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The effect of connected and isolated voluntary associations on economic activity in the United States, 1984–2000

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ABSTRACT

This paper makes two empirical contributions to the literature on the putative effect of voluntary associations on economic activity. First, using a longitudinal database covering the entire United States, we differentiate between the effect of voluntary associations that are connected to other voluntary associations through the multiple membership of their members and voluntary associations that lack these ties. Second, we test for the existence of a conditional effect of the areal size of the spatial units under consideration, comparing results at the local community and the state level of analyses. We find that connected voluntary associations have a positive effect on the number of manufacturing establishments whereas isolated voluntary associations either have a negative effect or do not have any effect. Both local community and state level analyses reveal this pattern but the effects are stronger when the spatial unit of analysis is the local community.

Scholars have found that spatial variations in volunteerism influence government effectiveness (Putnam, 1993; Rice and Sumberg, 1997), political democracy (Paxton, 2002), and political participation (McFarland and Thomas, 2006). Less studied and less understood is the relationship between voluntary associations and economic activity. Voluntary associations are thought to promote economic activity because they school people in cooperation and self-organization, deter opportunism, foster norms of reciprocity, and improve the flow of information about the trustworthiness of individuals (Fukuyama, 1995; Putnam, 1993). But, as Woolcock (1998: p. 158) aptly notes, synthesizing arguments made by Olson (1982) and Portes and Landolt (1996), voluntary associations can also "stifle economic growth by securing a disproportionate share of resources (for their members) or by inhibiting individual advancement by placing heavy personal obligations on members that prevent them from participating in broader social networks."

Despite the longtime theoretical interest in the relationship between voluntary associations and economic growth and its policy implications, little quantitative evidence exists to support the idea that voluntary associations strengthen economic activity. Qualitative evidence about developed (e.g., Saxenian, 1994) and developing economies (e.g., Granovetter, 1995; Woolcock, 1998) provides little direct evidence for the relationship, as it remains mainly at the descriptive level. Two quantitative studies that examine this relationship are Putnam's (1993) research on Italian regions and Knack and Keefer's (1997) cross-national analysis, but they offer conflicting results.

We seek to advance understanding of the relationship between voluntary associations and economic activity by addressing two questions that have not been examined in prior research. The first question is whether different types of associations differ in their effects on economic activity. One of the mechanisms presumed to account for the link between voluntary associations and economic activity is generalized trust, defined as trust in individuals not directly known (Paxton, 2007; Stolle,

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1998). Generalized trust is believed to lubricate economic activity by facilitating cooperation among those who are not tied by a history of repeated interactions (Granovetter, 1985, 1995; Putnam, 1993; Woolcock, 1998). When new businesses are created, for example, the failure to trust people beyond one's social circles can be a critical impediment to successful entrepreneurial efforts. Paxton (2007) suggests that associations have different effects on generalized trust depending on the extent to which they are connected to other associations through the multiple memberships of their members. According to Paxton (2007: p. 51), connected associations increase generalized trust because "network ties across associations allow individuals to transfer the trust gained within their association to individuals outside the association." Isolated associations may increase personalized trust that results from repeated interactions among known people but do not increase generalized trust. As we explain in greater detail below, Paxton (2002, 2007) classifies voluntary associations into connected and isolated by the number of connections to other voluntary associations stemming from the multiple memberships of their members. Using data from the World Values Survey, Paxton (2007) finds support for this difference in the relationship between connected and isolated associations and generalized trust at both the individual level and the national level. We think that this evidence may have important implications for the relationship between voluntary associations and economic activity. If generalized trust lubricates economic activity, it is possible that connected associations will have a positive effect on economic activity whereas isolated associations may not have the same beneficial effect or may even hinder economic activity.

The second question we address in this paper is whether the effects that voluntary associations have on economic activity are conditioned by the areal size of the spatial unit of analysis. Studying whether the areal size of the spatial units under consideration influences the relationship between voluntary associations and economic activity is important because it may help account for null effects and diverging findings. Putnam (1993), for example, focuses on Italian regions such as Calabria and Emilia Romagna, whereas Knack and Keefer (1997) adopt a considerably larger unit of analysis by examining countries such as Germany, Italy, and France. Whereas Putnam finds evidence that supports a positive effect of voluntary associations and economic development, Knack and Keefer do not. These diverging findings may stem from differences in the size of the spatial units because spatial aggregation may bias estimates of the relationship of interest – an instance of the ecological inference problem applied to spatial units (King, 1997; Anselin and Cho, 2002; Steel et al., 2004). To investigate the existence of aggregation bias, we compare the relationship between voluntary associations and economic activity at two different levels of geographical aggregation – the state and the local community. We address these questions using a large, longitudinal dataset that covers the entire U.S. between 1984 and 2000. Our main data source is the Quarterly Census of Employment and Wages (QCEW) published by the Bureau of Labor Statistics. With sample sizes of 6256 local community-years and 684 state-years, our analyses include much greater spatial and temporal variation than has been available in past research.

1. Voluntary associations and economic activity

Much of the research suggesting that voluntary associations may encourage economic activity suggests two primary mediating mechanisms accounting for this relationship. The first is that voluntary associations school people in cooperation and self-organization. As Fukuyama (1995: p. 273) notes, "sociability in civil affairs promotes a vigorous economic life because people good at self-government are also likely to be good at combining for business purposes, enriching themselves to a far greater extent than if they acted alone." Putnam (1993: p. 90), likewise, suggests that being a member of a voluntary association teaches self-discipline and collaboration – two skills likely to increase people's ability to effectively run economic enterprises.

