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Does Social Capital Matter in Corporate Decisions?
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Abstract: We investigate whether the levels of social capital in US counties, as captured by strength of civic norms and density of social networks in the counties, are systematically related to tax avoidance activities of corporations with headquarters located in the counties. We find strong negative associations between social capital and corporate tax avoidance, as captured by effective tax rates and book-tax differences. These results are incremental to the effects of local religiosity and firm culture toward socially-irresponsible activities. They are robust to using organ donation as an alternative social capital proxy and fixed effect regressions. They extend to aggressive tax avoidance practices. Additionally, we provide corroborating evidence using firms with headquarter relocation that changes the exposure to social capital. We conclude that social capital surrounding corporate headquarters provides environmental influences constraining corporate tax avoidance.

JEL Classification: A13, H26, M40, M41, Z13

Keywords: Tax avoidance; Tax aggressiveness; Social capital; Social norm; Social network

1. Introduction

Social capital has been a subject of extensive research in sociology (Coleman [1988]), political science (Putnam [1993]), and economics (Fukuyama [1995], Woolcock [1998]). A central theme that emerges from these studies is that social capital—vis-à-vis shared common beliefs (i.e., social norms) and dense associational networks—facilitates norm-consistent behaviors and constrains norm-deviant behaviors. There is considerable evidence showing that a community's social capital affects the social and economic behaviors of its residents (e.g., Putnam [2001], Guiso, Sapienza, and Zingales [2004], Buonanno, Montolio, and Vanin [2009]). However, there is little evidence relating a community's social capital to decisions of local corporations headquartered in the community.

In this study, we examine whether social capital at the county level in the US is systematically related to tax avoidance practices of local corporations headquartered in the county. We operationalize the social capital construct using density of social networks and strength of civic norms in US counties in which firms' headquarters are located, where civic norms are non-religious social norms that emphasize civic duty and socially cooperative behaviors (Knack [1992], Guiso, Sapienza, and Zingales [2010]).

On one hand, one would expect to observe a negative relation between social capital and corporate tax avoidance for the following reasons. First, social environments affect individual belief and behavior concerning the appropriateness of paying taxes (Alm and Torgler [2006], Cummings, Martinez-Vazquez, McKee, and Torgler [2009]). Second, managers affect corporate decisions (Bertrand and Schoar [2003]) and managers are susceptible to the influences of social peers surrounding corporate headquarters, such as neighbors, social club members, and parishioners (e.g., Hilary and Hui [2009], McGuire, Omer, and Sharp [2012]). Third, there is a

widely shared societal belief that all citizens, including corporations, have a civic duty to pay taxes.[1] These arguments imply that social peers in high-social-capital communities are more likely to perceive corporate tax avoidance behaviors as norm-deviant since these practices are incongruent with the prescribed values and standards associated with civic norms. Accordingly, managers of corporations headquartered in high-social-capital communities should anticipate higher psychic costs (Erard and Feinstein [1994]) and higher social sanctions (Coleman [1988]) associated with corporate tax avoidance decisions when compared to managers from corporations headquartered in low-social-capital communities, leading these managers to refrain from corporate tax avoidance practices and behave in a way that conforms to the expectations of their social peers in the communities (Kohlberg [1984]).

On the other hand, there is evidence that some constituents in the corporate sector, including shareholders, directors, and executives, hereafter corporate peers, are "tax-minded" in that they view tax minimization practices as acceptable means of conducting business operations and seek to actively implement strategies reducing a firm's tax burden.[2] Just as social peers could

[1] In every annual Taxpayer Attitude Survey in the past decade the Internal Revenue Service (IRS) commissioned, the results consistently show that more than 90% of those taxpayers surveyed either completely or mostly agree that "it is every American's civic duty to pay his or her fair share of taxes" (IRS [2013]). These societal expectations are echoed around the globe in similar surveys conducted in Ireland, New Zealand, and the UK (Johnson [2011], Cleary [2013], Christian Aid [2013]); and, they are shared by people in all walks of life, including politicians and academicians. For instance, Paul Krugman describes companies engaging in corporate inversion as "corporate deserters" that are "shirking their civic duty" (Krugman [2014]). Realizing the prevalence of these societal expectations, KPMG warned its corporate clients in 2013 that "now tax and the issue of paying your fair share is one of the most prominent areas being scrutinized by governments, the general public and, to a great extent, the media" (KPMG [2013]). Because civic duty to pay taxes is a prevalent societal expectation and civic norms emphasize civic duty and socially cooperative behaviors, there is a natural linkage between tax avoidance and social capital, vis-à-vis civic norms.

[2] For instance, Rego and Wilson [2012] find that firms use equity risk incentives to motivate managers to undertake tax avoidance practices. Survey results reveal that managers and directors "believe that current corporate law requires them to pursue legal courses of action that maximize shareholder value (Rose [2007, p. 319])." General Electric in its 2010 Citizenship Report contends that "like any business or individual, we do like to keep our tax rate low … we have a responsibility to our shareowners to reduce our tax costs as the law allows." While these aforementioned findings suggest that some corporate peers are tax-minded, there is also evidence that some corporate peers hold an alternative view on the matter. The Disney Citizenship 2014 Performance Summary provides a succinct argument reflecting this alternative view: "We manage our tax affairs responsibly and carefully …. we also give due consideration to our reputation, brand, corporate, and social responsibilities when assessing tax initiatives and uncertain tax positions, as

influence managers, so could tax-minded corporate peers. As such, managers could be influenced by two conflicting norms when making corporate tax decisions: civic norms arising from social peers surrounding corporate headquarters and tax-mindedness arising from tax-minded corporate peers. If the influences of tax-minded corporate peers are particularly overpowering in the corporate sector, one would expect the influences of social peers on corporate tax decisions to be minimal and insignificant. In this case, the levels of social capital surrounding corporate headquarters could have negligible or no systematic relation with corporate tax avoidance practices.

We test the validity of these two conjectures using US data.[3] We construct a county-level social capital measure to capture the confluence of effects from civic norms and associational social networks, based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. We use three widely used measures to capture consequences of corporate tax avoidance practices. Effective tax rates and cash effective tax rates are used to capture consequences of broad tax avoidance practices that reduce the firm's taxes relative to its pre-tax accounting income. We use the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference to capture tax avoidance practices that result in a permanent difference between book income and taxable income.

well as the applicable legal and fiduciary duties of directors and employees. Ultimately, we strive to manage all taxes so as to provide a responsible outcome that considers the interests of all stakeholders."

[3] We choose the US setting for the following reasons. First, a within-county empirical design helps to isolate the differences in "rules of law", tax codes, cultures, and institutions across nations. Guiso, Sapienza, and Zingales [2004] use a similar approach to examine the effect of social capital in Italy. Second, there is evidence that local religious norms and networks surrounding firms' headquarters affect corporate outcomes in US firms (e.g., Hilary and Hui [2009], McGuire, Omer, and Sharp [2012]). As such, it is logical to use the US setting to explore the effect of non-religious social norms and networks (i.e., social capital) on corporate decisions. Third, we wish to provide results using large-scale data and we are only able to obtain comprehensive historical county-level data on civic norms and social networks in the US.

