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Rural Group Social Capital: Small Business Resiliency to Economic Shock

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SUMMARY

Organization resiliency, ability to recover from significant adversity, has become an urgent context of study to organizational researchers and practitioners in the wake of the global pandemic. Using the COVID-19 pandemic as a research context, we study the relationship between group social capital of small businesses and resiliency in times of crisis. We analyze the triple resource constraint of small businesses, within a rural setting, subject to an economic downturn. We pair these conditions with rural community-at-large reactions to struggling small businesses: the shift of consumer behavior to be more conscious and adapting by buying locally (Khayru, 2021). We use proportional odds logistic regression analysis of small business survey data to compare model fit when considering rural group social capital differences between service and non-service industries—resulting in no significant impact on resiliency. These findings support recent developments in our understanding of rural social capital's link to economic performance.

Track Performance Management

Work Count 6,175

INTRODUCTION

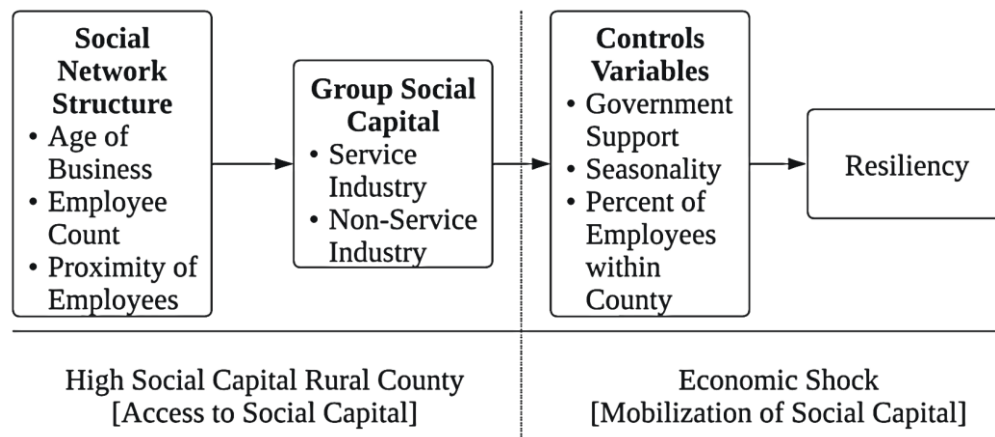
“It’s about stabilizing economies, on a micro scale. But we also knew that it would always be more than a currency. We knew that it would be a community relationship builder. Keeping money local, strengthens Main Streets, and sharing abundance.”

Mr. Chris Hewitt, Optimistake Owner of Tilda’s Kitchen and Community Space (Larsen, 2021)

This paper investigates the relationship between rural small businesses group social capital and resilience to economic shock, focusing on a rural county in the state of Maine during the COVID-19 pandemic. To date, a number of studies have examined contextual circumstances without the necessary refinement to isolate the most vulnerable of business organizations. We argue that the triple resource constraint of being a small business, in a rural county, during a pandemic offers a unique glimpse into the extrema and more vividly tests the role of social capital’s role in resiliency. To address this gap, we focus on the research question: “does group social capital affect resilience to an economic shock differently between service-sectors and non-service sectors small businesses?”

Data collection was conducted using questionnaires with 84 owners of rural small businesses to identify the strengths, weaknesses, opportunities, and threats (SWOT) their businesses face during the COVID-19 pandemic. Overall business sentiment, sales, and revenue changes versus pre-COVID levels is identified by respondents, as well as the key factors which led to their survival. Further, specific questions delved into the degree of embeddedness and the structure of the social network each business belonged to within its community.

FIGURE 1. Graphical Research Framework



We test our theory in the rural small business context of group social capital, exploiting these survey results to construct a novel dataset to analyze post-shock resiliency in the fall of 2022. Empirically, our contribution is twofold. First, in the context of rural small businesses: a resource-poor environment, shocked by further resource scarcity and heightened risk of failure. We apply structural and motivational elements of a social capital-rich environment to empirically

test effects on resiliency between industries. We refine industries further into service versus non-service due to the nature and role of social capital between these two types to test empirically the efficacy of that capital on resiliency. Second, our study adds to social network and social capital literature as small businesses leverage shifting customer sentiment toward the protection of local establishments for the sake of “saving Main Street” (the local community) in favor of more resilient national corporations.

Finally, our study contributes to practice by underscoring that small business owners should be cognizant of the greater role group social capital can have on economic shock resiliency. The resource constraints of being rural, small, and shocked by an economic downturn with public health policy implications may overcome the community’s support in these circumstances.

THEORY & HYPOTHESIS DEVELOPMENT

Recent work in understanding how organizations tap into their communities reveals a “shepherding effect” of community resources by organizations leveraging their social networks, rather than exploiting them (Altman et al., 2022). Further, the condition of uncertainty under a sharp economic decline or public health crisis lends itself well to actors engaging with communities to capture value creation (Dattee et al., 2018). The economic uncertainty manifested by the global health crisis of COVID-19 created a sudden and severe change in consumption patterns and consumer behaviors due to spread prevention protocols. This shift had an immediate and potent impact on revenue-generation for many industries reliant on social proximity (i.e., food services, rental property management, etc.). Since the implementation of national and state COVID-19 public health safety protocols in 2020, the successful navigation of economic decline has had mixed results, representing various levels of resiliency. In this context, we examine the role of the structural components of an organization’s social network (i.e., age, number of employees, location of employees, and industry type) to determine the degree of potential social capital derived therefrom. Further, in a county-based community characterized by pre-existing high social capital levels, we examine the motivated community to supply resources to these small businesses for the sake of preserving the utility they provide to the community in the form of goods, services, social capital, employment, rents, and other key economic and social benefits.