The second mediating mechanism concerns the generation of trust. Drawing on Granovetter's (1985) work on the social embeddedness of economic action, Putnam (1993: p. 173) proposes that voluntary associations foster trust because they form social networks that increase defection costs, foster norms of reciprocity, and improve the flow of communication about the trustworthiness of individuals. Trust, in turn, strengthens economic activity because it helps individuals overcome uncertainty that would otherwise stifle economic exchange. For example, when investors have reason to trust entrepreneurs, they are more likely to support new enterprises (Freeman, 1986). Likewise, when buyers and suppliers trust one another, economic exchange is more efficient (Uzzi, 1997).

In delineating the causal link between the trust generated by voluntary associations and economic activity, Putnam (1993: p. 171) distinguishes between trust that rests on intimate familiarity and trust that is more impersonal and suggests that it is the latter form of trust that plays a crucial role in sustaining cooperation and energizing economic activity. In subsequent work, Stolle (1998) and Paxton (2007) have clarified this distinction by referring to personal trust – trust in individuals directly known – and generalized trust – trust in individuals not directly known. Presumably, the logic of Putnam's argument is that impersonal or generalized trust has a stronger positive relationship to economic activity than personal trust because acquiring the resources needed to operate a business requires forging relationships beyond a person's circle of friends and acquaintances. In most situations, in fact, investors, customers, and even skilled workers come from distant social circles.

As Putnam notes (1993: p. 90), any voluntary association likely provides opportunities to its members to acquire self-discipline and to practice cooperation. So the first mediating mechanism does not imply varying effects of voluntary associations on economic activity. Voluntary associations, however, vary in the extent to which they foster generalized trust. Putnam (1993: p. 173) proposed that power relations among association members may condition the extent to which voluntary associations generate impersonal trust. Stolle (1998) and Paxton (2007) have focused on the degree of connectedness of voluntary associations and have shown that voluntary associations that are more connected to other voluntary associations through the multiple memberships of their members generate more generalized trust than voluntary associations that lack these connections. Ongoing interactions among association members create trust among them, but, Stolle (1998) and Paxton (2007) suggest, when they are coupled to ties to other associations, they also strengthen trust outside the associations to which they belong. The trust gained within an association where members are exposed to frequent interactions can be transferred to individuals in other associations through members that belong to more than one association. So association members are more likely to trust those they do not know when information about the trustworthiness of non-members can be conveyed through the multiple memberships of some of their members.

In the parlance of social capital research, connected and isolated voluntary associations may be seen as lying at opposing ends of bridging social capital. Putnam (2000: p. 22) contrasts bridging social capital, which is associated to networks that are outward looking, to bonding social capital, which is associated to exclusive identities and homogeneous groups. Through this lens, connected voluntary associations are high on bridging social capital whereas isolated voluntary associations are low on bridging social capital. The relationship between these two types of associations and bonding social capital is less clear because, as Putnam (2000: p. 23) notes, "bonding and bridging are not "either-or" categories ... (as) many groups simultaneously bond along some social dimensions and bridge across others."

Paxton (2007) and Stolle (1998) provide evidence for the varying relationship between connected and isolated voluntary associations and trust but the link between these two different kinds of associations and economic activity has not been explored empirically. If isolated associations are less likely to foster generalized trust than connected associations and if generalized trust strengthens economic activity, as it is often suggested, then isolated associations should have a weaker positive effect on economic activity than connected associations.

Besides considering the varying effect of different types of associations, when studying the relationship between voluntary associations and economic activity another important issue is the spatial unit of analysis. Putnam (1993) focused on Italian regions and highlighted the differences between regions in the North of Italy and regions in the South of Italy. Knack and Keefer (1997) glossed over variations within countries and examined the impact of civic participation across nations. Putnam found evidence supporting the purported relationship between voluntary associations and economic activity whereas Knack and Keefer did not. The problem in evaluating this available evidence is that the results are not fully comparable because they are obtained using spatial units that vary in size – the Italian regions examined by Putnam are considerably smaller than the nations examined by Knack and Keefer – and the size of spatial units may cause variation in statistical results – a problem termed by geographers the modifiable areal unit problem (Openshaw and Taylor, 1979; Anselin and Cho, 2002) but also known as an instance of the ecological inference problem (Robinson, 1950; King, 1997). So a question that remains under-explored in studies of the relationship between voluntary associations and economic activity is whether the choice of the spatial unit of analysis may cause diverging findings or, put it differently, whether one can infer from aggregate data at the national or state level relationships at lower level of aggregation such as cities or analogous spatial units of analysis.

Robinson (1950) provides a classic example of variations in statistical results due to aggregation. He found that the correlation between literacy and immigration was positive at the state level but negative at the individual level. The reason suggested for the diverging results is that immigrants are less literate than average citizens but they are more attracted to states that have high literacy rates. A considerable literature identifies conditions under which aggregation bias is more likely to occur and suggests methods to increase the quality of inferences that one can make from aggregate data (e.g., King, 1997; Anselin and Cho, 2002). Here, we are interested in empirically exploring the impact that variation in size of the spatial unit may have on the relationship between voluntary associations and economic activity by comparing results at two different levels of aggregation: U.S. states defined by administrative boundaries and U.S. labor market areas (LMAs) defined by the Census using commuting patterns between work and home.