Our social capital construct could reflect influences of county-level factors such as age, income, wealth, etc. Accordingly, we include a range of demographical factors in our empirical models to control for these differences and to isolate the empirical relation between social capital and tax avoidance. Additionally, we include other variables to isolate the effects of other factors, including firm attributes and state corporate income tax rate, which could affect corporate tax avoidance. Using a sample of 63,807 firm-year observations in the period 1990–2012, we find negative and statistically significant relations between social capital and all three tax avoidance measures, holding all the aforementioned factors constant. When the level of the county's social capital increases from the 25th percentile to the 75th percentile in the data, our coefficient estimates translate into a reduction in tax avoidance as reflected by an increase of 0.62% in effective tax rates and an increase of 0.87% in cash effective tax rates, on average, implying an increase of annual tax expense and annual tax payment of $1.40 million and $1.96 million, respectively. These estimates are per firm and so the overall impact of a given change in social capital could be much larger at the aggregate level.

These results are robust and the estimated coefficients on social capital do not attenuate significantly when we control for differences in local religious adherence in the empirical models (Boone, Khurana, and Raman [2013]), suggesting that the documented relation is unlikely to be driven by local religious adherence at the county level. Moreover, the baseline results are also robust when we add additional control to isolate the differences in firm culture towards socially-irresponsible activities (Hoi, Wu, and Zhang [2013]), when we use long-run tax rates as alternative proxy for corporate tax avoidance (Dyreng, Hanlon, and Maydew [2008]), when we use organ donation as an alternate measure of social capital, and when we use county as well as firm fixed effect regressions to mitigate omitted variable concern.

We find corroborating evidence using a subset of sample firms with corporate headquarter relocations that result in either a decrease or an increase in social capital. In particular, we find that firms with a social-capital-increasing relocation display significantly lower post-relocation overtime changes in tax avoidance when compared to firms with a social-capital-decreasing relocation. We also find consistent results in instrumental-variable regressions with closest distance to the Canadian border and ethnicity homogeneity as instruments for social capital.

Finally, we use various measures to capture aggressive and deliberate corporate tax avoidance practices. We find that social capital is negatively and significantly associated with the level of uncertain tax positions based on Financial Accounting Standards Board (FASB) Interpretation No. 48 (Lisowsky, Robinson, and Schmidt [2013]), the probability that a firm undertakes a tax sheltering transaction in a given year (Wilson [2009]), the likelihood that a firm has an offshore tax haven subsidiary (Balakrishnan, Blouin, and Guay [2012]), and the probability that a firm is a "tax dodger" in a given year in that it reports a positive pre-tax income but pays no taxes.

Taken together, these findings indicate that firms with headquarters located in US counties with higher levels of social capital, vis-à-vis strong civic norms and dense associational social networks, display lower corporate tax avoidance. They provide fresh evidence bringing the social capital construct into the corporate tax research while pinning down civic norms as a social norm that affects corporate tax avoidance.

Prior economic studies have examined the effects of social norms and social environments on individual beliefs concerning the appropriateness of paying personal taxes (Alm and Torgler [2006]) and individual tax-paying behaviors such as tax compliance (Cummings, Martinez-Vazquez, McKee, and Torgler [2009]). On the other hand, business studies have explored the

effects of religious social norms on corporate tax avoidance (Dyreng, Mayew, and Williams [2012], Boone, Khurana, and Raman [2013]). However, all of these studies have neglected the relation between non-religious social environments and corporate tax decisions. Likewise, the same linkage remains largely unexplored in the extant research streams on both corporate tax and social capital.[4] This study provides comprehensive empirical evidence to fill this gap. Our findings suggest that there is a systematic and negative relation between corporate tax avoidance and social environment as captured by norms and networks surrounding corporate headquarters.

These findings contribute to the understanding of how social environments affect corporate decisions. McGuire, Omer, and Sharp [2012] find that local religious norms and networks surrounding corporate headquarters reduces the likelihood of financial reporting irregularities. Hong and Kacperczyk [2009] find that social norms against funding operations that promote vice constrain pension fund investments in publicly traded companies involved in producing alcohol, tobacco, and gaming. We find that, holding local demographical factors and local religiosity constant, non-religious social norms and networks surrounding corporate headquarters, as captured by our social capital construct, influence corporate tax decisions by cultivating a social environment that deters corporate tax avoidance practices. Collectively, we view all of these findings as complementary in that they point to an important insight: norms and networks in society constrain business practices that are inconsistent with the prescribed values and standards associated with the norms.

[4] The extant corporate tax research has traditionally followed the neo-classical economic approach and focused on the effects of firm-level and industry-level factors. See Hanlon and Heitzman [2010] for a recent review of this literature. The extant social capital research has focused on a variety of economic phenomena (e.g., Knack and Keefer [1997], Guiso, Sapienza, and Zingales [2004]); it rarely extends the analysis to the corporate setting; and those that do (Hasan, Hoi, Wu, and Zhang [2016], Hoi, Wu, and Zhang [2016], Jha and Chen [2015]) have likewise ignored the linkage between social capital and corporate tax avoidance.

Lastly, our findings contribute to an understanding of the "under-sheltering puzzle", which, according to Hanlon and Heitzman [2010], remains an open question in the literature. The under-sheltering puzzle refers to the observation that many firms appear to under-shelter by foregoing valuable tax planning opportunities as they seem willing to voluntarily pay higher taxes than their peers. Our results suggest that social capital, an environmental factor that has received little attention in the extant corporate tax research, could help explain the extent to which a firm under-shelters.

2. Literature review and hypothesis development

This section discusses the related literatures and formulates two hypotheses with different predictions on the relation between social capital and corporate tax avoidance.

2.1. Defining social capital as civic norms and social networks

Prior studies have deployed various operational definitions of social capital (Rupasingha, Goetz, and Freshwater [2006]) and found that social capital is an environmental factor affecting individual and organizational behaviors.[5] Guiso, Sapienza, and Zingales [2010] review these studies and conclude that the definitions of social capital are vague and excessively broad, arguing that economic research of social capital would benefit by using a definition of social capital that focuses on "the set of values and beliefs that help cooperation". Heeding this advice, we adopt the

[5] There is evidence that the levels of social capital across nations are positively associated with organizational efficiency (La Porta, Lopez-De-Silanes, Shleifer, and Vishny [1997]), aggregate productivity (Bloom, Sadun, and Van Reenen [2012]), and economic performance (Knack and Keefer [1997]) across nations. Additionally, there is evidence that provincial social capital in Italy encourages local residents to undertake economic behaviors that are socially cooperative (Buonanno, Montolio, and Vanin [2009]) and conducive to financial development (Guiso, Sapienza, and Zingales [2004]).

approach that identifies civic norms and social networks as key constituents of social capital (e.g., Woolcock [1998]).

