Geographic Spillover of Unionism

by

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1. Introduction

If a union successfully organizes one plant, does it make it easier to organize other nearby plants? If the answer is yes, there is a *spillover* effect from one plant to the next. If spillovers are important, then when a union gets it foot in the door and organizes some initial plants, unionism may spread like a contagion and turn a city into what trade unionists call a "union town."

The purpose of this paper is to quantify the extent of geographic spillover of unionism. Trade unionists and business people alike think that such spillovers exist, but there is virtually no economic research on this issue.[2] There ought to be such research for three reasons.

First, the research can potentially shed light on the process underlying the dramatic decline of unions in the U.S. in recent years. Existing research on this decline has focused on factors such as changes in the underlying structure of the economy and changes in the

[1] I thank Alice Schoonbroot for helpful research assistance. The views expressed herein are solely those of the author and do not represent the views of the Federal Reserve Banks of Minneapolis or the Federal Reserve System.

[2] Geographers have an interest in unions, see for example, the collection of papers in Herod (1998), but I have not found work related to the question I address.

legal environment. Little attention has been place on the role of spillovers may have played in *magnifying* the effects of structural changes. When spillovers exist, there is "positive feedback" and small changes in fundamentals can lead to large changes in outcome. With estimates of the spillover effects, one can potential quantify this magnification effect.

Second, understanding the geography of unionism may be of use in understanding the evolution in the location of industry. In the post-war period, there has been a major migration of manufacturing from the Northeast and Great Lakes region of the U.S. to the South. A number of studies (i.e. Fuchs (1962), Holmes (1998)) suggest that union avoidance may part of the reason for why firms move south. To take an example, in the past two decades Japanese automobile manufacturers have built numerous automobile factories in the south. It is widely believed that these firms consciously avoided Michigan where the United Auto Workers (UAW) union is strong and all automobile plants are organized. In order to fully understand these business location decisions, one must first understand the extent to which geography impacts unionization. How much does the strong UAW presence in Michigan spill over and affect the probability that a new automobile plant in Detroit or Flint, Michigan would be unionized?

Third, research on spillover of unionism should be useful to those with a general interest in environments with spillovers. There has been much theoretical interest in such environments in recent years and much discussion of positive feedback, local market interactions, and so forth. (See, for example, Arthur (1989), Brock and Durlauf (2001)). More recently, empirical work has tried to quantify these spillovers in studies ranging from the adoption of new technologies to peer group effects in education. As emphasized by Manski (1993) and others, there are some basic difficulties in identification that need to be addressed somehow in this empirical work. Economic actors at the same location are likely to share common characteristics which lead them to make similar choices and have similar outcomes even without any spillover effects. These identification issues arise in this context as well. The main job of this paper is to confront these issues head on.

The variation in unionization across regions in the United States is remarkable. In 2002, 25.3 percent of employees in New York were members of unions, but in North and

South Carolina the membership rates were only 3.2 and 4.9 percent.[3] Sharp differences in unionization rates across locations are consistent with the existence of spillovers. With spillovers and positive feedback there can be multiple equilibria. As is familiar from the theoretical literature on technological adoption, one location can be a "high adoption" equilibrium where much of the labor forces is unionized and unionism spills over back and forth across workers. A second location might have a low adoption equilibrium where virtually no workers are organized.

While the dramatic differences in unionization across regions is consistent with the existence of spillovers, there are other alternative explanations that have nothing to do with spillovers. The goal of this paper is to disentangle the effects of spillovers from other effects. There are three main challenges that have to be dealt with for obtaining this goal. In this paper, I provide strategies to overcome all three challenges.

The first challenge is that locations differ substantially in industry composition and industries differ substantially in their proclivity to be unionized. Industries in the manufacturing sector, particularly heavy industries such as steel, have tended to be a highly unionized while unions are weak in agriculture and light industries like textiles. Historically, in the U.S. the North has specialized in manufacturing while the South has specialized in agriculture and textiles. Given this fact, it is not surprising that, historically, union activity has been low in the South and high in the North.

One can attempt to deal with these composition issues by directly controlling for industry. An obstacle here is that there is considerable heterogeneity within industries. If one simply controlled for manufacturing, one would miss the fact that heavy manufacturing industries such as steel are much more "unionizable" than textiles. But even if one were to control for what would be appear to be narrow industries one might find heterogeneity. For example, the four-digit SIC industry 3711 includes Ford and GM automobile assembly plants as well as facilities that make conversion vans and ambulances. For the steel industry, SIC industry 3312 includes blast furnaces (which are quite unionizable) and mini-mills (which have remained nonunion). Holmes and Stevens (2002) provide evidence of heterogeneity across locations within narrowly defined industries in traded sectors such as manufacturing.

[3] These figures are published by the Bureau of Labor Statistics.

The technical problem then is one of unobserved heterogeneity across locations.

My strategy for tackling this composition issue is to look at nontraded services. While traded goods are different across locations (that's why there is trade) nontraded services like grocery stores and nursing homes are very similar. Since, to a first approximation, tastes are similar across locations, the composition of nontraded goods is similar. The technology for production and therefore the degree of unionizability is similar. By looking at nontraded services I therefore minimize the potential problem of unobserved heterogeneity.

The second challenge to be addressed is what can be called the *vintage* issue. Businesses in the South tend to be younger than those in the North since the South has growth rapidly compared to the North and much economic activity is relatively new. This matters because federal government policies that affect unionization have changed substantially over time. There is wide agreement in the labor literature that the substantial increase in unionization that occurred in the late 1930s was due to active pro-union federal policies such as the Wagner act. (Freeman (1997)). Federal policy, beginning with the 1947 Taft-Hartley act, has in later years taken a more neutral stance—and some would argue that administrations such as Reagan's have taken a hostile stance. There has also been much legislation passed, particularly in the 1960s, that protects workers. Neuman and Rissman (1984) have argued that this legislation substitutes for unions and hence decreases the demand for unions. Thus one reason that the large automobile plants and steel mills are unionized is that these plants predate the Wagner Act and the worker protection legislation. The Japanese automobile plants in the South arrived at a later time under a different policy regime. This is also true about services—grocery store chains based in the North like A&P have long been unionized.