2. Data and methods

Our main source of data is the Quarterly Census of Employment and Wages (QCEW) published by the Bureau of Labor Statistics. The QCEW contains county-level data on the number of establishments, annual employment, and total wages by industry, as defined by the Standard Industrial Classification (SIC) system. The data is obtained from quarterly tax reports submitted to state workforce agencies by all employers subject to unemployment insurance laws. All organizations with at least one employee are required to submit these reports, resulting in a comprehensive dataset covering 99.7% of all wage and salary civilian employment (Bureau of Labor Statistics, 2009). The Bureau of Labor follows a meticulous procedure in counting voluntary associations. Each office a voluntary association organization has is treated as a unique data point as long as each office employs at least one person. So for any given voluntary association, the satellite locations are included in the data if employees are working at these locations, but are not included in the data if these locations are solely used as venues to hold meetings.

We identify the number of *voluntary associations* by focusing on SIC 86, membership organizations. The kinds of organizations included in this grouping match the broad range of organizations invoked in classic analyses of the importance of the civic infrastructure (Putnam 1993, 2000). SIC 86 includes professional membership organizations; business associations; civic, social and fraternal associations; religious organizations; labor unions and similar labor organizations; and political organizations. Paxton (2002, 2007) classifies voluntary associations into connected and isolated by the number of connections to other voluntary associations stemming from the multiple memberships of their members. Following her work, we disaggregate the number of voluntary associations into those that are more likely to be connected to other voluntary associations via the multiple memberships of their members, and those that are more isolated from other voluntary associations. According to Paxton (2002, 2007), *connected voluntary associations* consist of business associations; membership associations; and civic, social and fraternal associations. *Isolated voluntary associations* consist of labor unions, political organizations and religious organizations. Paxton's (2002) classification is based on data from the World Values Survey and is consistent with evidence reported in other studies (Cornwell and Harrison, 2004; Verba et al., 1995). Paxton (2002) reports that the average number of memberships is almost three times greater for the most connected association type than it is for the most isolated. The average number of memberships for labor unions is 1.3. Religious organizations are slightly higher, with an average number of memberships of 1.8. In contrast, the average numbers of memberships for the most connected association types are 3.5 for civic associations and 2.7 for business associations.

For the labor market area (LMA) analyses, we rely on the U.S. Bureau of Labor Statistics' (2007) definition of a LMA as "an economically integrated geographic area within which individuals can reside and find employment within a reasonable distance or can readily change employment without changing their place of residence." We use the 1990 classification that yields 391 LMAs. Every county in the United States belongs to an LMA, and LMAs often span state boundaries. LMAs overlap to a large extent with Metropolitan Statistical Areas (MSAs). The primary difference is that, unlike MSAs, LMAs are not required to contain a metropolitan area with at least one urbanized area of 50,000 people. So LMAs include the rural U.S. The geographical definition of U.S. states is more straightforward because it is based on administrative boundaries. We include states within the contiguous United States (i.e. Hawaii and Alaska are not included) and the District of Columbia.

A key advantage of the dataset assembled for this study, as we noted above, is that it has greater spatial and temporal coverage than other datasets used in research on voluntary associations. For example, the General Social Survey (GSS) reports data for 12 regions with each region made up of 3 to 9 states. The Social Capital Benchmark Survey (SCBS) associated with Putnam's Saguaro Seminar initiative reports data only for 2000 and 2006 and for a sample of 40 communities, each consisting of one or more counties. While we were unable to match with precision our LMA data to the SCBS data, we were able to create a dataset that matches the 12 regions used by the GSS. It is reassuring that, consistent with Paxton's research, that the correlation between the number of connected voluntary associations and generalized trust ($r = 0.42$, $p < 0.01$) was almost double the correlation between the number of isolated associations and trust ($r = 0.23$, $p < 0.05$). Generalized trust in the GSS survey is measured by asking people the extent to which they trust most people.

In our data, the number of voluntary associations varies greatly between LMAs, ranging from zero to 4819, with an average of 219. Only four LMAs (1.3%) have no voluntary associations: Lynchburg (Virginia), Roanoke Rapids (North Carolina), Vidalia (Georgia), and Staunton (Virginia). Not surprisingly, the number of voluntary associations is highly correlated with population. Highly populated areas, such as New York City (New York), Los Angeles (California) and Chicago (Illinois), also have the most voluntary associations. Analogously, the two smallest LMAs in terms of population have no voluntary associations. However, the proportion of voluntary associations that are connected varies greatly among comparable communities. For example, 33% of the associations in New York City are connected, while 64% of the associations in Los Angeles are connected. This variation persists even when comparing LMAs in terms of voluntary associations per-capita. For example, both Bismark (North Dakota) and Medford (Oregon) are similar in terms of associations per-capita, but in Bismark 74% of the associations are connected, while in Medford only 21% are connected.

We measure economic activity by focusing on a common indicator of local economic prosperity: the number of *manufacturing establishments*. Unlike other sectors, such as the service sector, that tend to cater to both local and non-local markets, manufacturing firms tend to produce goods and services intended for export beyond the boundaries of local communities and states (Duncan et al., 1960; Scott, 1998). These export activities create prosperity by channeling financial resources in the form of revenues from outside the locale (Hildebrand and Mace, 1950).