Resiliency

Holistically, resiliency research has taken many forms given its general application to any type of adversity created by a crisis: natural and man-made disasters, and war, to name a few. Immediate concerns post-survival of a crisis lie with the greater community’s ability to positively assess and control risks, and to reestablish economic activity. The degree of success can range from a return to only essential services to pre-crisis normalcy to an improved state, where conditions are better than before the crisis. The ability of a community to achieve these latter two conditions hinges heavily on the availability of resources: social and economic capital;

networks; values and knowledge; as well as community capital. Aldrich (2012: p. 2) lays the groundwork for this study, citing extraordinary recovery of economic capital in poor areas (Tamil Nadu, India and New Orleans Lower Ninth Ward) subject to natural disasters. Aldrich attributes these cases primarily to the existence of strong social capital networks within the community.

Resiliency can be broadly defined as the ability of a small business to be either: able to generate the same level of revenue as pre-shock conditions, or, the ability to generate higher than pre-shock revenues. In this context, I rely on the sense of obligation a small, rural, community feels to its small businesses. To “save Main Street”, community members alter collective behavior to supply the small business with resources. The contribution of the community aid the small business in surviving the crisis, resulting in higher resiliency.

Economic shock

Economic shock, in this context, is defined as a swift economic downturn or recession; the example used is the 2020 recession caused by the COVID-19 pandemic. While uniquely caused by social distancing, a public health policy, this economic cycle shared characteristics with other recessions: reduced consumption, job loss, and asset deflation (Phan & Wood, 2020). More broadly, the resilience literature is rich with scenarios that result in the type of economic shock seen in 2020. These scenarios typically focus on natural disasters and the ensuing crisis that results. Aldrich and Meyer (2014) cite social capital as a strong factor in determining the success or failure of economically poor regions recovering from natural and man-made disasters (i.e., Hurricane Katrina, Mozambique floods, Exxon Valdez spill, Japanese earthquakes).

Group social capital

“The set of resources made available to a group through members’ social relationships within the social structure of the group and the broader formal and informal structure of the organization” (Oh et al., 2006, p. 569). Group, in this case, will be the small business: the owner(s), the management team(s), and employee(s). Of the approaches of studying social capital, I do not discern between the personal benefits, known as the “private good perspective” (i.e., career advancement), that actors may gain from their social capital (Belliveau et al., 1996; Burt, 1997; Useem & Karabel, 1986) or the “public good view” with benefits to group members at large (Bourdieu, 1986; Coleman, 1988; Putnam, 1993; Kostova & Roth, 2003). Both of these views play a role in cultivating social capital.

Social capital mobilization

The “Gesamtheit” or shared social capital model of the community: aligned morals and values, and a resulting trust among members. A sentiment characterized by the COVID-19 notion of, “if these businesses die, our town dies” in rural areas. The intrinsic link between small businesses and rural community sustainability would otherwise be neglected in pre-pandemic consumer behavior patterns. Theory linking these conditions to cause community members to mobilize

social capital for the purpose of resiliency against economic shock. Results from this mobilization took many forms during the pandemic: volunteerism during labor shortages (Yawson, 2020); a shift in consumer consciousness toward local businesses (Khayru, 2021); and unique trust-building collaborations between the population and organizations based on emotional responses and trust (Sandoval & Calixto, 2021).

Services versus non-services sectors

Service sector small businesses require an more intimate interaction with the customer or client than do non-service sectors. In fact, this aggregated social capital with current or potential clients within a service organization is the most valuable capital due to reliance on these relationships for future business (Burt, 1992). The development of these close relationships develop social capital to a greater extent than the at-arms-length contracts and transactions of non-service sector organizations. While not as prevelant in non-service sector organizations, it is suspected that the weighting will shift “as a knowledge society emerges” (Pennings et al., 1998, p. 439).

The theoretical link between structural components of a network and group social capital were recently expanded upon by Oh et al. (2006). Those employed by rural small businesses members of the organization just as they are members of their greater community. Those community connections will tie the organization to grrater group social capital resources (Oh et al., 2006, p. 575).

The theoretical link causing social capital mobilization for small businesses in rural communities, resulting in access to resources is derived from the literature on social capital: the norms, values, and trust (Kown and Alder, 2014). This mobilization is characterized through the access of resources the community imparts on the organizations, given the ties the community has with the group of employees that constitute these small businesses.

Tying these proposition together: the theoretical link between mobilized group social capital and resilience during an economic shock lies in the collective motivation that a community and its ties to small businesses (i.e., employment, goods and services) to define the greater sense of communal obligation to keeping these organizations in business.

Therefore the following is hypothesized:

Hypothesis 1. Group social capital of a business organization affects the resilience to an economic shock, such that when group social capital increases economic shock resilience increases.

And further, given the differences in the utilization of social capital by industry type, we propose the following differences between service sector and non-service sector business organizations:

Hypothesis 2a. Group social capital of a service-sector business organization affects the resilience to an economic shock, such that when group social capital increases economic shock resilience increases.

Hypothesis 2b. Group social capital of a non-service sector (goods-producing) business organization does not affect resiliency to an economic shock, such that when group social capital increases economic shock resilience remains unchanged.

METHODS

Data, Sample, Measures

A questionnaire comprising of twenty-three (23) questions and four (4) parts was developed by the University of Maine for small businesses owners within Piscataquis County, Maine. The first part required general characteristics of the business, including location, age, number of employees, location and employment type (i.e., year round versus degree of seasonality) of those employees, and industry. The second and third sections asked respondents to identify why they chose to locate in this particular county in Maine and what makes doing business there unique, respectively. The final thirteen (13) questions were related to specific changes, concerns, and difficulties faced by the business due to COVID-19. Twelve (12) of the twenty-three (23) questions are referenced or utilized within this study. Survey feedback indicated concern from respondents on the directionality of the Likert scale ratings and key definitions (i.e., input) found within the survey. As such, these items are either omitted from the study or are used only in reference, when appropriate. For response rates per individual question and a full list of questions utilized in this study, reference Appendix II.