To deal with this vintage issue, I examine how spillovers affect *flows* of new unionization attempts, rather than *stocks*. By examining flows, I hold fixed the time period over which the organization is occurring. Specifically, I examine data on representation elections conducted by the National Labor Relations Board (NLRB). This data is often used to study unions. (See Farber (2001) for a recent analysis.) But the rich geographic information in this data set has not, to the best of my knowledge, been previously exploited.

In the above, I explained the issues of heterogeneity of industry and heterogeneity of vintage and described my strategies for controlling for them. My third challenge is that

there may be additional sources of heterogeneity that need to somehow be controlled for. Proving that spillovers exist is always a tough job. No matter how hard a researcher tries to control for heterogeneity, critics in a seminar audience can always be counted on to come up with some additional source of heterogeneity that is not controlled for. Suppose, for example, that for whatever reason, the quality of union leadership varies across locations. Locations with strong and charismatic leaders will presumably have a high level of unionization in both the services and the goods sectors even if there is no spillovers between these sectors.

To deal with this third challenge, I use as an instrument the location of coal mines, steel mills, and auto plants. The location of coal mines is literally a "natural experiment." For my purposes (as I will argue), the location of steel mills and auto plants can also be treated as a natural experiment. Since these industries are so highly "unionizable," employment in these industries is highly correlated with a location's unionization rate. But presumably whether or not there is coal in the ground should be uncorrelated with an area's "underlying" tendency to have its nursing homes unionized. This makes the location of coal mines an excellent instrument for my purposes.

Using the above three strategies, I find a substantial spillover effect. The spillover effect in those locations with large union activity increases the probability of new organization of service establishments by a factor of two or three compared to locations with little activity. In short, my empirical finding is that locations with a large number of coal mines, steel mills, and auto plants, tend to have a relatively large number of new organization attempts in nursing homes and hospitals. To get a sense of the results, it is useful to consider the example of Birmingham, Alabama. As mentioned earlier, there was little heavy industry in the South that predates the Wagner Act. But Birmingham, with its rich coal and iron ore deposits (hence the name) was an exception and it was a major steel producing area. Today, Birmingham is a place where one finds NLRB elections for nursing homes.

The Nature of Spillovers

At this point, it is worth discussing the nature of spillovers. By definition, spillovers make it more valuable for workers at a plant to unionize, the higher the level of organization of other plants in the area, akin to a network benefit in the technology adoption literature.

At the simplest level I am talking about attitudes towards unionism or what could be

thought of as "union goodwill." There is wide variation in opinions about unions and it is commonly thought that these differences in attitudes make a big difference in organizing campaigns. It is plausible that the experience of working at a union job will tend to make a person more favorably disposed to unions. Unions make an effort to indoctrinate new workers, to "train workers in unionism."[4] If we look at a given plant, the greater the extent of unionism in the location, the more positive the attitudes inside the plants because the employees will be more likely to have held previous union jobs elsewhere or be related to, or be friends with, union members (and have had positive attitudes transmitted this way).

Regardless of the attitudes inside a particular plant, an increase unionism at the plant's geographic area increases the returns to organizing the plant because a union's success depends upon the support of outsiders. For a strike to be successful, it is important that replacement workers and customers not cross picket lines. In a "union town" picket lines are more likely to be observed. Unions go to great effort to promote a "union label" identifying things as union made. (See Hall (1936) for a discussion of when a barber shop could put the union card on its window.) Union labels are only relevant if people outside the establishment care enough about unionism for it to affect a purchase decision.

This discussion of attitudes raises the issue of the role of immigration. In the period before immigration was closed in the 1920s, coal mines and steel mills attracted waves of immigrants. It is plausible that these immigrants brought positive attitudes towards unionism, socialism, etc., from Europe. It is possible that this immigration contributed to the unionization of the coal mines in 1900, and, with the persistence of attitudes through generations, is contributing towards the unionization of nursing homes a century later. I have two things to say about this. First, if this effect is at all present, then it only reinforces the importance of the kinds of spillovers that I am talking about. If a turn-of the century immigrant's experience with unionism that he brought with him from Europe is still spilling over one hundred years later, then the effect of current experiences with unionism can only be that much more powerful. Second, I control for immigration in my analysis and it turns out not to have a big effect on the results.

Another channel for spillovers besides attitudes has to do with union infrastructure and

[4] See quote from Barbers Union manual, Hall (1936).

staff. In locations with many unionized establishments, there are numerous full time union staff members. In addition to tending to their responsibilities for existing unionized plants, these staff members are always on the lookout for new opportunities for organizing and naturally opportunities where the staff member lives are easier to spot then out-of-town opportunities. In this paper I provide some evidence on the potential importance of this channel by proving the existence of a link between local presence of an industrial union and its success in organizing service establishments. I find that in steel towns like Pittsburgh where the Steelworkers are strong, nursing homes are likely to be organized by the Steelworkers. In Michigan where the Auto Workers are strong, nursing homes and hospitals are commonly organized by the Auto Workers.

Outline of the Paper

Section 2 of the paper provides a description of the data and provides a first look. As is standard practice in the labor literature I use data based on the Current Population Survey (CPS) to quantify the extent of union activity. The CPS has some limitations, however, in terms of its geographic and temporal scope, so I supplement the CPS data with a new data set that I have constructed based on the Labor Department's *Labor Organization and Reporting System* (LORS). The LORS data is administrative micro data that has been continuously collected since 1960. This data is extremely useful for studying the geography of unionism.

Section 3 presents a simple mechanical model of spillovers and estimates the parameters. This section considers some experiments.

Section 4 is a first attempt to clarify the channels of spillovers. It examines the link between local presence of a particular union, e.g. the UAW or the Steelworkers, and local organizing.

2. The Data and a First Look

2.1 Data on Unionism

Today the standard source for estimates of the number of union members is the CPS. For the years 2000, 1990, and 1980, Table 1 presents CPS estimates of the percent of private sector workers that are union members as well as the number of union members. Estimates

for the earlier years of 1970 and 1960 are not available from the CPS and these are obtained from other sources (See Troy and Sheflin (1985)). The membership percentage fell from 31.9 in 1960 to 9.0 percent in 2000.