We include several control variables in our analyses. *Per-capita income* is a proxy for the wealth of the community. Wealthier communities may have a richer civic life given that civic organizations often depend on residents' donations to carry out their activities. *Human capital*, measured as the percentage of college graduates over the age of 25, is included because it has often been found to have a positive effect on economic activity. A community's *population density* (i.e., people per square mile) differentiates between urban and rural communities.

The number of manufacturing establishments may be affected by the geographic position that a given LMA or state occupies. For example, LMAs that are located near LMAs that have large numbers of voluntary associations may exhibit different values of the dependent variable than LMAs that are located near LMAs that have few voluntary associations. To control for this spatial interdependence, we include non-local densities of voluntary associations and manufacturing establishments weighted by geographical distance. In our analysis, the center of an LMA is the center of its most populous county. We use the coordinates of these center points to compute the geographical distance between all possible pairs of local communities. After obtaining these geographical distances, the non-local counts weighted by geographical distance (NLVW) are obtained by using the following formula:

$$\mathrm{NLVW}_j = \Sigma(V_u) \times (1/d_{uj}), u \neq j$$

where j is the focal community, u consists of all communities excluding community j, V_u is the variable to be weighted in community u, and d_{uj} is the geographic distance between community u and community j. To compute the geographical distances among states, we assigned to each state a "center" given by the average latitude and longitude of the center points for all counties in the state.

To examine these relationships we use ordinary least squares regression. Although the dependent variable is a count variable, according to both Cameron and Trivedi (1998: p. 2) and Greene (2008: p. 907), when the mean of a count variable is high and the proportion of zeros is relatively small, as in these data, ordinary least regression is an appropriate method to estimate the impact of the independent variables. A Woodridge (2002) test for autocorrelation in panel data did not reveal evidence of autocorrelation ($F(1390) = 19.832$). Results of negative binomial regression not reported here yielded the same pattern of results.

We report results obtained with two different modeling approaches: models in which we include the lagged dependent variable (LDV) and models in which we include spatial units fixed effects and year-fixed effects. In both models, the independent and control variables are lagged one year. With our data spanning the period from 1984 to 2000, this means that the first year for the independent variables is 1984, whereas the first year for the dependent variables is 1985. We employ two modeling approaches to improve internal validity. The models with the LDV provide a stringent test of reverse causality for dynamic processes (Keele and Kelly, 2006). If manufacturing establishments influence associational activity, then these models reduce the possibility that any effect of voluntary associations at time t on economic activity at time $t + 1$ will capture effects of manufacturing establishments at time t on manufacturing establishments at time $t + 1$. But the LDV models are susceptible to omitted variable bias – especially for variables that may not be observable. The fixed-effects models, on the other hand, allow us to control for unobserved features of the spatial units that remain constant over time (i.e., natural resources that may influence economic activity, community traditions, or laws that persist over time) and temporal changes at the national level that may affect the number of manufacturing establishments (e.g., interest rates, trade and other federal policies). However, the coefficients from fixed-effects regressions may be biased in dynamic models (Nickell, 1981). Despite the tradeoffs of each approach, we find the same pattern of results using these two different modeling approaches. Tables 1 and 2 report summary statistics and within correlations for all the variables used in the analyses.

3. Results

Table 3 reports the results of the LMA models with the lagged dependent variable. Model 1 shows the effect of the control variables. As expected, the lagged dependent variable has a positive and significant effect. The coefficient is greater than one, which suggests that during the period examined here the number of manufacturing establishments expanded over time. LMAs with larger population densities have fewer manufacturing establishments. There are several possible explanations for this negative coefficient. Suburban communities may not want manufacturers. At the same time, manufacturers may find it difficult to locate in urban areas due to the lack of affordable space for production facilities. Lastly, large urban centers are often hubs for financial and professional services.

Per-capita income has no effect on the number of manufacturing-sector establishments. The proportion of college graduates over the age of 25 is positively and significantly related to manufacturing activity. Model 2 adds voluntary association counts but does not distinguish between connected and isolated voluntary associations. The newly added variable is posi-

Table 1
Descriptive statistics and within correlations for LMA-level analyses.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1. Number of manufacturing establishments, $t + 1$ (000s)	0.96	2.19											
2. Number of mfg. establishments (000s)	0.95	2.19	0.91										
3. Population density (000s)	0.14	0.32	0.09	0.13									
4. Per-capita income (000s)	17.65	4.91	0.23	0.25	0.52								
5. Percent of college graduates over the age of 25	0.09	0.03	−0.06	−0.09	−0.29	−0.45							
6. Non-local number of mfg. establishments, weighted by geographic distance (000s)	0.76	0.25	0.29	0.30	0.30	0.86	−0.30						
7. Number of voluntary associations (000s)	0.22	0.44	0.24	0.30	0.51	0.38	−0.23	0.18					
8. Non-local number of vol. associations, weighted by geographic distance (000s)	0.17	0.06	0.15	0.16	0.48	0.92	−0.37	0.81	0.38				
9. Number of connected vol. associations (000s)	0.15	0.27	0.40	0.44	0.49	0.41	−0.15	0.22	0.71	0.39			
10. Number of isolated vol. associations (000s)	0.07	0.19	0.03	0.08	0.33	0.21	−0.19	0.09	0.84	0.23	0.21		
11. Non-local number of connected vol. associations, weighted by geographic distance (000s)	0.12	0.04	0.14	0.15	0.44	0.88	−0.25	0.83	0.31	0.97	0.36	0.15	
12. Non-local number of isolated vol. associations, weighted by geographic distance (000s)	0.06	0.03	0.13	0.15	0.46	0.82	−0.54	0.61	0.45	0.88	0.36	0.34	0.73

Note: A total of 6256 LMA-years are represented.