Nature and Purpose of the Data. In 2022, the Economic Development Administration (EDA) supported an effort through grant funds to contract with the University of Maine, Department of Economics; the Margaret Chase Smith Policy Center at the University of Maine; and the Piscataquis County Economic Development Sub council. The purpose of the effort was to perform a county-wide SWOT (strengths, weaknesses, opportunities, threats) analysis of the 2022 business environment in the midst of the COVID-19 pandemic. This analysis served the purpose of informing an economic development strategy by the Country Sub council. Research staff included: an Associate Faculty of Economics member as the lead investigator; a research staff member representing the Policy Center; and an undergraduate research assistant within the Department of Economics. The survey questions were compiled using vetted U.S. Census and academic questionnaire sources.

Piscataquis County, Maine. According to the U.S. Census Bureau, total employment percentage change from 2019-2020 was 0.0%. With a population of 16,800 (95.6% white) over 3,961 square miles, the resulting population density is 4.2 persons per square mile (2020). A median household income (2021 dollars) of \$46,948 (2017-2021) falls well below the national average of \$70,784 but remains above the poverty threshold of \$33,148 (2021 dollars). Generally, it can be characterized as the oldest (by age of residents), one of the poorest, and most rural counties within the state of Maine. It is Maine's second largest but least populated county. The county is entirely rural, by Census population definition, with no adjacency to urban areas. From 2020-21, this county was one of two within the state that saw a 1.6% (or greater) increase in population,

per Census data. All adjacent counties (3) saw population increases during the same period of 0.1-0.5% (2) or decreases from 0.5-0.0% (1).

Rural Social Capital. There are several attributes of rural communities which make them of interest within the social capital literature in terms of sustainability: economic, ethnic, and cultural. In these highly demographically homogeneous regions, ethnic and cultural sustainability is more prevalent. The proximity of homes, for one, increases the likelihood of social interaction. “Each neighbor is usually well aware of what the others are doing” (Debertin, 1996: p. 6). These frequent social interactions, regardless of depth, make up the social network within rural communities. Piscataquis County, for decades (1990-2014), has ranked among Maine’s top levels of social capital, even outperforming neighboring rural counties with similar demographic characteristics (Rupasingha et al., 2006 [with updates]). Of the 16 counties within the state, Piscataquis ranked 6th in the most recent survey (2014). See Appendix I. for an exhaustive list of social capital variables used by Penn State to calculate social capital by county (2014). What makes this an attractive feature for the study of social capital is that the key benefits of higher levels of social capital can be assumed: trust, socio-economic outcomes, cooperative behaviors, commonly shared norms (Falk & Kilpatrick, 2000). When coupled with the concept of “embeddedness” (Granovetter, 1985), this study attempts to understand the interaction of social networks of a business organization in the formation of group social capital via the intrinsic embeddedness of these organizations within this rural county.

Data collection. The data collection period consisted of November and December of 2022. The data were collected via a web-based survey utilizing Qualtrics software. The survey was distributed by the county Chamber of Commerce Office to its small business members by Chamber of Commerce staff. Email addresses were not provided to research staff to preserve business organization anonymity. Likewise, survey respondents were assured anonymity through a randomly assigned survey respondent identification number within the collected dataset.

Survey Questionnaire. Survey questions were compiled based on survey design methods utilized by the University of Maine Department of Economics. The final questionnaire was approved for use by tenured faculty in economics as well as senior public policy research staff. The survey was not subject to human subjects review by the University of Maine Institutional Review Board (IRB) for the Protection of Human Subjects because University Policy does not require such review for business respondents.

Sample. Of the 270 total businesses located within the country with an active membership in good standing with the Piscataquis County Chamber of Commerce, 31% (n=84) of business owners responded to the survey. According to the U.S. Census Bureau, there were 452 employer establishments in this county in 2020. Due to an 18.58% representation of businesses across the county, a comparative analysis is provided in Table 1.

Supply and Demand: Doing Business Locally. In order to understand the degree of business that is done locally both inputs and client distance are assessed. This is important in the understanding of the percentage of surveyed small businesses which may do online or out of state sales or services, whereby the degree of county-based social capital is less impactful on

performance. Alternatively, those with clientele located within the county are dependent on these relationships and the derived social capital for routine business. During an economic shock, these relationships become critical to the businesses survival likelihood as demand becomes uncertain.

Locality of inputs. 57% (n=13) respondents received business inputs in 1-3 days; 35% (n=8) respondents received business input in 1 week; 4% (n=1) 7-12 months; 4% (n=1) 12 or more months. While less impactful on to our research question, it is helpful to note that the inputs for goods and services tend to be limited to three (3) days or less in shipping time

Locality of client base. 95% (n=37) respondents sold products or services on site; 3% (n=1) respondents sold products or services with 1-3 months of travel time; and, 3% (n=1) respondents sold products or services with 12 or more months of travel time.

Conformity to representative sample of 2020 Census. Because of the limited size of the sample, extra precaution is taken to determine the representativeness of the sample to like datasets. In order to determine the quality of the sample in terms of its accurate representation of the population of interest, several key qualities are analyzed: industry representation, age, and size of small businesses. Neither over nor under representation within the sample appeared to be cause for concern across all three qualities. Tables 1 and 2 summarize these analyses.