By providing a set of common beliefs and an evaluation system for people to judge conducts, civic norms could constrain individual and organizational behaviors, including corporate behaviors, that are perceived as incongruent with the acceptable or appropriate standards, values, or beliefs associated with the prescribed norms (Buonanno, Montolio, and Vanin [2009]). Nevertheless, how civic norms are communicated and enforced depends on the connections and interactions among persons in the communities. Coleman [1988, p. S100] argues that "social capital exists in the relations among persons" because frequent social interactions and dense networks between people lead to greater, more effective information sharing, which, in turn, could result in better communication and enforcement of the prescribed norm. Additionally, Putnam [1993] argues that horizontal social ties among people (e.g., memberships in a bowling league) are more likely to instill "habits of cooperation, solidarity, and public-spiritedness" because these social ties provide interactions and connections both within and across networks that are more likely to be free of conflating or conflicting interests.

2.2. The prosocial view: negative relation between social capital and corporate tax avoidance

There is evidence that individuals in nations with different social environments have different intrinsic motivation to pay taxes, hereafter tax morale (Alm and Torgler [2006]), and different tax compliance (Alm, Sanchez, and De Juan [1995], Cummings, Martinez-Vazquez, McKee, and Torgler [2009]). As well, there is evidence that managers affect corporate decisions (Bertrand and Schoar [2003]) including corporate tax decisions (Dyreng, Hanlon, and Maydew [2010]); but, they are themselves influenced by social peers surrounding firms' headquarters such

as neighbors, social club members, parishioners, etc. (e.g., Hilary and Hui [2009], McGuire, Omer, and Sharp [2012]). Accordingly, social capital, vis-à-vis civic norms, could have a natural link to corporate tax avoidance. This is so because civic norms appeal to peoples' expectations of civic-minded, socially-cooperative behaviors. Moreover, the purported link could be particularly prevalent in the US because there is evidence that individuals in the US have especially high tax morale (Alm and Torgler [2006]) and annual IRS Taxpayer Attitude Surveys in the past decade consistently show that there is a widely shared belief among people in the US that all citizens, including corporations, have a civic duty to pay taxes.

Because civic duty to pay taxes is a prevalent societal expectation and civic norms emphasize civic duty and socially cooperative behaviors, people in communities with higher levels of social capital, vis-à-vis strong civic norms, are more likely to view tax avoidance as incongruent with the values associated with civic norms.[6] This, in turn, implies that managers of corporations headquartered in high-social-capital communities would anticipate higher psychic costs (Erard and Feinstein [1994]) and higher social sanctions (Coleman [1988]) associated with corporate tax avoidance when compared to managers from corporations headquartered in low-social-capital communities. Psychic costs include significant innate discomfort such as guilt, shame, and other negative moral sentiments; Elster [1989] argues that psychic costs are present even when the actual behaviors are unobserved. Social sanctions include social ostracism (Uhlaner [1989]) and stigmatization (Posner [2000]). These internal and external channels are detrimental to managers'

[6]There is evidence that individual taxpayers avoid less tax when there is higher tax morale in the external environment (Alm and Torgler [2006], Cummings, Martinez-Vazquez, McKee, and Torgler [2009]). Since individual taxpayers have to bear the full burden of the tax they pay, they should directly benefit from avoiding taxes. Accordingly, these findings imply that tax morale in the environment could mitigate individual tax avoidance even when individuals can benefit from avoiding taxes. Civic norms and tax morale both reflect societal expectations and norms. As such, it is plausible that social capital, vis-à-vis civic norms and social networks, could mitigate corporate tax avoidance regardless of who ultimately bear the burden of corporate taxes; that is, social capital could mitigate corporate tax avoidance even if the corporate tax burden is borne by social peers such as employees or the customers of the firm.

self-concept and social relationships (Cialdini and Trost [1998]) with respect to the social peers surrounding corporate headquarters. Consequently, they could increase the perceived marginal costs associated with corporate tax avoidance, incentivizing managers in corporations headquartered in high-social-capital communities to refrain from tax avoidance behaviors and behave in a way that conforms to the prescribed civic norms and to the expectations of their social peers in the communities (Kohlberg [1984]). We formulate the prediction from this perspective as follows.

> H_1: Corporate tax avoidance practices are negatively associated with the levels of social capital surrounding corporate headquarters.

2.3. The alternative view: no relation between social capital and corporate tax avoidance

Although people in local communities, particularly people in high-social-capital local communities, might view corporate tax avoidance as norm-deviant, all corporate peers do not necessarily share the same belief. For instance, some shareholders might view corporate taxes as unfair because equity income is double-taxed at the corporate level and the individual level. Moreover, those corporate executives and directors who are inclined to believe that corporations are more efficient than governments in resource allocation might perceive corporate tax payments as ineffective means of promoting social welfare and detrimental to economic growth. Ultimately, these views could culminate in "tax-mindedness" among some corporate peers.

In the US, in particular, "tax-minded" corporate peers could perceive tax minimization practices as acceptable means of conducting business operations and seek to actively implement strategies reducing a firm's tax burden. This is so because the US federal statutory corporate tax rate is as high as 35 percent, which is one of the highest among the world's developed economies; and, it is a generally accepted legal principle that all tax payers, including corporations, may organize their activities in such a way as to pay the least tax possible under the law (Weisbach

[2002]). Additionally, there is evidence that managers and directors in US corporations are economically incented to undertake actions to reduce corporate taxes (Rego and Wilson [2012]); and, under the pretext of fiduciary duty to shareholders, tax-minded corporate peers could construe tax minimization as beneficial to shareholders as tax savings might accrue to shareholders.

Just as social peers could influence managers, so could tax-minded corporate peers. As such, managers could face two conflicting norms when making corporate tax decisions: civic norms arising from social peers surrounding corporate headquarters and tax-mindedness arising from tax-minded corporate peers.

Social psychologists, such as Cialdini, Reno, and Kallgren [1990] and Cialdini, Kallgren, and Reno [1991], find that a social norm may not affect the behavior of an individual unless it is made salient in the situation. Moreover, when an individual faces conflicting norms, the one that becomes more salient is the norm from the social group that the individual identifies with (Terry and Hogg [1996], Terry, Hogg, and White [1999]). This is so because individual behaviors are purposive attempts to build and maintain social relationships and self-concept with respect to members of the social group that an individual identifies with (Cialdini and Trost [1998]).

In this context, if the influences of tax-minded corporate peers are overwhelming among constituents in the corporate sector, one would expect social peers to have minimal and insignificant influences on corporate tax decisions and that corporate tax decisions should consistently tilt in favor of undertaking tax planning practices to avoid corporate taxes.[7] Under this view, the levels of social capital surrounding corporate headquarters could have negligible or no

[7] Existing evidence is inconclusive on whether the influences tax-minded corporate peers overpower the influences of social peers in corporate tax decision making. For instance, the "under-sheltering" phenomenon (Weisbach [2002], Hanlon and Heitzman [2010]) indicate that both of these forces are at play as many corporations do not apparently avail themselves of tax avoidance opportunities but other firms engage in them actively (Dyreng, Hanlon, and Maydew [2008]).

systematic relation with tax avoidance practices of local corporations. We formulate the corresponding prediction as follows.