The CPS contains information about the state and the metropolitan statistical area (MSA) of the workers in the survey. With this information, it is possible to construct state-level and MSA-level estimates of unionization. Hirsch and Macpherson (2003) have constructed these estimates for all the years for which the data are available and have published this data on the web. One limitation is that the MSA-level data only begins in 1986. Moreover, many small MSAs are left out and there is no disaggregate data for rural areas. Furthermore, the small MSAs that are in the sample tend to have very small cell counts leading to estimates with high standard errors. In the CPS there is no information about the union affiliation of the worker (Steelworkers, Teamsters, etc.).

Before the advent of the CPS to measure unionization, Leo Troy used the administrative records from the Labor Organization and Reporting System (LORS) to construct state-level estimates. As part of a broad research program studying the geography of unionism, I am resurrecting the use of this data. For the universe of labor organizations, this data provides detailed geographic information as well as affiliation. Moreover, the time coverage of this data extends from 1960 to the present. Since, fixing its coverage, the Census-collected CPS is the highest quality available, I use the CPS for my baseline estimates. I use the LORS data to check the robustness of my results to extending the time period and to extending the geographic coverage. I also use the LORS data in applications that utilize the affiliation information.

The LORS data is based on forms called LM reports that labor organizations are required to file on an annual basis. All labor organizations representing private sector employees have been required to do this under the Labor-Management Reporting and Disclosure Act (LMRDA) of 1959. What makes this data useful for my purposes is that it is not just the national-level organization units that are required to file these forms—local units need to file the reports as well. The local is the basic structural unit in American labor.[5] An example of one such local is #879 of the United Auto Workers (UAW). This represents

[5] Troy and Sheflin (1985, p. 5-1) write, "Local Unions were the first type of union established and throughout the history of organized labor in the U.S., they have remained its basic structural unit."

the workers at the Ford assembly plant in St. Paul, Minnesota. In its LM filing for 2000, this local reported having 2,129 members and $1,637,266 in receipts. Unfortunately, data on membership is not available prior to 2000.[6] But data on counts of locals by location and affiliation at the decade frequency beginning with 1960 up to 2000, and this is the information that I use in the analysis.[7] Table 1 presents counts of private sector locals for each of these periods. Note the substantial decline from approximately 50,000 locals in 1960 to approximately 20,000 locals today. Total number of members has also declined over the period but not by quite as much in percentage terms, resulting in an increase in average local size from 300 members to 440 members.

Table 2 presents the ten largest national unions in terms of numbers of members in local organizations. Observe that there is substantial variation in local size. The Steelworkers have the largest absolute number of locals and the smallest average size. This reflects the Steelworkers organizational structure of setting up separate locals for each establishment and, in the case of a large steel works, sometimes even multiple locals for the same establishment. In contrast, unions such as the Food and Commercial Workers tend to have large locals that represent multiple establishments in a given geographic area. This discussion illustrates that counts of locals at an area provide only a coarse and imperfect measure of the extent of unionization in the area. It is nevertheless a useful measure, as will be seen.

So far I have discussed measures of the *stock* of unionism at a location that provide a potential source of spillovers. I turn now to a discussion of data on *flows* of new unionism. I use data on representation elections supervised by the National Labor Relations Board (NLRB). In a representation election, workers at a particular establishment vote on whether they want a particular union to be recognized as their representative in negotiations with the owner of the establishment.[8] Table 3 presents counts of NLRB elections for the two most recent decades. There were approximately 50,000 elections with 2.8 million eligible

[6] Leo Troy used information about receipts and estimates of union dues to infer membership counts. Unfortunately, information about receipts for years before 2000 appears to be lost.

[7] This data was scanned in from published directories. This data will be discussed in detail in a separate paper that will exploit the logitudinal aspect of the data.

[8] An NLRB election is an incomplete measure of flows of establishments into unionism. Some plants unionize without an election by the card-check process. (This happens when a company is trying to maintain good relations with its union. For example, when GM started its Saturn plant in Tennessee, it did not have an election.) The card check procedure is relatively rare, particular in recent years. And since there is no data on it, researchers have focused on NLRB elections to measure flows.

votes in the 1980s and this fell to 35,000 elections with 2.2 million eligible votes in the 1990s. The win rate for unions is close to fifty percent. The win rate falls if the rate is weighted by the amount of eligible voters, because the win rate is lower for larger establishments. (See Farber (2001) for an analysis of this pattern.)

The bottom two rows contain the analogous figures when we restrict attention only to the service sectors. I define *services* here to include the Retail industry (SIC code 52), Finance, Insurance and Real Estate (SIC code 60), and Services (SIC code 70). The service sector defined this way accounts for about a third of all NLRB elections and eligible voters. My analysis will restrict attention to this set.

2.2 Geographic Dispersion in Union Activity

In this subsection I take a first look at geographic dispersion in union activity. I begin with a discussion of MSA-level data from the CPS.[9] For small MSAs, there are as few as 50 observations in a given year on which to base estimates. Hence, I took a four year average over the period 1986-1989 so that each MSA has at least 200 observations. (This is the earliest four year period for which data is available). The rates are the percentage of private sector workers that is union members. Table 4 presents the MSAs with the 10 highest and 10 lowest membership rates calculated in this way. The top ten all have rates above 25 percent and all are in the Midwest or Northeast. The bottom ten have rates of 2 percent or less and all are in the South. This table indicates substantial variation in unionism across cities.

The table also reports the number of locals from the LORS data in each MSA per 10,000 in private employment for 1990. As can be seen in the table, this measure of union activity is highly correlated with the membership rate measure, though imperfectly so. The correlation coefficient between these measures for the 262 MSAs for which there is CPS data is .62.

A useful feature of the LORS data is that it consists of the universe of all locals, including those in rural areas. Figure 1 provides a dot density map for the locations of the 20,801 locals from 2000. Figure 2 is the analogous map for the 48,652 locals that existed in 1960.