Table 2
Descriptive statistics and within correlations for state-level analyses.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1. Number of manufacturing establishments, t + 1 (000s)	7.65	8.71											
2. Number of mfg. establishments (000s)	7.61	8.66	0.90										
3. Population density (000s)	0.37	1.38	0.05	0.05									
4. Per-capita income (000s)	20.06	5.51	0.37	0.40	−0.10								
5. Percent of college graduates over the age of 25	0.11	0.02	−0.08	−0.12	0.36	−0.47							
6. Non-local number of mfg. establishments, weighted by geographic distance (000s)	0.66	0.21	0.39	0.41	−0.18	0.88	−0.30						
7. Number of voluntary associations (000s)	1.75	1.95	0.37	0.44	0.02	0.51	−0.26	0.40					
8. Non-local number of vol. associations, weighted by geographic distance (000s)	0.16	0.06	0.31	0.32	−0.12	0.94	−0.41	0.83	0.41				
9. Number of connected vol. associations (000s)	1.18	1.22	0.55	0.61	0.01	0.62	-0.20	0.53	0.68	0.58			
10. Number of isolated vol. associations (000s)	0.57	0.88	0.14	0.19	0.03	0.27	-0.22	0.20	0.89	0.18	0.26		
11. Non-local number of connected vol. associations, weighted by geographic distance (000s)	0.11	0.04	0.28	0.29	-0.14	0.88	-0.30	0.82	0.40	0.98	0.56	0.17	
12. Non-local number of isolated vol. associations, weighted by geographic distance (000s)	0.05	0.02	0.32	0.33	-0.06	0.91	-0.55	0.73	0.38	0.90	0.53	0.17	0.79

Note: A total of 784 state-years are represented.

tively and significantly related to manufacturing establishments. A standard deviation increase in the number of voluntary associations leads to an average increase of 1.4% in manufacturing establishments. Model 3 shows that this effect holds after controlling for spatial interdependence. The non-local count of voluntary associations weighted by geographical distance does not have a significant effect on manufacturing establishments.

Table 3
Ordinary least squares regressions of manufacturing establishments by LMA with lagged dependent variable (clustering by LMA, robust standard errors).

	Model 1	Model 2	Model 3	Model 4	Model 5
Number of manufacturing establishments (000s)	1.008***	1.004***	1.004***	1.004***	1.004***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Population density (000s)	−0.111***	−0.122***	−0.124***	−0.083***	−0.087***
	(0.024)	(0.025)	(0.026)	(0.018)	(0.019)
Per-capita income (000s)	0.002	0.001	0.001	−0.0002	−0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
% of college Graduates over the age of 25	0.305***	0.281***	0.277***	0.206**	0.234**
	(0.083)	(0.077)	(0.077)	(0.075)	(0.074)
Non-local number of mfg. establishments weighted by distance (000s)	0.012	0.014	0.037*	0.009	0.024
	(0.008)	(0.008)	(0.018)	(0.006)	(0.016)
Number of voluntary associations (000s)		0.031**	0.033**		
		(0.011)	(0.011)		
Non-local number of voluntary assoc. weighted by distance (000s)			−0.091		
			(0.084)		
Number of connected voluntary associations (000s)				0.089***	0.088***
				(0.020)	(0.021)
Number of isolated voluntary associations (000s)				−0.091**	−0.085**
				(0.030)	(0.031)
Non-local number of connecting assoc. weighted by distance (000s)					0.208
					(0.208)
Non-local number of isolating assoc. weighted by distance (000s)					−0.475
					(0.310)
Constant	−0.021*	−0.013	−0.018	0.002	−0.010
	(0.010)	(0.010)	(0.012)	(0.008)	(0.007)
R-squared	0.998	0.998	0.998	0.998	0.998
df	20	21	22	22	24
Model *F*	175949	155996	158718	164985	160681
Observations	6256	6256	6256	6256	6256

* $p < 0.05$ (two-tailed tests).
** $p < 0.01$.
*** $p < 0.001$.

Model 4 separates voluntary association counts into two components: the number of connected voluntary associations and the number of isolated voluntary associations. The number of connected voluntary associations is positively and significantly related to manufacturing establishments. However, the number of isolated voluntary associations has a negative and significant coefficient. Model 5 reveals that these effects remain unchanged when we control for the non-local densities of these two kinds of voluntary associations. A standard deviation increase in the number of connected voluntary associations leads to an average increase of 2.5% in manufacturing establishments, whereas a standard deviation increase in the number of isolated voluntary associations leads to a 1.7% decrease in manufacturing establishments. These results are depicted graphically in Fig. 1. Table 4 reports the results when we use LMA- and year-fixed effects and shows the same diverging effects of connected and isolated voluntary associations on manufacturing establishments. Note that the non-local densities of connected and isolated voluntary associations have surprisingly large effects in the models with the fixed effects. These unusual coefficients may be due to the large correlations between these control variables and per-capita income, a relationship that may introduce multi-collinearity and bouncing betas. Importantly, when we run the models without these non-local densities, the pattern of the main results is identical.