> H_2: Corporate tax avoidance practices and the levels of social capital surrounding corporate headquarters are not systematically related.

3. Research design, sample selection, and summary statistics

This section introduces the empirical measures for corporate tax avoidance and social capital, describes the baseline regression model and the sample selection procedure, and presents the summary statistics.

3.1. Measures of corporate tax avoidance

As in Dyreng, Hanlon, and Maydew [2010, p. 1164], we define "tax avoidance broadly to encompass anything that reduces the firm's taxes relative to its pre-tax accounting income." We use two widely used measures to capture consequences of broad tax avoidance practices. The first is the firm's effective tax rate (ETR) as defined under Generally Accepted Accounting Principles (GAAP). ETR is defined as total tax expenses, including both current and deferred tax expenses, divided by pre-tax book income before special items. The second measure is the firm's cash effective tax rate (CETR), which equals cash taxes paid divided by pre-tax book income before special items. Dyreng, Hanlon, and Maydew [2010] argue that ETR captures tax practices that reduce tax expenses for financial reporting purposes and CETR reflects those that reduce actual cash taxes paid. We use a third measure, *DTAX*, to capture the tax practices that drive a permanent difference between book income and taxable income (Frank, Lynch, and Rego [2009]). This measure is more likely to reflect deliberate attempt to avoid taxes. Appendix A presents detailed

definitions of these variables. Although our focus is not aggressive tax avoidance practices, we do provide corroborating evidence based on these practices. We discuss these results in Section 6.

For ease of exposition, we multiply ETR and CETR by -1 and use the transformed variables, *TA_ETR* and *TA_CETR*, as our corporate tax avoidance measures. By definition, a higher *TA_ETR*, *TA_CETR*, or *DTAX* implies a greater extent of corporate tax avoidance. So, negative associations between social capital and these tax avoidance measures are consistent with H_1.

3.2. Social capital measure

We construct the test variable, *Social capital*, based on the data provided by NRCRD at the Pennsylvania State University. NRCRD provides data on voter turnouts in presidential elections (*Pvote*), response rates in US census surveys (*Respn*), the total numbers of non-profit organizations (*Nccs*), and the total numbers of 10 types of social organizations for all US counties (*Assn)* in the years of 1990, 1997, 2005, and 2009. These data capture norms and networks in US counties. They are suitable for our analysis which focuses on the joint effects arising from county-level norms and networks. Appendix B describes these NRCRD data. Rupasingha, Goetz, and Freshwater [2006] describe in detail how to use the NRCRD data to measure social capital across US counties.

Because there are no legal or direct material incentives to vote or to participate in census surveys (Knack [1992], Guiso, Sapienza, and Zingales [2004]), the *Pvote* and *Respn* measures likely reflect individual behaviors that are manifestations of civic responsibilities, and, consequently, they are in tune with the social capital theory and our argument. On the other hand, the *Assn* and *Nccs* measures capture a wide range of horizontal social interactions across many

social networks, including non-profit organizations, social organizations such as sports clubs, public golf courses, bowling and fitness centers, and associations with a professional, business, political, religious, or other orientation. Coleman [1988] and Putnam [1993] argue that it is these kinds of network ties in the social environment that promote cooperation and reinforce the attendant civic norms of the networks. Accordingly, we use these four measures to build the social capital construct in our analysis. The variable, *Social capital*, is the first principal component from a factor analysis based on *Pvote*, *Respn*, *Assn*, and *Nccs*.

With the exceptions of *Assn* and *Nccs* in 1990 and 1997, we rely on the same data and same procedure NRCRD used to construct its social capital index. So our procedure produces estimates for *Social capital* in 2005 and 2009 that are identical to those social capital indexes in the NRCRD dataset. In 1990 and 1997, our estimates differ because we use only those 10 types of social organizations that are consistently reported in NRCRD to account for social organizations (*Assn)*. Additionally, we also estimate the number of non-profit organizations (*Nccs*) in 1990 ourselves. We find that it is necessary to estimate *Nccs* in 1990 because the corresponding data from NRCRD in that year seems incomplete: it reports very few non-profit organizations for many counties in 1990. Appendix B describes the estimation procedures for *Nccs* in 1990 and for the *Social capital* variable. In the end, *Social capital* in 1990 and 1997 are highly correlated with the corresponding social capital indexes reported in NRCRD. The corresponding Pearson correlation coefficients are statistically significant at the 1% level and they are 0.93 and 0.99, respectively.

Figure 1 contains a snapshot showing the spatial distribution of *Social capital* in 2005 for all US counties. We rank this variable and use the corresponding ranking variables to create this snapshot. A darker shade indicates a higher ranking (i.e., a higher quintile) of the corresponding variable. This snapshot shows that social capital is higher in upper Midwest/Northwest counties

and lower in Southeast and Southwest counties. Rupasingha, Goetz, and Freshwater [2006] provide similar spatial-distribution for social capital in 1997.

[Insert Figure 1 here]

3.3. Baseline regression model

We use the following empirical model to test our hypotheses

$$\textit{Tax avoidance}_t = f\,(\textit{Social capital}_t, \textit{firm attributes}_t, \textit{county attributes}_t, \textit{state statutory tax rate}_t, \textit{year dummies}, \text{ and } \textit{industry dummies}). \quad (1)$$

Tax avoidance is TA_ETR_t, TA_CETR_t, or $DTAX_t$ for a firm in year t. $Social\ capital_t$ is the social capital index in the county of the firm's headquarter location in year t. Following Chen, Chen, Cheng, and Shevlin [2010], we include a number of firm-level variables to control for the effects of firm size, profitability, liquidity, leverage, foreign operations, firm growth opportunities, and other firm attributes that are related to tax avoidance practices. Our social capital construct could reflect influences arising from behaviors of state legislatures and county-level demographical attributes including income inequality, income level, education, age, and rural/metro classification (Putnam [1995], Alesina and La Ferrara [2000], Rupasingha, Goetz, and Freshwater [2006]). Accordingly, we include state statutory tax rates and county-level demographical factors in the empirical models to control for such differences and to isolate the association between social capital and tax avoidance. By doing so, one is more confident that the estimated coefficients on $Social\ capital_t$ reflect residual variation in local social environment that is captured by our social capital construct and are not explained by these other factors. Lastly, we include dummy variables to control for year effects and two-digit SIC industry effects in the regression models. Appendix A presents detailed definitions and constructions of all these variables. Hereafter, we omit the subscript hereafter to ease the exposition and refer to this regression model as the baseline model.

3.4. Sample selection and summary statistics

We estimate the baseline model using data from three sources. We obtain company headquarter location information and financial information for all publicly traded firms with headquarters located in US counties between 1990 and 2012 from Standard & Poor's Compustat database. The Compustat source reports the latest location for which the firm's headquarter is located, creating a potential matching problem for firms that relocated their headquarters to other counties during the sample period. We resolve this issue by obtaining the firm's historical headquarter addresses using electronic 10-K filings from the Securities and Exchange Commission (SEC) Edgar database.[8] We use the state and county name of each firm's headquarter location to match the county-level social capital data from NRCRD and the county-level demographic data from the Bureau of Economic Analysis and the US Census Bureau.