Table 1. Industry. County Sample Representation of Census Data

2-Digit NAICS Code	NAICS Description	County Census Representation* (%)	County Sample Representation (%)	Over/(Under) Representation within Sample (%)
<i>Non-Service Providing (Goods-Producing) Businesses</i>				
11	Agriculture, forestry, fishing and hunting	4	8	4
21	Mining, quarrying, and oil and gas extraction	0	0	-
22	Utilities	1	0	(1)
23	Construction	13	6	(7)
31	Manufacturing	5	10	5
<i>Service-Providing Businesses</i>				
42	Wholesale trade	1	0	(1)
44	Retail trade	18	17	1
48	Transportation and warehousing	6	0	(6)

51	Information	1	2	1
52	Finance and insurance	4	2	(2)
53	Real estate and rental and leasing	5	10	6
54	Professional, scientific, and technical	3	2	(1)
55	Management of companies and enterprises	0	0	-
56	Administrative and support and waste	5	0	(5)
61	Educational services	1	2	1
62	Health care and social assistance	11	10	(1)
71	Arts, entertainment, and recreation	2	6	4
72	Accommodation and food services	11	16	5
81	Other services (except public administration)	8	10	2
99	Industries not classified (N/A)	0	2	2
*Source: Census.gov, County Business Patterns: 2020, Piscataquis County (ME)				

Table 2. Total Employment. County Sample Representation of Census Data			
Total Employment (Size)	County Census Representation* (%)	County Sample Representation (%)	Over/(Under) Representation within Sample (%)
1-4	65	60	(5)
5-10	17	15	(2)
11-20	13	10	(3)
21-50	5	11	4
51-150	1	0	(1)

151-300	0	0	-
301+	0	5	5
*Source: Census.gov, County Business Patterns: 2020, Piscataquis County (ME)			

Measures

Measures in this study consisted of performance measures and organizational characteristics recorded via survey questionnaires filled out by small business owners. All measures are of the organization-level (Level 2), with the exception of the grouping variable. The 2-digit North American Industry Classification System (NAICS) code offers grouping of small businesses by a high-level industry classification group (Level 1). For an exhaustive list of survey questions corresponding to the listed variables, see Appendix II.

Dependent Variable

Resiliency. Small business members of the Piscataquis County Chamber of Commerce were surveyed as to the business conditions relative to pre-COVID-19 levels. The dependent variable is an ordinal categorical variable coded as one (i.e., “1”) if the small business is performing at the time of the survey (November or December 2022) as it was prior to the COVID-19 pandemic. This response indicates a full recovery from any loss in business caused by the pandemic, as indicated by no change. Other responses are coded as zero (i.e., “0”) if the small business is worse off after the pandemic in terms of performance, and two (i.e., “2”) if it is better off. This ordinal ranking is consistent with the literature’s definitions (Duchek, 2014) of resiliency as: 1) a firm’s capacity to maintain or restore an acceptable level of functioning despite perturbations or failures” (Robet, 2010: 13), and further, 2) beyond restoration to include the development of new capabilities and an expanded ability to keep pace with and even create new ones (Lengnick-Hall et al., 2011). We used a three-item scale for changes in revenue, sales, and overall business sentiment. Understanding that education levels are quite low, any ambiguity in the technical differences between these three measures is captured by the averaging with equal weighting, using a simple average, into a latent variable. For example, COVID-19 may have impacted income and not revenue within a business and the respondent, unfamiliar with the accounting definitional difference, may interpret this question quite differently. All response categories contain greater than 10% of total responses. For evaluation of the three-item measure, see “results”.

Explanatory Variables

Our theoretical perspective relies on the mobilization of group social capital as a catalyst for accessing community resources. At the organizational level, external embeddedness in social capital terms, has been proven through multiple fields of research to be strongly associated with the social network structure (Mouw, 2006). We therefore, utilize measures of the small business social network in an attempt to capture embeddedness, a measure of group social capital. More recent literature develop a multi-dimensional model of embeddedness, directly in-line with the proposed explanatory variables: through physical presence, operations, key

employees and local hires (Vanninen et al., 2022). We therefore consider the structural elements of social capital of these small business community members such as the size of the organization as indicated by employee headcount, the age of the business as a proxy for embeddedness, and the proximity of employees to the business itself as an indication of individual employees embeddedness in the local community, contributing in aggregate to the group social capital level. These measures are consistent with Oh et al. (2006) propositions on the characteristics of group social capital.

Age of the Small Business. The count of years the business organization has been in operation. Respondents are asked to select an appropriate bin of five (5) categorical age ranges. Those ranges consist of: 0-2; 3-5; 6-10; 11-20; and, 20+ years of operation. These bins are coded within the data as 1 - 5, respectively. Due to social homophily, or the tendency of similar people to become friends with one another (Mouw, 2006), group social capital levels of a small business are more easily obtained within a generally homogenous county demographic. The age or number of years within operation grants us insight into the depth of these relationships as they mature over time and the increased access to resources they develop through trust.

Employee Headcount. The count of employees within the business organization. Respondents are asked to select an appropriate discrete bin of seven (7) size ranges. Those ranges consist of: 1-4; 5-10; 11-20; 21-50; 51-150; 151-300; and, 301+ employees. These bins are coded within the data as 1 - 7, respectively. The largest employer in the county has 393 employees, ensuring that no respondent falls outside the Small Business Administration's definition of a small business (<500 employees). Organizational size has a rich community effect with regards to an organization's group social capital: larger organizations benefit from recognition of social or public impact resulting in (Baum & Oliver, 1996: 1386); 1) distributing endorsements and rewards (Baum & Oliver, 1992), 2) enhances survivability (Scott & Meyer, 1983), 3) develop an interconnectedness between the organization and the community to which survival, resource mobilization, and legitimacy between the two players become deeply rooted (Hannan & Carroll, 1992: 41). In a community setting, the larger the employee pool, the larger the social network ties of the organization. Zimmerman et al. (2010), provides a nine category social network consideration: owners (same and different industries); suppliers; client; financial institutions; competitors; industry events; public officials; relatives and friends. Within these categories, we understand that the attitude within a rural community is that each of these is a neighbor, a friend, a community member, and a tie by the communal sense of shared interest in the community.

Proximity of Employees. The home address of employees within the business organization as a proxy for physical distance from the county and resulting embeddedness, or lack thereof. Respondents are asked to select an appropriate nominal bin of six location ranges. Those ranges consist of: "they are locals"; "they reside within Piscataquis County"; "they reside within the State"; "they reside within New England"; "they reside within the US"; and, "they are from outside the US". These bins are coded within the data as 1 - 6, respectively. In line with Vanninen et al. (2022), this allows us to capture the physical presence element of embeddedness and derived social capital creation.