[9] The MSAs are defined according to the 1984 Census definition. For some metro areas, the Census defines Consolidated Metropolitan areas that are aggregates of Primary Metropolitan Statitical Areas (PMSAs). In these cases I use the PMSA as the geographic unit.

The geographic pattern in 1960 is similar to that in 2000, through there are substantially fewer units in the latter date. Union activity is heavily concentrated in the upper Midwest and Northeast. Note in particular that the state of Ohio is essentially covered with locals in 1960 and still mostly covered even today. There are relatively few locals in states like Montana and North Dakota, but that is to be expected since there are hardly any people there as well. But the South does have a large population yet the coverage in locals is thin, with some notable exceptions. In particular, note the large number of locals in the north central part of Alabama which is the Birmingham area. This is the site of mining and steel making activity as discussed in the introduction.

Figure 3 controls for population by illustrating the number of locals in an area relative to employment in the area (the geographic unit is the county and the year is 1960). The story is similar to the previous figures. Unionism is heavily concentrated in the Midwest and Northeast and is low in the South. But note the coal region in West Virginia and Eastern Kentucky and again the Birmingham, AL area. Note also that parts of Montana and Wyoming actually have large degrees of union activity relative to population. This is due to the large amount of mining in these areas.

2.3 A First Look at Spillovers

In this subsection, I take a first look at spillover of unionism to the service sector. I start out with the example of the barbers union. That the barber trade is an occupation that has had unionized workers may come as a shock to many people. Yet many years ago, this was actually quite common in certain parts of the country (See Hall (1936) for a history). As of 1960, there were 743 locals in the Barbers Union. In Figure 4, I superimpose the location of the Barber locals on that same map presented earlier as Figure 3. The key thing to take from this figure is that barber unions appear only in areas where the overall degree of unionism is high. With the heavy manufacturing in Ohio and Pennsylvania we see high overall unionization rates. And we also see a large number of barber locals. An analogous thing is true in Montana. In the South, there are low overall unionization rates and barber unions are nonexistence with a few exceptions. The exceptions are places like Birmingham, AL which have a steel industry and high overall unionization rates.

My next step is to bring in data on the location of coal mines, steel mills, and auto plants. I picked these industries because they are highly unionized industries. In 1983, the membership rates were 61.0, 65.2, and 58.8 percent. My preference is to use data on location of these industries that goes back as far as possible. In the current version of this paper I use data on the location of these industries from the 1974 County Business Patterns, which is the earliest year for which computer readable data is available. (In the next version I will bring include earlier data.) For each location, I calculate the fraction of total employment in one of these three industries. I call this variable the *heavy industry employment share*. I then use this variable to categorize locations into four different groups based on this share.

Table 5 presents a number of statistics for MSAs categorized in this way. The table shows that the 1986-1989 unionization rates varies substantially with the heavy share rates. It is 10 percent in the lowest category, and doubles to 20 percent in the highest category.

The table also reports statistics for the extent of NLRB election activity in services. The first statistic is the number of elections in the 1990-1999 period per 1,000 establishments[10] The second statistics is the number of workers eligible to vote in elections in the decade per 1,000 workers. By either measure, for the 1990-1999 period, average election activity doubles between the MSAs with the lowest heavy share and those with the highest. There is a clear connection between presence of heavy industry, high overall unionization rates, and high *new* organizing activity in services. In what follows I will consider various statistical formulations and incorporate additional controls. But is important to emphasize here that the pattern illustrated in the raw data in Table 5 is what is driving my results that spillovers are significant.

In terms of the chain of causation, my premise is that the location of heavy industry is driving the level of unionism and that level of unionism is driving the flow of new organization activity in services. Therefore, for my data needs I want the industry location data to predate my data on the stock of unionism, and for this data to predate the new flow data. In addition to the flow data from the 1990s, I also have flow data from the 1980s. But the CPS stock data is only available for the late 1980s. This leads me to consider the LORS data. Part B of Table 5 shows how the LORS based unionism measure varies across the

[10]The establishment and employment counts for all of services is from the 1992 County Business Patterns

heavy share categories. It parallels what happens with the membership rate as the measure approximately doubles both for 1990 and 1980 between the top and the bottom categories. Turning to the flow data for the 1980s, we see that the pattern parallels the experience of the 1990s, though the magnitude of the effect is somewhat smaller. Those MSAs with the highest values of heavy share had new organization rates fifty percent higher than those with the lowest values.

The last panel of Table 5 brings data in on immigration, an issue that was raised in the introduction. The variables *Foreign Stock 1900* is the percent of the population in 1900 that was either born in a foreign country or had foreign-born parents. *Foreign Stock 1960* is defined in an analogous way. There is some connection between heavy share and foreign stock, particularly for the 1900 level of the variable.

3. Estimates of Spillovers

3.1 A Statistical Model

Consider the following statistical model of new organization behavior. Suppose at given location j in a particular time period the *stock* of unionism at the location is s_j. (A time subscript could be added here, but I suppress it for notational simplicity.)

At location j in the current period there are n_j nonunion establishments that are potential targets for new organization attempts. Let the potential targets be indexed by i. Let $u_{ij} = 1$ if establishment i at location j has an election and $u_{ij} = 0$ otherwise. Assume a linear model for the probability establishment i has an NLRB election (I later consider probit models for a robustness check, but use the linear model as the benchmark model.) Specifically,

$$E[u_{ij}] = \alpha s_j + \beta x_j + \gamma y_i + \xi_j + \eta_i. \tag{1}$$

The parameter α is the spillover parameter, the key parameter of interest. It tells how the probability of organization changes from the treatment effect of an increase in the stock of unionism s_j at location j.

The remaining terms of (1) allow the probability to depend upon location characteristics distinct from the spillover effect as well establishment characteristics. The location characteristics include things like state laws that affect labor unions (e.g. right-to-work laws).

As discussed in the introduction, it also includes things like the ethnic background of the workers in the area (which may be correlated with a predisposition towards unions). The location characteristics are divided up into those that are measured x_j and an unmeasured characteristic ξ_j. In the analysis, the measured characteristics will include dummy variables for states and variables on the ethnic composition. The unmeasured characteristic potentially includes things like the charisma of local labor leadership.