We use NRCRD data to estimate the social capital index for four different years in 1990, 1997, 2005, and 2009 for all US counties. Thus, we have to fill in the data for the missing years using the estimated social capital index in the preceding year in which data are available; for example, we fill in missing data from 1991 to 1996 using the social capital index in 1990. This procedure is consistent with prior studies such as Hasan, Hoi, Wu, and Zhang [2016]. The final sample contains 63,807 firm-year observations for which data are available for all independent variables in the baseline regressions and at least one tax avoidance variable. It includes 8,702 unique firms with headquarters located in 823 unique US counties in the period 1990-2012.

[8] We are able to obtain SEC-mandated electronical 10-K filings as far back as 1993. We find that there are around 400 sample firms that moved their headquarters to other counties in the period 1994-2012, representing less than 5% of the firm-year observations in our sample. We are unable to obtain electronic 10-K filings in 1990, 1991, and 1992. We use the company's latest headquarter location as of 1993 as the headquarter location in 1990-1992. We find that results are qualitatively unchanged if we exclude these firm-years in 1990-1992 from the regressions.

Table 1 reports sample statistics for all variables used in the baseline regressions and sensitivity and auxiliary analyses. The mean values of effective tax rate and cash effective tax rate are 29% and 26%, respectively. The mean value of *DTAX* is 0.03. These sample statistics and the sample statistics for other variables capturing firm attributes are in the range of those in the extant literature (e.g., Frank, Lynch, and Rego [2009]; Dyreng, Hanlon, and Maydew [2010]). The standard deviation of *Social capital* is 0.869 and the corresponding inter-quartile spread ranges from -1.193 to 0.05, indicating significant variations in the levels of social capital. Indeed, given our empirical design, it is important that the data reflect meaningful and large variations in social capital, both cross-sectionally and across time. We explore these issues and report the corresponding findings in the online appendix. We find that there are significant and meaningful variations in social capital, both cross-sectionally and across time.

[Insert Table 1 here]

4. The relation between social capital and corporate tax avoidance

4.1. Results from the baseline model

Table 2 presents estimates of the baseline model using OLS regressions with county-level clustered standard errors. The dependent variables are *TA_ETR*, *TA_CETR*, and *DTAX*. The regressions for *TA_ETR* and *TA_CETR* contain 63,807 firm-year observations. The sample for the *DTAX* regression contains 32,241 firm-year observations. Sample attrition in the latter regression is primarily due to additional data requirements for constructing the *DTAX* variable.

[Insert Table 2 here]

The coefficients on *Social capital* are negative and significant at the 1% level across all models. They are -0.005, -0.007, -0.004 when we use *TA_ETR*, *TA_CETR*, and *DTAX* as the

dependent variable, respectively. They show that corporate tax avoidance practices of US corporations are significantly and negatively associated with the levels of social capital surrounding firms' headquarters after controlling for firm characteristics, county demographic factors, and state corporate tax rates. The finding is consistent with H_1.

Our results are economically significant. The *Social capital* estimate in the *TA_ETR* regression suggests that an increase of *Social capital* from the 25th percentile to 75th percentile in our data, from -1.193 to 0.05, would raise the effective tax rate by 0.62% (= 0.50% × (0.05+1.193)). Given that the mean value of pre-tax income for our sample is $226 million, the implied increase in annual tax expense amounts to $1.40 million. Likewise, the *Social capital* estimate in the *TA_CETR* regression implies that an inter-quartile increase in *Social capital* would raise the effective cash tax rate by 0.87% (= 0.70% × (0.05+1.193)), with an implied increase in annual tax payment of $1.96 million. By way of comparison, Chen, Chen, Cheng, and Shevlin [2010] report a 1.20% difference in cash effective tax rate between family and non-family firms.

These estimates of economic impact are per firm; they mask the economic significance of the aggregate impact of a change in social capital. Our sample has roughly 2,900 firms in a given year during the sampling period. Accordingly, rough approximation of corresponding aggregate impact on annual tax payment would be around 5.6 billions (= 1.96 million × 2900). By way of comparison, data from the U.S. Department of the Treasury indicate that the mean annual total share of corporate income taxes during the period 1990-2012 is roughly 187 billions. This implies that an increase of *Social capital* from the 25th percentile to 75th percentile in our data could increase the annual share of corporate income taxes by almost 3.0% (= 5.6 / 187) per annum.

4.2. Fixed-effect regression results: the effects of omitted variables

Although the baseline model includes firm attributes and county demographic factors, it might still omit some unknown firm or county characteristics which affect social capital and tax avoidance. To ease this concern, we use firm fixed-effect regressions and county fixed-effect regressions to control for the influences of unknown time-invariant firm-level and county-level factors, respectively. We report the corresponding results in Table 3, Panels A and B, respectively. We continue to estimate the baseline model, except that we replace industry dummies with dummy variables that capture either firm fixed-effects or county fixed-effects. For brevity, we report the estimates on *Social capital* only. Across all models and in both panels, the estimates on *Social capital* remain negative and statistically significant. They suggest that results from the baseline model are not plagued by significant omitted firm-level or county-level factors.[9] Additionally, we find similar results using managerial fixed-effect regressions (Dyreng, Hanlon, and Maydew [2010]) and region fixed-effect regressions. These results are reported in the online appendix.

[Insert Table 3 here]

4.3. The effect of local religious adherence and corporate irresponsibility

Recent studies find that local religious adherence affects corporate decisions (Hilary and Hui [2009], McGuire, Omer, and Sharp [2012], Boone, Khurana, and Raman [2013]). Also, the extent of socially irresponsible activities a firm undertakes (i.e., corporate irresponsibility) is positively related corporate tax avoidance (Hoi, Wu, and Zhang [2013]). If these attributes and

[9] These fixed effect models explore the influences of overtime variations in social capital within firm and within county, respectively. The online appendix presents evidence of meaningful variations in social capital overtime. While headquarter relocations could also produce overtime variations in social capital, results from fixed-effect models are largely driven by overtime variations in social capital in the absence of headquarter relocation. This is so because most firms did not relocate headquarters during the sampling period.

behaviors do not change overtime, the fixed effect regressions in Section 4.2 would have controlled for their corresponding effects. But, to the extent that these attributes and behaviors change overtime, they could create spurious associations in the baseline model.

In this section, we examine the latter possibilities by including additional controls for local religious adherence and corporate irresponsibility in the baseline model. As in Boone, Khurana, and Raman [2013], we measure local religious adherence using data from surveys conducted by the Association of Religion Data Archives (ARDA) in various years. The variable, *Religious adherence*, is the fraction of a county's population that claims affiliation with an organized religion in a given year as reported in the ARDA survey. Following Hoi, Wu, and Zhang [2013], we use the total number of corporate activities that are perceived as detrimental to stakeholders to capture corporate culture that is more predisposed to undertake socially irresponsible activities. We use a dummy variable, *Corporate irresponsibility*, to capture this effect. *Corporate irresponsibility* equals one if a firm has more than three negative social ratings in a year and it equals zero otherwise. Negative social ratings are aggregated across the seven categories of corporate activities evaluated by KLD Research & Analytics. The seven categories include corporate governance, employee relations, environment, community, diversity, human rights, and product quality and safety.