These results indicate that differences in the extent to which associations are connected to each other through the multiple memberships of their members influence the relationship between voluntary associations and economic activity. We

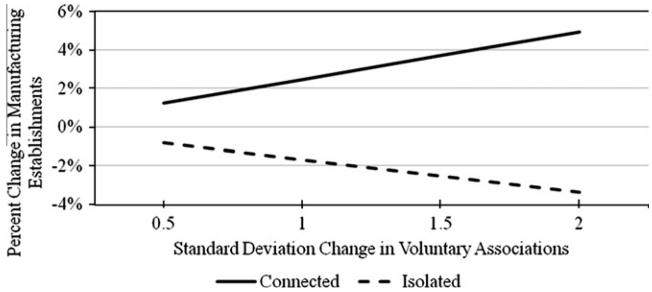

Fig. 1. The effect of connected and isolated associations on manufacturing establishments. *Note:* Based on results reported in Table 3, Model 5.

Table 4
Ordinary least squares regressions of manufacturing establishments by LMA with LMA- and year-fixed effects.

	Model 1	Model 2	Model 3	Model 4	Model 5
Population density (000s)	−0.022	−1.146***	−0.931***	−1.637***	−0.967***
	(0.213)	(0.215)	(0.208)	(0.201)	(0.194)
Per-capita income (000s)	0.024***	0.0107**	0.023***	−0.008*	0.005
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
% of college Graduates over the age of 25	−0.202	1.395**	−0.946	1.218*	0.040
	(0.529)	(0.520)	(0.517)	(0.484)	(0.477)
Non-local number of mfg. establishments weighted by distance (000s)	2.218***	2.651***	2.049***	2.970***	3.214***
	(0.141)	(0.139)	(0.138)	(0.130)	(0.136)
Number of voluntary associations (000s)		1.238***	1.305***		
		(0.0649)	(0.0629)		
Non-local number of voluntary assoc. weighted by distance (000s)			−15.21***		
			(0.772)		
Number of connected voluntary associations (000s)				3.976***	3.841***
				(0.110)	(0.105)
Number of isolated voluntary associations (000s)				−0.004	−0.241**
				(0.074)	(0.074)
Non-local number of connecting assoc. weighted by distance (000s)					−25.37***
					(1.035)
Non-local number of isolating assoc. weighted by distance (000s)					2.560*
					(1.232)
Constant	−0.924***	−1.294***	1.518***	−1.487***	0.723***
	(0.116)	(0.114)	(0.180)	(0.106)	(0.167)
R-squared (within)	0.100	0.153	0.206	0.264	0.334
df	19	20	21	21	23
Model *F*	34.33	52.87	72.18	100.1	127.4
Observations	6256	6256	6256	6256	6256
Number of LMAs	391	391	391	391	391

* $p < 0.05$ (two-tailed tests).
** $p < 0.01$
*** $p < 0.001$

expected that connected associations would have a stronger positive effect on economic activity than isolated associations. The results are surprising in that they indicate that the effects of connected and isolated associations on economic activity vary not only in magnitude but also in direction. Connected associations, as expected, benefit economic activity, whereas isolated associations hinder it. In the discussion section we suggest possible reasons for the negative effect of isolated voluntary associations. To probe further these relationships and to determine whether these effects become weaker when the areal size of the spatial units under study is considerably larger, we turn our attention to the results of the state level analyses reported in Tables 5 and 6.

The main pattern of the results is confirmed. Connected voluntary associations have a positive and marginally significant effect ($p = 0.055$) on manufacturing establishments in the models with the lagged dependent variable and have a positive and strongly significant effect on manufacturing establishments in the models with state- and year-fixed effects. Isolated voluntary associations have a negative and significant effect in the models with the lagged dependent variable and have a negative but not significant coefficient in the models with state- and year-fixed effects. So the same pattern is found at both levels of geographical aggregation.

Inspecting the four sets of models in Table 3 through 6, it is easy to see that the results are generally stronger at the level of the local community than at the level of the state. For example, focusing on the lagged dependent variable models and the specification in model 5, we find in the local community model coefficients significant at the 0.05 level in the predicted direction for both connected and isolated voluntary associations whereas we find in the state level model an equally significant coefficient in the predicted direction only for the isolated voluntary associations. The coefficient for connected voluntary associations is in the predicted direction but it is significant at the 0.10 level. The same pattern of varying strength of the results can be seen for the models with fixed effects: the local community analysis reveals in model 5 significant coefficients in the expected direction for both connected and isolated voluntary associations whereas the state level analysis reveals again in model 5 the predicted significant effect for connected voluntary associations. The coefficient for isolated voluntary associations is in the predicted direction but it is not significant.

Although comparing the results of local community and state level analyses is indicative of the varying conclusions that can be reached depending on the spatial unit of analysis researchers choose, it does not amount to a statistical test. The Chow test (Chow 1960) is often used as a test of the equality between sets of coefficients for independent samples but the samples we use are not independent since the state level dataset is an aggregation of the local community dataset. Keeping this important limitation in mind and given that we are not aware of statistical tests that allow comparing the results of the local community and state models, we report the results of a Chow test on models that include as control variables only the lagged

Table 5
Ordinary least squares regressions of manufacturing establishments by state with lagged dependent variable (clustering by state, robust standard errors).