Control Variables

Industry. The 2-digit NAICS code controls for variation by industry. Industries have fared unevenly under COVID-19 restrictions for a variety of different reasons (e.g., supply chain lags, labor market disruptions, social distancing or masking requirements, etc.) (Crane et al., 2021; Xiang et al., 2021). These variations should be controlled for at this highest level of industry categorical coding in order to define those unique and unobserved pandemic-related circumstances within the data. Within a variation of the model (model iii), this 2-digit code is reduced to a dummy variable to indicate whether the small business is within the a service industry or a non-service industry, per Bureau of Labor Statistics definition. Twenty-four (24) good-producing (non-service) and seventy-seven (77) service-providing businesses were represented in the full dataset. A delineation of which industries are categorized as service versus non-service industry can be found within Table 1.

Seasonality. 79% (n=49) of responding small businesses employ a vast majority (76-100%) of their employees year-round, indicating no “closed season” or seasonality to the business’s employment. 15% (n=9) respondents employ (0-25%) of their employees year-round; and 6% (n=4) respondents employ a majority (51-75%) of their employees year-round. These bins are coded within the data as 1 - 4, respectively. Because of the harsh winter weather experienced in Piscataquis County, Maine, as well as a robust tourism industry (PCEDC, 2023), high seasonality requires 14% (n=9) respondents to employ only 0-25% of their employees year-round. Because our measurements of the social network structure are quasi-dependent upon physical location, controlling for this seasonality represented a time element of employees engaging with clients and the community, per year or season. Because this seasonality is not tied to NAIC-definitions and spans multiple NAICS industries, a unique control variable is required.

State or Federal Governmental Support. Responding small businesses were asked “what factors drove your business to recover from the impacts of the COVID-19 pandemic?”. Four (4) respondents indicated direct support from the Federal and State Governments or Paycheck Protection Program (PPP) loans. While our selected dependent variable is not affected (sales) by these loans, controlling for their presence allows for a better depiction of the relationship of this support to the dependent variable within the statistical results. The data are categorically coded “0” for no mention of State or Federal Government support and “1” for explicitly identifying this support as a recovery factor. It is possible that Federal and/or State support may have been provided to a business that did not indicate it as a “factor”; however, the question is worded as such to indicate whether the government support was a factor in recovering from the COVID-19 pandemic.

Percent of Employees Living within the County. The percentage of employees within the business organization which reside within the county. Respondents are asked to select an appropriate nominal bin of four (4) percentage ranges. Those ranges consist of: 0-25%; 26-50%; 51-75%; and, 76-100% of employees. These bins are coded within the data as 1 - 4, respectively. This allows us to control for those circumstances in which respondents indicated that the

proximity of their employees is “within Piscataquis County” but not necessarily all of the employees—these percentages apply a more granular level of detail.

RESULTS

Measurement Evaluation

Prior to testing the hypothesized model, we assessed the quality of the measurement model. Using a three-item resiliency measure, each indicator was subjected to confirmatory factor analysis (CFA). From this process, all three items were retained that “loaded” together and represented a general resiliency in small business performance as a latent variable. Cronbach’s alpha of the resiliency scale in this study was 0.83; the reliability of its three dimensions ranged from 0.58 to 0.94. Analysis of model fit revealed that a three-factor latent variable with the three dimensions of items as separate factors fit the data very well, $\chi^2(0) = 0.00$ (p -value = .000; CFI = 1; RMSEA = 0; SRMR = 0), supporting the construct as proposed. As a control for multicollinearity, variance inflation factor (VIF) scores were calculated for each of the variables within the regression model. All VIF scores were below 4, and all were below 1.88, suggesting that multicollinearity was not a serious problem in the analysis.

Descriptive Statistics and Correlations

Descriptive statistics and correlations are reported in Table 3. The dummy variable for service versus non-service sector industry is omitted as it is derived from the list of 2-digit NAICs whereby “1” indicates service sector and “0” non-service sector. Inclusion would be redundant along side the 2-digit NAICs, with misleading correlation.

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Table 3 Means, standard deviations, and correlations with confidence intervals

Variable	M	SD	1	2	3	4	5	6	7
1. Resiliency	1.07	0.73							
2. Number of Employees	1.97	1.55	.05 [-.25, .34]						
3. Proximity of Employees	1.74	0.92	.09 [-.20, .37]	.48** [.26, .65]					
4. Seasonality	1.50	1.07	.20 [-.10, .46]	-.10 [-.35, .15]	.12 [-.14, .36]				
5. Government Support (0-No, 1-Yes)	0.05	0.21	-.24 [-.49, .05]	.09 [-.16, .33]	.00 [-.25, .25]	-.12 [-.36, .13]			
6. Age of Business	3.52	1.37	-.13 [-.40, .17]	.32* [.08, .53]	.31* [.07, .52]	-.17 [-.40, .08]	.18 [-.06, .40]		
7. % Employees within County	3.10	1.28	-.05 [-.34, .24]	-.12 [-.36, .13]	-.47** [-.64, -.25]	-.48** [-.65, -.27]	-.07 [-.31, .18]	-.04 [-.28, .21]	
8. Industry (2-digit NAICS)	52.65	20.96	-.10 [-.38, .19]	-.10 [-.34, .16]	-.22 [-.45, .03]	.13 [-.13, .37]	.14 [-.11, .38]	-.02 [-.27, .23]	.11 [-.15, .35]

Note. N=47. M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$.

