359)	(23.349)	(70.554)	(70.868)	(70.133)	(70.444)
12 other variables that describe population and population density	✓	✓	✓	✓	✓	✓	✓	✓
industry share variables			✓	✓			✓	✓
observations	2844	2799	2843	2798	2624	2584	2623	2583

Notes: Least squares estimates. Standard errors are in parenthesis. An observation is a county. For the first four regressions, the dependent variable is "ln(number of municipalities in a county in 1990) minus ln(number of municipalities in the county in 1960)", and analogously for special districts for the last four regressions. All independent variables are in changes as well (1990 value minus 1960 value). Notes from Tables 2 apply.