	Model 1	Model 2	Model 3	Model 4	Model 5
Number of manufacturing establishments (000s)	1.005***	1.014***	1.014***	1.008***	1.008***
	(0.003)	(0.006)	(0.006)	(0.004)	(0.004)
Population density (000s)	0.006	0.008	0.005	0.002	−0.003
	(0.006)	(0.008)	(0.007)	(0.006)	(0.006)
Per-capita income (000s)	−0.009	−0.004	−0.006	−0.004	−0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
% of college graduates over the age of 25	0.236	−0.004	−0.193	−0.261	−0.278
	(0.761)	(0.802)	(0.801)	(0.802)	(0.889)
Non-local number of mfg. establishments weighted by distance (000s)	−0.129	−0.133	−0.456	−0.090	−0.298
	(0.066)	(0.0701)	(0.279)	(0.054)	(0.194)
Number of voluntary associations (000s)		−0.044	−0.044		
		(0.044)	(0.045)		
Non-local number of voluntary assoc. weighted by distance (000s)			1.236		
			(1.040)		
Number of connected voluntary associations (000s)				0.066*	0.070
				(0.033)	(0.036)
Number of isolated voluntary associations (000s)				−0.147***	−0.154***
				(0.034)	(0.036)
Non-local number of connecting assoc. weighted by distance (000s)					1.961*
					(0.956)
Non-local number of isolating assoc. weighted by distance (000s)					−1.371
					(2.686)
Constant	0.267*	0.240*	0.301**	0.220*	0.230*
	(0.111)	(0.103)	(0.103)	(0.0904)	(0.107)
R-squared	0.998	0.998	0.998	0.998	0.998
df	20	21	22	22	24
Model F	15676	63054	106306	185527	374015
Observations	784	784	784	784	784

* $p < 0.05$ (two-tailed tests).
** $p < 0.01$.
*** $p < 0.001$.

Table 6
Ordinary least squares regressions of manufacturing establishments by state with state- and year-fixed effects

	Model 1	Model 2	Model 3	Model 4	Model 5
Population density (000s)	0.462	−0.397	−0.239	−0.732	−0.756
	(0.686)	(0.676)	(0.671)	(0.614)	(0.612)
Per-capita income (000s)	−0.126**	−0.172***	−0.078	−0.262***	−0.216***
	(0.042)	(0.042)	(0.048)	(0.039)	(0.046)
% of College graduates over the age of 25	2.401	11.66	2.081	11.08*	6.648
	(6.245)	(6.193)	(6.655)	(5.62)	(6.105)
Non-local number of mfg. establishments weighted by distance (000s)	3.201	3.500	0.859	4.641	5.078
	(2.891)	(2.801)	(2.865)	(2.544)	(2.745)
Number of voluntary associations (000s)		1.032***	0.735***		
		(0.149)	(0.168)		
Non-local number of voluntary assoc. weighted by distance (000s)			−47.73***		
			(12.82)		
Number of connected voluntary associations (000s)				4.586***	4.280***
				(0.317)	(0.329)
Number of isolated voluntary associations (000s)				0.029	−0.053
				(0.157)	(0.174)
Non-local number of connecting assoc. weighted by distance (000s)					−46.71***
					(12.54)
Non-local number of isolating assoc. weighted by distance (000s)					23.69
					(24.38)
Constant	6.298**	4.463*	12.93***	1.983	5.151
	(1.975)	(1.931)	(2.971)	(1.764)	(2.936)
R-squared (within)	0.200	0.250	0.265	0.383	0.397
df	19	20	21	21	23
Model F	9.403	11.94	12.23	21.12	20.36
Observations	784	784	784	784	784
Number of states	49	49	49	49	49

* $p < 0.05$ (two-tailed tests).
** $p < 0.01$.
*** $p < 0.001$

dependent variable and the non-local count variables. The coefficients of these models are reported in Table 7. The Chow test reveals that the coefficients in the state and LMA analyses are significantly different ($F(22, 6998) = 12.78$; F critical value $(22, 6998) = 1.54$). The direction of this difference is consistent with our prediction: the coefficients for connected and isolated voluntary associations are approximately 30% larger at the level of the local community than at the level of the state. Overall, the results of the local community and state level analyses and the results of the Chow test, keeping in mind this test's limitations, suggest that the relationship between voluntary associations and manufacturing establishments appears to be stronger at the level of the local community than at the level of the state.

Table 7
Results of analyses used to compute chow test; ordinary least squares regressions of manufacturing establishments (LMA, state, and pooled analyses).

	State	LMA	Pooled
Number of manufacturing firms (000s)	1.008***	1.003***	1.006***
	(0.004)	(0.001)	(0.001)
Number of connected voluntary associations (000s)	0.070*	0.107***	0.080***
	(0.027)	(0.008)	(0.008)
Non-local number of connecting assoc. weighted by distance (000s)	1.252	0.012	7.600e−07
	(1.391)	(0.092)	(1.163e−06)
Number of isolated voluntary associations (000s)	−0.159***	−0.207***	−0.145***
	(0.027)	(0.011)	(0.013)
Non-local number of isolating assoc. weighted by distance (000s)	−3.435	−0.185	−2.079e−06
	(2.562)	(0.141)	(1.083e−06)
Constant	0.132	0.021***	0.019*
	(0.067)	(0.006)	(0.007)
Observations	784	6256	7040
Degrees of freedom	20	20	20
Residual degrees of freedom	763	6235	7019
Residual sum of squares	116.8	47.72	171.1
R-squared	0.998	0.998	0.999

* $p < 0.05$ (two-tailed tests).
** $p < 0.01$.
*** $p < 0.001$.