The establishment characteristics include information about the industry of the establishment and other characteristics such as size. The measured characteristics are denoted y_i. I allow for unmeasured establishment characteristics through the variable η_i.

The problem with using least squares to estimate (1) is that we expect

$$E[S'(\xi + \eta)] \neq 0,$$

where S, ξ, and η are the vectors containing the variables for all of the potential targets. To see why, consider first the unobservable establishment characteristics η_i. As discussed in the introduction, there is industry heterogeneity even within narrowly defined industry definitions, e.g. mini-mills and blast furnaces are both in SIC code 3312. We expect establishments at a given location to be correlated in terms of these unobservable industry traits that make certain establishments more prone to unions. Moreover, given persistence in characteristics over time at a given location, we expect η to be positively correlated with the stock of unionism. Analogously, it is possible that ξ_j is correlated with the stock of unionism s_j. If there is a charismatic local labor leader who lives a long time, he will tend to drive up the stock as well as the flow.

By restricting attention to services, I minimize the problem of the mean value of the unobserved establishment characteristic η_i varying across locations. By their nature, being nontraded goods, services tend to be the same everywhere. Grocery stores are the same throughout the country in a way that steel mills are not (some are blast furnaces, others mini-mills). Henceforth, I will assume that $\eta_i = 0$, using my restriction of attention to services as my justification.

I still need to deal with the fact that for the unobserved location characteristic ξ, $E[S'\xi] \neq 0$. I accomplish this by using the location of coal mines, automobile and steel plants as an instrument for S. I discuss this further in the following subsection.

3.2 Details

For my baseline estimates I use the MSA level data to define geographic unit and I use the average union membership rate over the period 1986-1989 as my measure of the stock of unionism s_j.

I define n_j to be the nonunion service sector establishments at location j from the County Business Patterns data. Establishment level data on union/non-union status does not exist. As a preliminary step, I will use as an estimate for n_j the total number of service establishments—nonunion and union combined. For the service sector, the fraction of establishments that are union tends to be small, so the measurement error will tend to be small. (In the next version of this paper, I will try to correct for this measurement error). In the mean time, note that this measurement error will tend to bias *downward* my estimate of α (though I again I expect this bias to be small). I use the number of service sector firms from the County Business Pattern data, just like in Table 5.

I use the NLRB election data for 1990-1999 for my baseline estimates. Let m_j be the number of elections held over this period. Then for the n_j establishments at the location, m_j hold elections (so $u_i = 1$ for these establishments) and $m_j - n_j$ do not hold elections (so $u_i = 0$ for these establishments).

To instrument for the unionism stock S, let z_j include all the location level variables x_j as well as the *heavy share* variable described in the previous section. A priori, I expect that $E[Z'S] \neq 0$ and $E[Z'\xi] = 0$. The assumption that ξ and the heavy share variable are uncorrelated requires more discussion. Given the location decisions today, we might even expect a negative correlation. For example, locations that had a low ξ_j might be attractive locations for Japanese firms to locate a transplant automobile factory or a nonunion steel producer to place a mini-mill. I finesse this by using location decisions from 1974 which predates the transplant building boom of the 1980s and the mini-mills. At this date, the major automobile plants and steel plants were all unionized, regardless of their location. Firms like GM building plants in the South could be sure that their plants would be unionized regardless of the location. I use this argument to justify why I expect $E[Z'\xi] = 0$.

The location level variables include the demographic variables as well as state dummies.

(Note: In this preliminary version I did not use establishment level variables such as

industry but will use this information in the next version.)

3.3 Estimates

To make the numbers easier to interpret, I rescale the indicator variable for an organization attempt to $u_i = 1,000$. Thus the mean value of u_i across firms is in units of elections per 1000 establishments, analogous to the previous section. Table 6 presents the summary statistics for the establishment level data.

Table 7 presents the coefficient estimates. I consider three different specifications and for each I present results with and without the instruments.[11] The first is the entire sample of MSAs without state effects. The second allows state fixed effects. The third restricts attentions only to MSAs considered to be in the South.[12]

Adding state fixed effects makes little difference. For the specifications that use the whole sample, instrumenting for the union membership share actually leads to an increase in the coefficient. One possible explanation for this result that I think has some validity is that there is measurement error in using membership share for my index of the unionism stock. This measure treats unionized barbers the same as unionized steelworkers and coal miners. A priori it seems likely that spillovers are greater from unionized steelworkers than from unionized barbers. To the extent this is true the IV estimates will be larger than the non-IV estimates.

The coefficient is large. The IV estimate, with or without state fixed effects, is approximately .3. This means that a 10 percentage point increase in the membership share; e.g. from 5 percent to 15 percent, raises the probability by 3 out of a 1000. Since the sample average is 3 out of a 1000, this is a doubling of the probability. A twenty percentage point swing, which is common in the data (see Table 4) triples the probability. If we restrict attention to only MSAs in the South, the coefficient is smaller, just about one half of what it is with the full sample. But even at half as large it is still a large impact.

Of course 3 out of a 1000 is a small probability, even if doubled. The fact that I am

[11] All specifications use weighted least squares to correct of the heteroscedasticity inherent in the linear probability model. The estimated probabilities for all the observations in the sample all are strictly greater than zero and less than one.

[12] I define the south here to be: Texas, Oklahoma, Louisiana, Arkansas, Mississippi, Alabama, Tennessee, Kentucky, Georgia, Florida, South Carolina, North Carolina, and Virgnia. Cobb () uses this definition.

defining the pool of potential organizing targets to be all service establishments, including establishments with less than handful of employees and this addition to the denominator deflates the probability. If we wait by employment as in the last column of Part A of Table 5, election activity increases by a factor of 5. In 1990s, the rate ranges from 10 eligible voters per 1,000 employees for MSAs at the low end to 20 per 1,000 at the top end. If we look at the 1980s, both the establishment based measure and the employment based measure are approximately twice as large as their counterparts in the 1990s. Having said all of this, it is clear that the both 1990s and 1980s were periods with low levels of new organizing activity, compared to earlier decades. My finding is that in this period of famine for the unions, those locations with high spillovers did significantly better, in a relative sense, than those with low spillovers.