Table 4 presents the results. We add *Religious adherence* to the baseline model in Models 1 to 3. We add both *Religious adherence* and *Corporate irresponsibility* to the baseline model in Models 4 to 6. The sample sizes in these regressions drop significantly, especially in Models 4 to 6. This is so because KLD covers at most 3,000 US companies after year 2003 and far fewer companies before that.

[Insert Table 4 here]

If the results from our baseline models are driven by religious adherence or corporate irresponsibility, or both, one would expect the estimated coefficients on *Social capital* to substantially attenuate in these models. The results in Table 4 provide little evidence to support this conjecture. Across all six models, the coefficients on *Social capital* remain negative and significant at either the 1% or the 5% level and their magnitudes are comparable to those in the baseline models, which do not include controls for *Religious adherence* and *Corporate irresponsibility*. These results are consistent with the prediction of H_1. They show that the negative relation between social capital and tax avoidance is unlikely to be driven by local religious adherence or corporate irresponsibility, or both.

4.4. Using organ donation as an alternative proxy for social capital

Guiso, Sapienza, and Zingales [2004] use blood donation across Italian provinces as an alternative measure of social capital. Following these authors, we use organ donation data to construct an alternative empirical proxy for social capital in the US. Ideally, we prefer county-level organ donation data. However, we are only able to obtain state-level organ donation data in the US from the Organ Procurement and Transplantation Network (OPTN). The OPTN is a unified transplant network established by the United States Congress under the National Organ Transplant Act of 1984. We obtain the state-level organ donation data from the website of OPTN. Specifically, we obtain the annual total number of organ donors in each state in the US for our sample period, from 1990-2012. *Organ donation* is the state-level per capita organ donor multiplied by 1,000.[10]

[10] State-level per capita organ donor is the total number of organ donors in a state in a given year divided by total state population in that year. Donor is a person from whom at least one organ or tissue is recovered for the purpose of transplantation. A donor could be deceased or living. A deceased donor is a person who has been declared dead using either brain death or cardiac death criteria, from whom at least one vascularized solid organ is recovered for the purpose of organ transplantation. A living donor is a living person who donates an organ or segment of an organ for the intent of transplantation. Organ donation data can be obtained from the OPTN via the link: http://optn.transplant.hrsa.gov/latestData/stateData.asp?type=state. The data for some states with smaller populations,

We modify the baseline model by replacing *Social capital* with *Organ donation*. Table 5 reports the results. We find that the estimates on *Organ donation* are negative and significant across all models, suggesting that our main finding is robust to the alternate measure of social capital.

[Insert Table 5 here]

As before, we find that the results are economic significant based on per firm estimates. However, the relative magnitudes are smaller when compared to the corresponding implied effects obtained in the baseline regressions. The estimate in the *TA_ETR* regression suggests that an increase of *Organ donation* from the 25th percentile to 75th percentile in our data, from 0.031 to 0.047, would raise the effective tax rate by 0.202% (= 12.6% × (0.047-0.031)), with an increase in annual tax expense amounts to $0.46 million. Likewise, the *Organ donation* estimate in the *TA_CETR* regression implies that an inter-quartile increase in *Organ donation* would raise the effective cash tax rate by 0.328% (= 20.5% × (0.047-0.031)), with an implied increase in annual tax payment of $0.74 million. The corresponding coefficients in the baseline models translate into an increase of 0.62% in effective tax rates and an increase of 0.87% in cash effective tax rates, implying an increase of annual tax expense and annual tax payment of $1.40 million and $1.96 million per firm, respectively.

4.5. Alternate measures of tax avoidance based on ETR or CETR

A firm is more tax aggressive if it pays significantly lower taxes when compared to peer firms belonging to the same industry. We use dummy variables to capture firms paying significantly lower taxes than their industrial counterparts in a given year. *Low_ETR* equals one if

such as Alaska, Delaware, Idaho, and New Hampshire, are missing. Therefore, we have fewer observations for the analysis when we use *Organ donation* as an alternative social capital measure. The final sample contains 55,415 firm-year observations. The Pearson correlation coefficient between *Organ donation* and the state-level mean values of *Social capital* across counties is 0.38 and it is significant at the 1% level.

a firm's ETR belongs to the bottom quintile of the ETR distribution for all firms with the same two-digit SIC code in a given year, and zero otherwise. *Low_CETR* is constructed analogously to capture firms paying lower CETR when compared to their industrial counterparts. The variables *Low_ETR* and *Low_CETR* capture firms that pay few taxes, but they do not necessarily reflect the most egregious cases of tax avoidance practices. For instance, they do not precisely capture those companies that the Center of Tax Justice (CTJ) labels as "tax dodgers", namely companies that are profitable but pay no corporate taxes. We use two dummy variables to capture tax dodging firms per CTJ's definition. *ETR_Dodger* equals one if a firm has a positive pre-tax profit and a zero ETR in a given year, and zero otherwise. *CETR_Dodger* equals one if a firm has positive pre-tax profit and a zero CETR in a given year, and zero otherwise.

We use these dummy variables as the dependent variables in logistic regressions. We use the same set of independent variables as specified in the baseline model. Table 6 presents the results from these regressions. Models 1 and 2 predict the likelihood that a firm pays significantly lower taxes when compared to its industrial counterparts. Models 3 and 4 predict the likelihood that a firm dodges taxes in a given year. Across all four models, we find that the coefficients on *Social capital* are negative and significant, indicating that firms located in higher social capital counties are less likely to dodge taxes in a given year and they are less likely to pay significantly lower tax rates when compared to their industrial counterparts in a given year.

[Insert Table 6 here]

Following Dyreng, Hanlon, and Maydew [2008], we use long-run tax rates measured over a five-year period as an alternative measure. A firm that is successfully in avoiding taxes year after year can be perceived as an aggressive tax-avoider. *TA_ETR5* is (-1) times the ratio of total tax expense scaled by total pre-tax income net of total special items averaged over a five-year period.

TA_CETR5 is (-1) times the ratio of total tax paid scaled by total pre-tax income net of total special items averaged over a five-year period. We use *TA_ETR5* and *TA_CETR5* as the dependent variables, and we use the same set of independent variables as specified in the baseline model. Models 5 and 6 of Table 6 report the results of the OLS regressions of *TA_ETR5* and *TA_CETR5*, respectively. The coefficients on *Social capital* remain negative and statistically significant, indicating a negative association between long-run corporate tax avoidance and the levels of social capital surrounding firms' headquarters in US counties.

4.6. Other robustness checks

We perform a range of analyses to ensure the robustness of our baseline regression results. In all of these robustness checks, we find that the estimates of *Social capital* remain negative and statistically significant, indicating a robust, negative relation between social capital and tax avoidance. The analyses are as follows and all of the corresponding results are reported in the online appendix.