Table 4 Ordinal regression results

<i>Dependent variable</i>	<i>Ordinal logistic regression models</i>					
	<i>Reduced Model (i)</i>		<i>2-digit NAICs Model (ii)</i>		<i>Service v. Non-Service Model (iii)</i>	
Resiliency	<i>Coeff.</i>	<i>O.R.</i>	<i>Coeff.</i>	<i>O.R.</i>	<i>Coeff.</i>	<i>O.R.</i>
<i>Intercepts</i>						
Resiliency 0 0.33	-1.10 (0.96)		-1.08 (1.01)		-0.92 (0.99)	
Resiliency 0.33 0.67	-0.42 (0.94)		-0.40 (1.00)		-0.23 (0.97)	
Resiliency 0.67 1.00	-0.03 (0.93)		-0.02 (0.99)		0.15 (0.96)	
Resiliency 1.00 1.33	0.27 (0.93)		0.28 (0.99)		0.46 (0.96)	
Resiliency 1.33 1.67	0.64 (0.93)		0.65 (0.99)		0.84 (0.97)	
Resiliency 1.67 2.00	0.92 (0.94)		0.94 (1.00)		1.12 (0.98)	
<i>Control variables</i>						
Government Support (Yes = 1)	-0.63 (0.24)	0.53	-0.63 (0.58)	0.53	-0.63 (0.57)	0.53
Seasonality	0.17 (0.18)	1.19	0.17 (0.19)	1.18	0.16 (0.18)	1.17
% Employees within County	-0.02 (0.15)	0.98	-0.02 (0.15)	0.98	-0.05 (0.16)	0.96
Industry (NAICs, Service/Non)						
2-digit NAICs	-	-	0.00 (0.01)	1.00	-	-
Service Industry (Yes = 1)	-	-	-	-	0.36 (0.41)	1.43
<i>Explanatory variables</i>						
Age of Business	-0.09 (0.13)	0.91	-0.09 (0.14)	0.91	-0.10 (0.14)	0.90
Employee Headcount	0.04 (0.12)	1.04	0.04 (0.12)	1.04	0.06 (0.12)	1.06
Proximity of Employees	0.15 (0.24)	1.16	0.15 (0.25)	1.17	0.17 (0.25)	1.19
Akaike Information Criterion (AIC)	189.58		165.58		190.83	
Log likelihood (df)	-82.79 (12)		-82.79 (13)		-82.41 (13)	
LR test (change over the reference model)			0.00		0.76***	

Notes: Standard errors are in parentheses; Significance levels are *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; Likelihood ratio (LR) test: Model 2 vs. 1 and Model 3 vs. 2.

Hypothesis Testing Using Proportional Odds Logistic Regression

We conducted an ordinal regression model to test our hypotheses (H1, H2a and H2b). Because our dependent variable “Resiliency” is an ordinal variable, a proportional odds logistic specification is recommended, as in Stranieri et al. (2017). The *polr* command from the MASS package in the R 4.2.2 software generated the regression-estimated model presented in Table 4. For ease of interpretation, the antilog is used to estimate the coefficients into odds ratios (labeled O.R.); interpretation of which is omitted in later results discussion due to the lack of statistical significance. To evaluate the goodness of fit of the full model, two additional models were subject to the log likelihood and the log likelihood ratio tests to assess model improvements through select industry identifying variables. Supplementary analysis of the log likelihood ratio test was utilized to assess the group comparison between i) the “reduced model” with industry identifiers omitted, ii) 2-digit NAICs industry specificity, and ii) service and non-service sector industry small businesses.

DISCUSSION

The results of the ordinal regression are presented in Table 4. We performed a log ratio test to see if the models are statistically different; however, we found no statistical differences. In each case, (i) the reduced model (without differentiating industry), (ii) the model including 2-digit NAICs codes to indicate industry of the small business, and (iii) the categorical model using a dummy variable to indicate service sector industry versus non-service sector industry all proved to contain no statistically significant relationships to the dependent variable “resiliency”.

Model 1 (i), or the reduced model contains no specification as to industry. The coefficient estimates of the variables “Age of business” ($b = -0.09$, $SE = 0.13$, $p = 0.50$, $CI [0.70, 1.19]$), “Employee headcount” ($b = 0.04$, $SE = 0.12$, $p = 0.74$, $CI [0.82, 1.32]$), and “Proximity of employees” ($b = 0.15$, $SE = 0.24$, $p = 0.54$, $CI [0.72, 1.89]$) are not statistically significant, suggesting no relationship between these explanatory variables and resiliency. Furthermore, we cannot gain insight from interpretation of the various control variables “Government support” ($b = -0.63$, $SE = 0.24$, $p = 0.27$, $CI [0.18, 1.63]$), “Seasonality” ($b = 0.17$, $SE = 0.18$, $p = 0.35$, $CI [0.83, 1.71]$), or “Percent of employees within the county” ($b = -0.02$, $SE = 0.15$, $p = 0.92$, $CI [0.73, 1.32]$). This reduced model serves as a baseline against which we compare the inclusion of 2-digit NAICs Model 2 (ii), and finally our hypothesized relationship with service sector and non-service sector results within Model 3 (iii).

Although we will focus on Model 3 (iii), we also provide the modified Model 2 (ii), a model that includes the 2-digit NAICs as an assessment of the goodness of fit improvement over the reduced model. In spite of a reduced Akaike Information Criterion over Model 1 (i): less information is lost in Model 2 (ii) indicating an improvement of model fit; we once again find no statistically significant relationships, at any level of alpha (0.05, 0.01), among the proposed variables when controlling for multiple industry types ($b = 0.00$, $SE = 0.01$, $p = 0.96$, $CI [0.98,$

1.02]). Between the results in Model 1 (i) and Model 2 (ii), we therefore conclude that H1 is unsupported.