Discussing the quantitative impact of this spillover is something that will be done in more detail in the next version of this paper. But the estimated effect is large enough that I can make the following observation. The unionization rate for services tends be low in the South. There are a variety of possible alternative explanations one could put forth that are not directly related to spillovers. It could be due to the fact that the South had less immigration, e.g. less pro-union Swedes arrived as compared with Minnesota's experience. It could be due to the anti-union right-to-work laws that were passed in the South. It could be due to the vintage effect—establishments and firms are younger in the south and that means there is less of a chance that they were around in the "boom times" of union organization. While these alternative explanations may have some validity, my empirical findings indicate that an important part of the explanation is that service establishments in the South in general lacked the spillovers of unionism that were emanating from steel mills and auto plants in the North. The key feature of the data that allows me to make this claim is that when we look in the South and find the locations that did have coal mines, auto plants and steel miles, we find relatively high levels of new organization of services.

These quantitative results are have so far been robust to the alternative specifications that I have considered. In particular, similar results are obtained if a probit specification is used instead of the linear probability model.

4. Spillovers at the Affiliation Level

To be completed.

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Table 1

Union Membership and Local Organizations

Year	Union Members as a Percent of Private Employment	Members of Unions in the Private Sector	Count of Local Organizations From LORS	Members per organization
1960	31.9	14,613	48,652	300.4
1970	29.1	16,978	45,616	372.2
1980	20.1	14,332	38,765	369.7
1990	11.9	11,366	28,791	394.8
2000	9.0	9,148	20,801	439.8

Table 2

Membership in Local Organizations by Affiliation
Ten Largest National Unions

National Union	Number of Members in Locals	Number of Locals	Average Local Size
TEAMSTERS	1,267,404	491	2581.3
FOOD & COMMERCIAL Workers	1,118,074	556	2010.9
SERVICE EMPLOYEES	903,172	288	3136.0
AUTO WORKERS	774,534	942	822.2
MACHINISTS	762,420	1044	730.3
ELECTRICAL WORKERS IBEW	641,550	902	711.3
STEELWORKERS	595,493	1516	392.8
COMMUNICATIONS WORKERS	563,500	903	624.0
CARPENTERS	435,068	809	537.8
LABORERS	370,509	495	748.5

Table 3

NLRB Elections in the 1980s and 1990s

Sector	Time Period	Elections	Eligible Votes	Win Rate (unweighted	Win Rate (weighted)
All	1980-1989	48,662	2,817,808	.44	.38
All	1990-1999	35,003	2,225,649	.47	.40
Services	1980-1989	16,598	903,172	.48	.44
Services	1990-1999	12,844	771,074	.54	.50

Table 4
Unionism at the MSA Level

Top Ten	Union Membership Rate 1986-1989	Locals per 10,000 private employment
Flint, MI	35.6	3.2
Niagara Falls, NY	32.4	10.5
Modesto, CA	32.1	1.7
Youngstown-Warren, OH	30.7	8.8
Gary-Hammond, IN	29.8	5.6
Jersey City, NJ	28.4	4.3
Lima, OH	27.1	9.6
Saginaw-Bay City-Midland, MI	27.1	6.2
Battle Creek, MI	26.6	9.6
Duluth, MN-WI	26.4	13.7
Bottom Ten		
Columbia, SC	2.3	1.5
Hickory, NC	2.2	0.8
Austin, TX	2.2	0.9
Fort Myers-Cape Coral, FL	2.1	0.8
Brownsville-Harlingen, TX	2.0	2.1
Tallahassee, FL	1.9	1.5
Lawton, OK	1.7	3.7
Houma-Thibodaux, LA	1.5	0.8
Greenville-Spartanburg, SC	1.5	0.9
Sarasota, FL	1.1	0.3

Table 5
Metro Area Statistics
by Auto/Steel/Coal Share

A. First Group of Statistics

Auto/Steel/Coal Share of Employment 1974	Number of MSAs	Union Membership Share 1986-1989	NLRB Elections in Services 1990-1999 (per 1,000 establishments)	NLRB Eligible Voters in Services 1990-1999 (per 1,000 employees)
Less the 1.0	147	10.0	2.3	10.2
1.0-1.9	31	14.0	2.9	10.7
2.0-4.9	26	15.3	3.3	13.1
5.0 and up	32	19.8	4.6	20.3

B. Statistics from the LORS Data and Earlier NLRB Elections

Auto/Steel/Coal Share of Employment	1990 Number of Union Locals (per 10,000 in Private Employment	1980 Number of Union Locals (per 10,000 in Private Employment	NLRB Elections in Services 1980-1989 (per 1,000 establishments)	NLRB Eligible Voters in Services 1980-1989 (per 1,000 employees)
Less the 1.0	2.8	4.8	4.4	20.0
1.0-1.9	4.7	7.8	4.8	21.1
2.0-4.9	4.3	7.2	5.7	21.8
5.0 and up	6.7	10.3	7.0	32.3

C. Statistics on Immigration Shares

Auto/Steel/Coal Share of Employment	1900 Percent of Population of Foreign Stock (Foreign born or child of foreign born)	1960 Percent of Population of Foreign Stock (Foreign born or child of foreign born
Less the 1.0	32.2	16.5
1.0-1.9	30.3	14.8
2.0-4.9	35.9	15.0
5.0 and up	38.0	16.8

Table 6
Summary Statistics for Establishment-Level Data

Variable	Definition	Mean	Min	Max
U	=1000 if NLRB election	3.1	0.0	1000.0
Stock of Unionism	Percent of Private Employment Union Members	13.3	1.5	35.6
Foreign Stock 1900	Percent foreign or foreign parent	40.5	0	80.1
Foreign Stock 1960	Percent foreign or foreign parent	21.4	.7	47.6
Heavy Share	Employment in Coal, Auto, or Steel as a percent of private employment	2.1	0	38.0
Number of Establishments	3,075,259			