The social capital variable is essentially based on data in four different years: 1990, 1997, 2005, and 2009. Thus far, we fill in data for the missing years using values of the social capital variable in the preceding year in which data are available. This procedure might lead to estimates with overstated statistical significance. To ease this concern, we run the regressions using a reduced sample limited to the four years in which social capital data are in fact available, namely 1990, 1997, 2005, and 2009. Additionally, following Alesina and La Ferrara [2000] and Hilary and Hui [2009], we estimate the regressions using linearly interpolated social capital data which involve generating the values in the missing years, namely from 1991 to 1996, from 1998 to 2004, and from 2006 to 2008, by linear approximation. Lastly, we include additional variables to the

baseline regression model to control for 1) the effects of CEO equity incentive (Rego and Wilson [2012]) and discretionary accruals (Frank, Lynch, and Rego [2009]) and 2) the effects of government quality and tax enforcement (Slemrod [2003]), respectively.

5. Corroborating evidence

5.1. Evidence from social-capital-changing corporate relocations

Thus far, we find that the levels of social capital surrounding corporate headquarters are significantly and negatively related to corporate tax avoidance practices. These findings are consistent with H_1, and they imply that the levels of social capital surrounding corporate headquarters contribute to social environments that constrain corporate tax avoidance. Although results in Section 4.2 exploit the effects associated with overtime changes in social capital, they do not solely focus on firms with headquarter relocation that changes the firm's exposure to social capital. We conduct such an analysis in this section.

If the levels of social capital surrounding corporate headquarters contribute to social environments that constrain corporate tax avoidance, one would expect tax avoidance to decrease (increase) after a firm relocates its headquarter to a different county with a higher (lower) level of social capital. Accordingly, we use an alternative empirical design that involves firms that undertook a social-capital-changing corporate relocation to re-examine our hypotheses. In particular, we compare the overtime changes in tax avoidance, before and after the relocation, across firms with a social-capital-increasing relocation and firms with a social-capital-decreasing relocation.

We use corporate headquarter addresses as reported in a firm's 10-K filings to identify social-capital-changing relocation events. A social-capital-changing relocation event occurs when

a firm reports headquarter addresses in two different counties in its 10-K filings in two successive years. We require that all relocated firms have at least two years of data before and after the year of the relocation. Moreover, we require that relocated firms have the same old headquarter location in 10-K filings in the two years immediately preceding the relocation event and the same new headquarter location reported in 10-K filings in the two years immediately after the relocation event. Mandatory electronic SEC filings began in 1993. So, we are able to identify social-capital-changing relocation events starting in 1995 and ending in 2010 because data for 1993 and 1994 are required for relocations in 1995 and data for 2011 and 2012 are required for relocations in 2010.

We identify 462 social-capital-changing relocations for all Compustat firms in the period 1995–2010. Of these, 382 relocations were undertaken by firms in our sample for which we have complete data to perform the analysis. To avoid confounding time windows, we purge another 98 firms with multiple relocation events during the sample period and rely on a sample that contains 284 firms with a unique social-capital-changing relocation in the period 1995–2010.[11] In the end, we have 145 firms with a unique social-capital-increasing relocation and 139 firms with a unique social-capital-decreasing relocation.

For these 284 firms, we directly extract the corresponding data and variables from the sample of 63,807 firm-year observations that we use in the baseline regressions, resulting in a sample containing firm-year observations that straddle the year of the relocation. We then exclude data in the year of the relocation because the level of social capital in that year is changing and therefore indeterminate. The final sample contains 2,280 firm-year observations spanning the time

[11] The results are weaker but the tenet of the findings remain if we keep the first relocation event for those firms with multiple relocations during the sample period. These results are reported in the online appendix.

period 1993–2012. Of these, 1,199 are from the pre-relocation window and 1,081 are from the post-relocation window.

We use variables and corresponding firm-year data that are identical to those we employ in baseline regressions as reported in Table 2. The empirical specifications for the regression models are identical to the baseline models, except that we drop the year dummies and we replace the social capital variable with *After*, *Social_capital_increasing relocation*, and the interaction variable, *After* × *Social_capital_increasing relocation*. All variables are in the levels and they are as described in Section 3 and in the Appendix A. *After* is a dummy variable that equals one if the firm-year observation is from the period after the relocation; it equals zero if the observation is from the period before the relocation. *Social_capital_increasing relocation* is a dummy variable that equals one if a firm relocated its headquarter to a different county with a higher level of social capital; it equals zero if a firm relocated its headquarter to a county with a lower level of social capital. We drop the year dummies because *After* partially captures the year effects. Our results hold if we include year dummies in the model (these results are not tabulated).

We are particularly interested in the coefficient of the interaction variable because it provides an estimate of the difference in the overtime change in corporate tax avoidance between firms with a social-capital-increasing relocation and firms with a social-capital-decreasing relocation across the two periods straddling the relocation event. Table 7, Panel A, reports the results. Across all models, we find that the coefficients on the interaction variable are all negative and statistically significant. These results show that firms with a social-capital-increasing relocation display significantly lower post-relocation overtime changes in tax avoidance when compared to firms with a social-capital-decreasing relocation.

[Insert Table 7 here]

These results would be more credible if one can show that firms with social-capital-increasing relocations and social-capital-decreasing relocations are comparable in firm attributes and tax avoidance prior to relocations. Such evidence would lend credence to the argument that the observed differences in the overtime changes in tax avoidance practices among the sampled firms are attributable to the corporate relocation decisions. We use the Student's *t*-test to formally test whether firm characteristics and tax avoidance practices are systematically different across the social-capital-increasing firms and the social-capital-decreasing firms during the year immediately prior to the relocation event. Results reported in Panel B of Table 7 suggest that there are no significant differences between the two sets of firms in any of the dimensions examined, suggesting that our sampled firms are comparable.

Another criticism is that corporate headquarter relocation decisions could be endogenous. As such, one should interpret the results from the relocation analysis with caution. While they do not demonstrate causality, they do provide evidence to confirm the negative association between social capital and corporate tax avoidance in an alternative empirical setting, lending additional support to H_1.

5.2. Evidence from instrumental-variable regressions

Our baseline model includes common determinants of tax avoidance and we use firm fixed-effect regressions to mitigate time-invariant omitted variable bias. However, a potential concern is that these models could still be affected by time-variant omitted variables correlated with social capital and tax avoidance. For instance, random shocks in the economy that affect both corporate tax avoidance and social capital could create potential issues of endogeneity in our estimation. We use instrumental-variable approach to partially mitigate this concern.

We identify two instrumental variables for social capital. Putnam [2001, p. 48] finds that "the best single predictor of the level of social capital in American states is distance to the Canadian border" and argues that this is because "slavery as a system and the post-slavery reconstruction period were institutionally designed to destroy social capital." We use *Log*(*Distance*) as our first instrument and expect that it is negatively associated with social capital. *Log*(*Distance*) is the natural logarithm of the closest distance between the Canadian border and the county in which the firm's headquarter is located. The second instrument, *Ethnicity homogeneity*, is a Herfindahl index calculated across four basic Census tract ethnic categories including Hispanic, non-Hispanic black, non-Hispanic white, and Asian in a county during a given year. Putnam [2007, p. 167] argues that "this standard measure is best interpreted as the likelihood that any two individuals randomly selected from a given community will be from the same category." He finds that ethnic homogeneity increases "social solidarity and social capital." Accordingly, we expect that *Ethnicity homogeneity* is positively correlated with social capital.