In Model 3 (iii), we included in the analyses the dummy variable for service industry (1) and non-service industry (0) NAICs codes. This simplification of NAICs from multiple categories to only two, surprisingly increased the AIC over both the reduced model (i) and the improved Model 2 (ii), suggesting a less precise model fit. The coefficient estimates of the variables “Age of business” ($b = -0.10$, $SE = 0.14$, $p = 0.44$, $CI [0.69, 1.17]$), “Employee headcount” ($b = 0.06$, $SE = 0.12$, $p = 0.64$, $CI [0.83, 1.34]$), and “Proximity of employees” ($b = 0.17$, $SE = 0.25$, $p = 0.49$, $CI [0.74, 1.95]$) are not statistically significant, suggesting no relationship between these explanatory variables and resiliency. Furthermore, we cannot gain insight from interpretation of the various control variables “Government support” ($b = -0.63$, $SE = 0.57$, $p = 0.27$, $CI [0.18, 1.62]$), “Seasonality” ($b = 0.16$, $SE = 0.18$, $p = 0.38$, $CI [0.82, 1.69]$), or “Percent of employees within the county” ($b = -0.05$, $SE = 0.16$, $p = 0.77$, $CI [0.70, 1.29]$). We find no statistically significant relationships, at any level of alpha (0.05, 0.01), among the proposed variables when controlling for service versus non-service industry types ($b = 0.36$, $SE = 0.41$, $p = 0.38$, $CI [0.64, 3.20]$). The results in Model 3 (iii) therefore conclude that H2a and H2b are also unsupported.

Interestingly, these findings are inconsistent with the hypotheses presented from the theoretical arguments we proposed. Due to the lack of statistical significance in the relationship between any of the independent variables with the dependent variable, we cannot meaningfully interpret coefficients or their derived odds-ratios. For thoroughness, we tested three models of increasing specificity toward our ultimate goal of discerning social capital’s role in resiliency between service and non-service industry small businesses. Not only did subsequent models prove only modest improvements over the reduced model, no significant relationships were ever identified. Subsequent analysis of unique combinations of independent variables were further analyzed to test for the existence of any statistically meaningful relationships, with results only between select independent variables. These analyses are omitted from the results due to insignificance toward to the aim of the study.

Theoretically, these findings do not support a causal link between rural group social capital and resiliency of small businesses to economic shock. This result remains in spite of conditions of high existing social capital within the county of interest and the close relationships developed by service-providing businesses. These results are more recent work on the quality of social capital in rural areas. Klärner & Knabe (2019) contribute to our understanding of the functions of social capital, citing that the deep connections (i.e., family) found in these communities is a poor resources for economic performance. This agrees with the responses from many surveyed small business owners. The presence of family in the area was indeed a strong draw for starting a business in this rural region. While the strong bonds of family are valuable in many aspects of well-being, the socioeconomic conditions of this rural county may prove too weak in resources to result in increased resiliency for local small businesses.

Practical Implications

Our findings result in perplexing interpretation: seemingly optimal conditions for i) high social capital levels from social network structural considerations and ii) high social capital mobilization conditions inconclusively impact small business resiliency. These findings contradict recent findings from mixed rural, urban environments (Montserin et al., 2021). This may be due to the extraordinarily resource constrained conditions characterizing this study. The areas reliance on natural resource-based tourism may have been too impacted by travel restrictions and social distancing protocols for any effect of local social capital mobilization.

Limitations and Directions for Future Research

Self-Reporting. The survey data is entirely self-reported, making the entire dataset used for the study susceptible to the introduction of self-reporting bias. To discourage and minimize social desirability in responses, respondents were assured that all questionnaire responses would be kept confidential with the researchers. See Appendix II for confidentiality notice provided to respondents.

Small business closures. For completeness and thoroughness, it would be ideal to acquire survey data from those small businesses which closed during the COVID-19 period under review (2020-2022). It would be prudent to compare closed businesses' level of group social capital to those who remained opened to determine if social capital levels played a role in survivability, as a more holistic measure of resiliency.

Rural versus urban. More robust statistical conclusions could be made more persuasive if a sample of small businesses were taken from urban counties with varying levels of social capital. This comparison would solidify the assumption that the networks these businesses maintain with external community members is effective due to the unique social characteristics of rural populations.

Small sample size. The dataset is considered small as $N < 200$ (Bentler & Yuan, 1999) and an $N:df$ ratio of less than 3 (Herzog & Boosma, 2009), and therefore special precautions should be taken when assessing data-model fit, especially in the application of structural equation modeling (McNeish, 2020: 488). Robustness checks are to be performed whenever possible to support statistical findings. Special considerations should be applied whenever possible due to the likelihood of overfit of the model to the data and other undesirable outcomes.

Temporal Nature of Resilience. We here utilize a dataset of static measurement of those small businesses that experienced COVID-19 challenges. The data indicate that many of these challenges are ongoing at the time of the survey. Further, some of the indicated reasons for survival are not long-term sustainable (i.e., debt accumulation). A follow-up study and comparison of longitudinal data would allow for a temporal study of the suggested effects of group social capital.

Appendix I.

Social Capital Variables (Rupasingha et al., 2006, with updates)

religious2014: Number of establishments in Religious organizations (NAICS 813110)

civic2014: Number of establishments in Civic and social associations (NAICS 813410)

business2014: Number of establishments in Business associations (NAICS 813910)

political2014: Number of establishments in Political organizations (NAICS 813940)

professional2014: Number of establishments in Professional organizations (NAICS 813920)

labor2014: Number of establishments in Labor organization (NAICS 813930)

bowling2014: Number of establishments in Bowling center (NAICS 713950)

recreational2014: Number of establishments in Fitness and Recreational Sports Centers (NAICS 713940)

golf2014: Number of establishments in Golf Courses and Country Clubs (NAICS 713910)

sports2014: Number of establishments in Sports Teams and Clubs (NAICS 711211)

pop2014: Population

assn2014: The aggregate for all of above variables divided by population per 1,000 (1st factor)

pvote2012: Voter turnout (2nd factor)

respn2010: Census response rate (3rd factor)

nccs2014: Number of non-profit organizations without including those with an international approach (4th factor)

Sk2014 (calculated): Social capital index created using principal component analysis using the above four factors (nccs09 is divided by population per 10,000). The four factors are standardized to have a mean of zero and a standard deviation of one, and the first principal component is considered as the index of social capital.

Appendix II.