4. Discussion and conclusions

This paper makes two contributions to the empirical literature on voluntary associations. The first contribution is that we show that the effect of voluntary associations on economic activity evidenced by the number of manufacturing establishments is conditioned by the multiple memberships of their members. Previous analyses of the effect of voluntary associations on economic activity do not differentiate associations on the basis of their degree of connectedness and report mixed evidence (Knack and Keefer, 1997; Putnam, 1993). Adding to this prior work, we found that voluntary associations that are more connected to other voluntary associations through the multiple memberships of their members strengthen economic activity. Voluntary associations that have fewer ties to other associations arising from the multiple memberships of their members either hinder economic activity or do not affect it. These effects were found in local community and state analyses and were robust to specifications that included lagged dependent variables as well as fixed effects for the spatial units.

These results extend research on the different effects of connected and isolated voluntary associations. Paxton (2007) studied variations in generalized trust across countries and found that countries that had a higher number of individuals with connected memberships had higher levels of generalized trust whereas countries that had a higher percentage of individuals with isolated memberships had a lower level of generalized trust. Although it is beyond the scope of this paper to determine exactly which mechanisms underlie the different effects of connected and isolated voluntary associations on economic activity, Paxton's results point to the potential importance of generalized trust. Trust that extends beyond one's familiar social circles is believed to allow individuals to overcome the uncertainty that often stifles economic action (Granovetter, 1985, 1995; Putnam, 1993; Woolcock, 1998). Connected voluntary associations may strengthen economic activity because, as Paxton's results indicate, they encourage this form of trust by bridging different segments of society. We did not have access to data about generalized trust at the LMA level nor at the state level but, when we matched the Bureau of Labor Statistics data used in this paper with the GSS data available for 12 U.S. regions, we did find that connected voluntary associations have a considerably stronger correlation with generalized trust than isolated voluntary associations (0.42 vs. 0.23) – a piece of evidence consistent with the possibility that generalized trust accounts for the varying effects of connected and isolated voluntary associations on economic activity.

A focus on trust as a potentially important mechanism underlying the relationship between voluntary associations and economic activity may also provide a possible explanation for the negative or null effect of isolated voluntary associations on manufacturing establishments revealed by our analyses. Isolated voluntary associations have little effect on the creation of generalized trust but they are likely to create strong bonds of trust among their members (Stolle, 1998; Woolcock, 1998). These strong bonds are not necessarily conducive to effective economic action. Studies of developing economies (e.g., Granovetter, 1995) and immigrant communities (e.g., Portes and Sensebrenner, 1993) suggest that strong personalized trust among members of a community may create loyalties and attachments that lead individuals to place the interest of the community and its members above their personal desire to advance economically. It is possible that these normative pressures operate as a constraint also on members of isolated voluntary associations. Systematic empirical support for this argument that generalized trust and personalized trust may account for the different economic consequences of connected and isolated voluntary associations is left for future research.

The second contribution of this study is that we provide rare evidence on the issue of whether the areal size of the geographical units of analyses conditions the relationship between voluntary associations and economic activity. Researchers often make data constraints rather than theoretical analysis the basis for the choice of where the geographical boundaries of the spatial units are drawn. The level of aggregation of the spatial units under study, however, may be consequential because larger spatial units of analysis may produce biased estimates of the parameters of interest (King, 1997; Anselin and Cho, 2002). On this issue, our results offer a reassuring picture. Local community and state analyses yielded the same pattern of results. At the same time, though, we found evidence that is at least suggestive that the relationship between voluntary associations and manufacturing establishments is weakened by aggregation. Although these findings on the areal size of spatial units are not a reason for alarm, they suggest that scholars need to give greater consideration to where the geographical boundaries of their unit of analysis are drawn and need to be more mindful of the possibility that null results may be affected by the choice of a considerably large spatial unit.

This study also contributes to the exploding literature on social embeddedness, which suggests quite unequivocally that relations formed outside the market and outside corporate hierarchies influence economic action (Portes and Sensebrenner, 1993; Uzzi, 1997; Ingram and Roberts, 2000). Voluntary associations have long been viewed as central for an understanding of how the social and the economic spheres interact, but empirical evidence that sheds light on this important relationship has been rare and its validity has been hindered by data limitations. Empirical studies of the social embeddedness of economic action within geographically bounded communities have focused on relationships among producers (e.g., Saxenian, 1994; Ingram and Roberts, 2000; Ingram and Lifshitz, 2006) or producers' varying degree of involvement in the locale (e.g., Audia and Rider, 2010). In this literature, voluntary associations have received relatively less attention, even though they are not uniformly distributed across geographical space. Through the lens of social embeddedness research, our findings suggest that spatial variations in the extent to which voluntary associations are embedded in local social structures, through the multiple memberships of their members, influence economic activity. Taking into greater consideration spatial variations in the presence of different kinds of voluntary associations may be a helpful approach to provide a more complete picture of the social embeddedness of economic action within geographically bounded communities (Freeman and Audia, 2006; Marquis and Battilana, 2009). Given that the data used in our analyses are easily available from public sources, we hope that this inquiry will spur additional research efforts on this important topic.

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