Table 7
Estimates of Linear Probability Model

	Specification					
	No State Fixed Effects		State Fixed Effects		South Only (No state fixed effects)	
Variable	(WLS)	(IV)	(WLS)	(IV)	(WLS)	(IV)
Stock of Unionism	.197	.289	.145	.316	.137	.132
	(.006)	(.017)	(.011)	(.040)	(.094)	(.034)
Intercept	-.167	-.813	.152	-.366	.133	.108
	(.041)	(.109)	(.139)	(.202)	(.092)	(.257)
Foreign Stock 1900	.004	-.001	.020	-.001	-.004	-.005
	(.002)	(.003)	(.004)	(.006)	(.003)	(.006)
Foreign Stock 1960	.022	.004	-.003	-.012	-.032	.041
	(.004)	(.004)	(.007)	(.008)	(.006)	(.010)
Number of Observations	3,075,259	3,075,259	2,967,141	2,967,141	887,981	887,981

Figure 1
Location of Union Locals
LORS Data
2000
(Each dot is a single local)

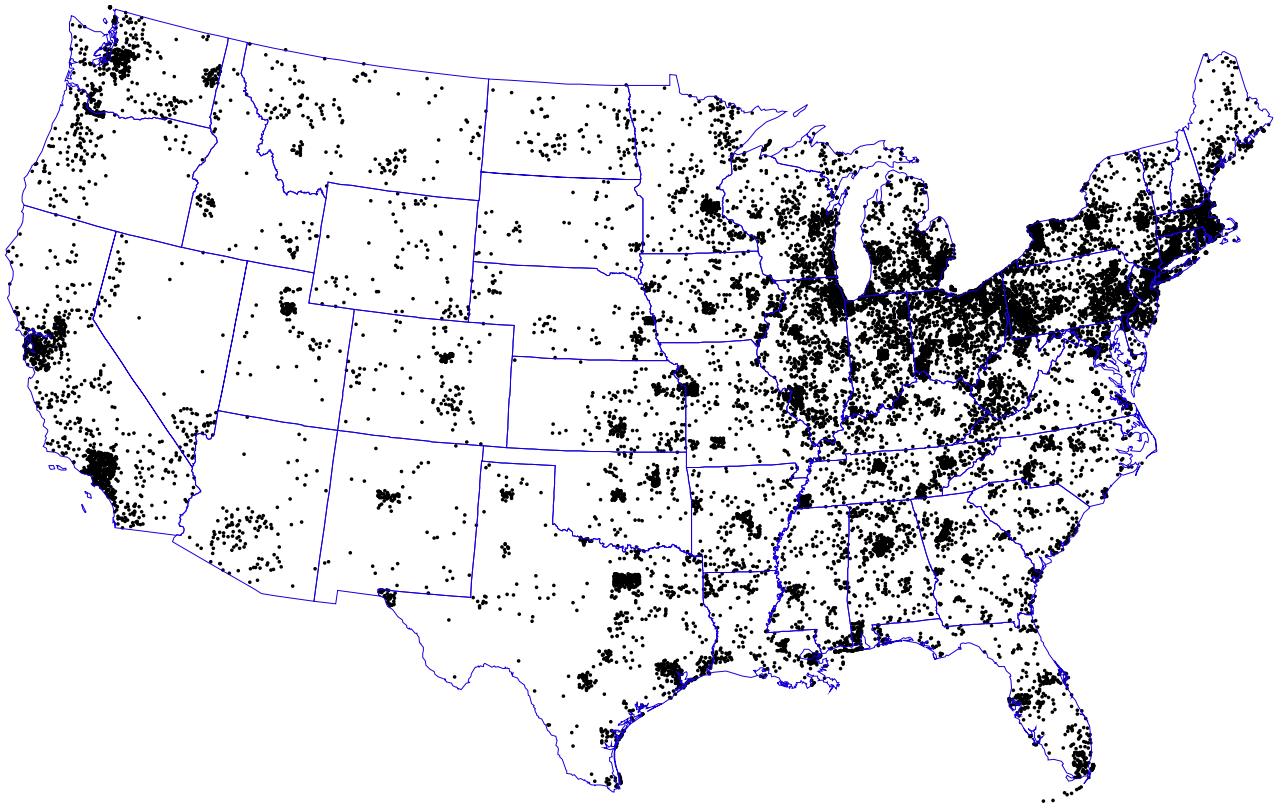

Figure 2
Union Locals 1960

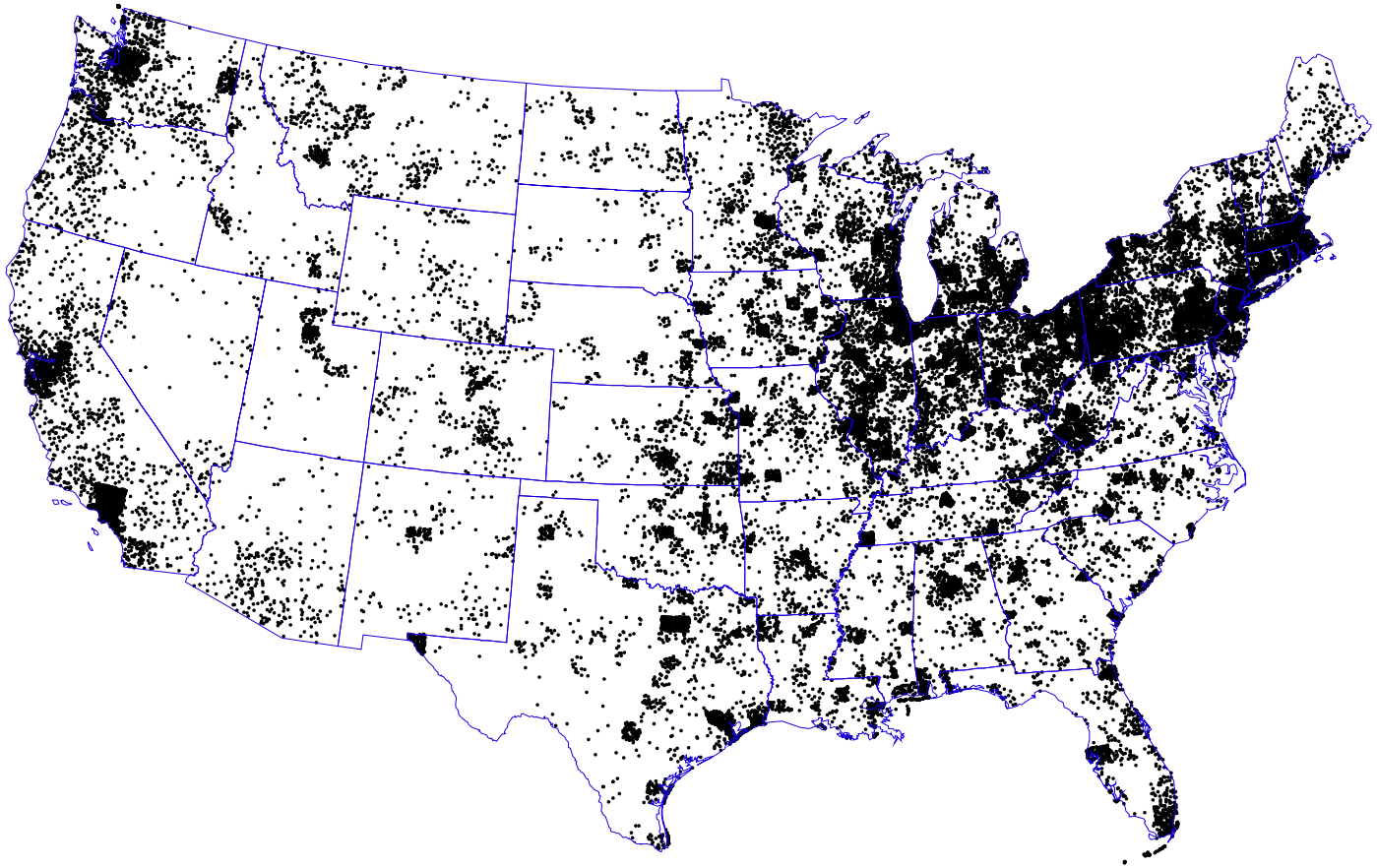

Figure 3
Union Locals per 10,000 Employees
1960

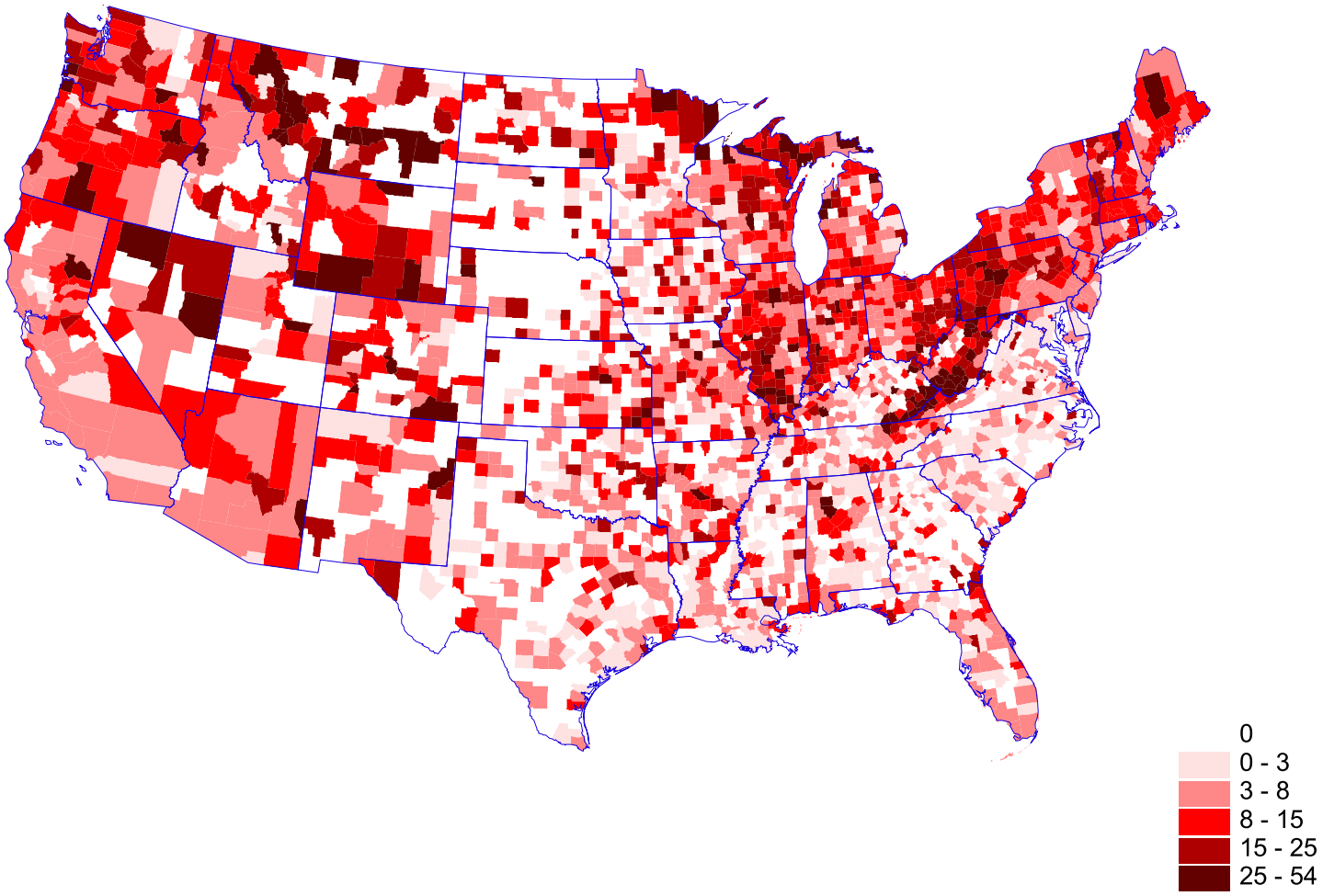

Figure 4
The Location of Barber Locals in 1960
(Added to Figure 3)