Truncated List of Survey Questions (number of respondents)

1. How long has your business been in operation? (n=69)
2. How many people are employed by your business? (n=62)
3. What percentage of your employees reside in Piscataquis County? (n=63)
4. Where do most of your workers reside? (n=62)
5. What percentage of your employees work year-round? (n=62)
6. What industry is your business a part of? (n=63)
7. What is the travel time for your outputs? (n=39)*
8. How long does it take to get your inputs to your business? (n=23)*
9. Has your business recovered since the start of the COVID-19 pandemic? (n=52)
10. What factors drove your business to recover from the impacts of the COVID-19 pandemic? (n=33)*
11. Did you experience a change in sales as a result of the COVID-19 pandemic? (n=49)
12. Did you experience a change in revenue as a result of the COVID-19 pandemic? (n=50)

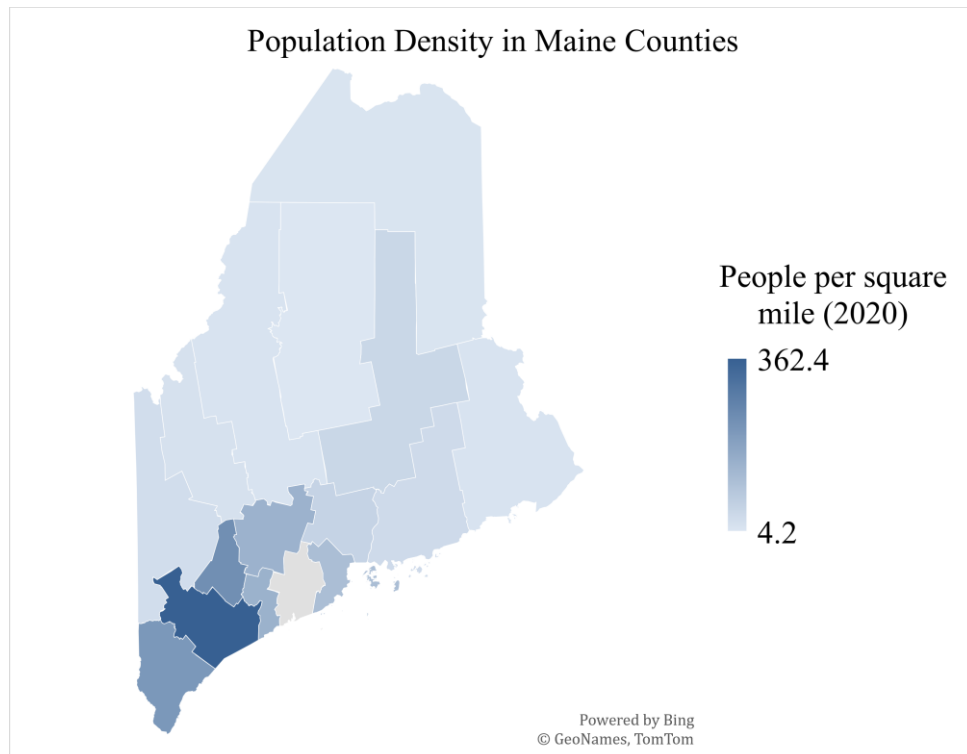
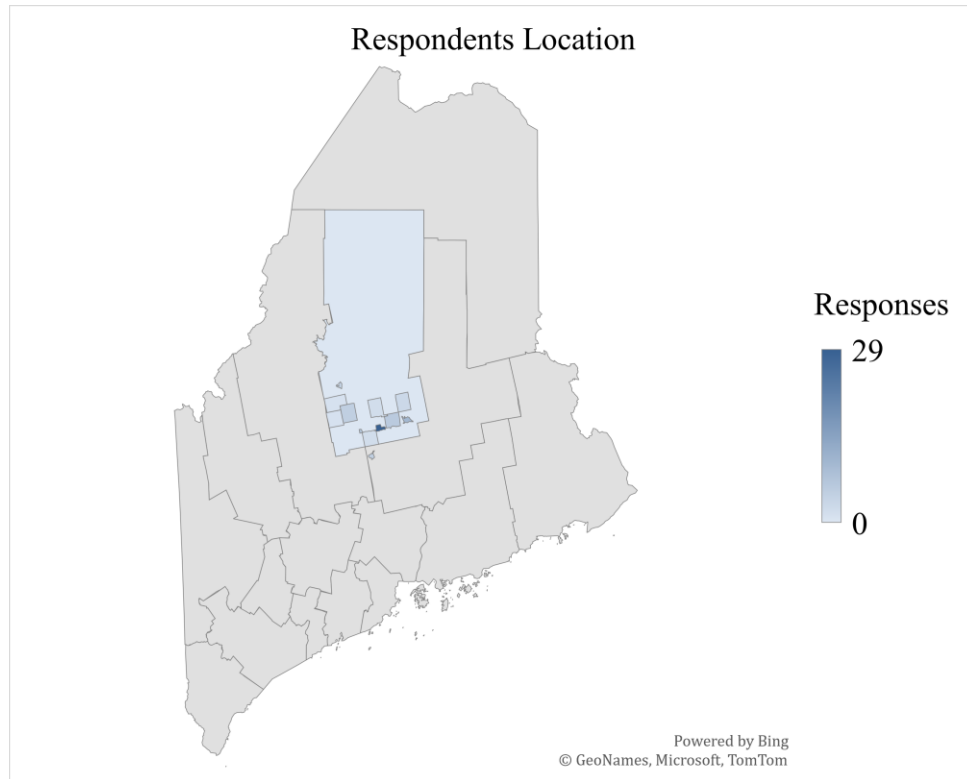
*Used in limited capacity due to low response rate due in part to confusion of terms (i.e., input)

Notice of Confidentiality (via Qualtrics)

“This survey has been constructed on behalf of the Piscataquis County Economic Development Council to collect information on the benefits of, and concerns around, doing business in Piscataquis County. This information will contribute to the development of an economic development strategy for the region.

The survey is entirely confidential and all information gathered will be treated with the utmost sensitivity. Unless otherwise directed please provide data for 2022. All data is stored in a password protected electronic format and no individual responses will be disclosed. All information will be reported in an aggregate form.”

Appendix III.



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