There are evidence that these instruments satisfy the exclusion restriction. We find no prior theoretical argument or empirical evidence linking the instruments to corporate tax avoidance. Moreover, in our context, a proper instrument should have a strong correlation with social capital and no direct effect on corporate tax avoidance. We examine the latter condition by including the two instruments as additional control variables in the baseline model. We find that they are uncorrelated with any tax avoidance measure and have no explanatory power in the regresisons. These results are reported in the online appendix.

Table 8, Model 1, reports the representative results from the first-stage regressions.[12] *Social capital* is the dependent variable in this model. Along with the two instrumental variables,

[12] Model 1 contains the first-stage regression results for *TA_ETR* and *TA_CETR* because regression sample involving these variables is identical. The first-stage regression for the instrumental-variable analysis on *DTAX* is based on a

we include all control variables as specified in the baseline model. The coefficients on both instrumental variables are highly significant and they are consistent with the arguments of Putnam [2001, 2007]. Moreover, the Cragg-Donald *F*-statistic is 32.28, which is above the critical cutoff as stated in Stock and Yogo (2005), indicating that our instruments are relevant.

[Insert Table 8 here]

The second-stage regressions are based on the baseline models, except that the key independent variable is the *Fitted social capital* obtained from the first-stage regression. Models 2 to 4 of Table 8 report the second-stage regression results. Across all models, we perform tests of overidentifying restrictions via the Hansen J-statistics. We find that the J-statistics are not significant at the conventional levels.

More to the point, the coefficients on *Fitted social capital* are negative and statistically significant in all models. Both the level of statistical significance and the magnitudes of the coefficients on *Fitted social capital* are comparable to those on *Social capital* from the baseline model (Table 2). These findings suggests that our OLS estimates in the baseline model are not severely biased, mitigating the concern that our baseline results could be plagued by the omitted variable bias.

6. Evidence from aggressive tax avoidance beyond state and local government influences

So far, the findings indicate that the levels of social capital surrounding firms' headquarters are negatively associated with tax avoidance practices that reduce a firm's taxes relative to its pre-tax accounting income. However, state and local governments could have significant influences over firms' tax bills and differences in tax policies across these government bodies could

smaller sample but the results are qualitatively identical. For brevity, we do not report this specific first-stage regression.

potentially influence our findings. For example, corporate tax rates could be lower for companies headquartered in states or localities where government policies provide significant tax incentives for companies to invest in local geographical areas or specific assets and technologies. We examine the validity of this conjecture using measures of aggressive tax avoidance behaviors that are not necessarily in the control of either state or local government tax authorities. A negative association between social capital and these alternate aggressive tax avoidance measures is inconsistent this conjecture; and, it provides further evidence in support of H_1.

We use tax sheltering activities and the level of unrecognized tax benefits (UTB) that a firm discloses in pursuant to FASB Interpretation No. 48 to capture tax aggressiveness. UTB reflects a firm's uncertain tax positions that could be disallowed by the IRS if audited. Lisowsky, Robinson, and Schmidt [2013] and Hoi, Wu, and Zhang [2013] use UTB balances to capture a firm's tax aggressiveness in terms of uncertain tax positions. Following these researchers, we define *Log(UTB)* as the natural logarithm of (1 + TXTUBEND), where TXTUBEND is the end-of-year UTB balance for a firm in a given year as reported in the Compustat database.

Using actual tax sheltering cases, Wilson [2009] establishes several empirical models that predict the likelihood that a firm is currently engaging in tax sheltering activities. These models allow researchers to use publicly available financial and accounting information to estimate concurrent sheltering probabilities. Following Rego and Wilson [2012], we use the model as reported in Table 5, Column 3 in Wilson [2009] to estimate a tax sheltering probability for each Compustat firm with sufficient data in each year. We use a dummy variable to capture the incidence in which a firm's annual sheltering probability ranks in the top quartile of the corresponding distribution in the year. Specifically, *Dummy(Shelter)* equals one if a firm's

sheltering probability in a year is in the top quartile of the corresponding distribution in that year, and zero otherwise.

Additionally, we use a dummy variable to capture those firms with at least one offshore tax haven subsidiary because there is a widespread concern among policy makers and government agencies that US companies are using offshore tax haven subsidiaries to avoid taxes in the US. For instance, the US Congress held a series of hearings in 2006, 2012, and 2013 to examine the impact of offshore tax haven abuses on tax base erosion and profit shifting by multinational corporations. Specifically, *Dummy(Tax haven)* equals one if a firm has at least one offshore tax haven subsidiary, and zero otherwise. The list of tax haven countries is based on information provided by Dyreng and Lindsay [2009] and Scott Dyreng's personal webpage (https://sites.google.com/site/scottdyreng/Home/data-and-code).

We use these measures of tax aggressiveness as alternative dependent variables in the baseline model. Table 9 reports the results. Model 1 is based on OLS regression with *Log(UTB)* as the dependent variable. Models 2 and 3 are based on logistic regressions with *Dummy(Shelter)* and *Dummy(Tax haven)* as the dependent variables, respectively. Sample sizes differ across the models because data requirements for the alternative tax aggressiveness measures vary. In particular, since FIN 48 was enacted in 2006 the sample in Model 1 contains only firm-years during the period 2007-2012. Nevertheless, results across all models are consistent. The coefficients on *Social capital* are all negative and significant, indicating that firms with headquarters located in higher social capital counties have fewer uncertain tax positions, are less likely to engage in tax sheltering transactions in a given year, and are less likely to have an offshore tax haven subsidiary.

[Insert Table 9 here]

7. Additional analyses

7.1. The relation between social capital and tax avoidance in geographically-diversified firms

Our empirical construct for social capital captures the influences of social peers surrounding corporate headquarters. We interpret the negative relation between social capital and tax avoidance as indicating that social peers surrounding corporate headquarters affect corporate tax decisions. This interpretation implies that the negative relation between social capital and tax avoidance could attenuate significantly for geographically-diversified firms with a significant presence in many non-headquarter localities. This is so because in geographically-diversified firms social peers in non-headquarter locations could also affect corporate tax decisions and the influences from social peers in headquarter and non-headquarter locations need not be perfectly correlated. We examine this possibility using material subsidiary disclosures in Exhibit 21 in 10K filings as required by the SEC. The data are collected and provided by Dyreng Scott via his personal website at https://sites.google.com/site/scottdyreng/Home/data-and-code.

Ideally we would like to use county-level data for material subsidiaries. However, it is not feasible since Exhibit 21 disclosures do not contain this level of information. Consequently, we define a geographically-diversified firm as a firm that reports material subsidiaries in at least four different states in a given year. This cutoff is chosen as most firms, about 75% of the sample, report material subsidiaries in fewer than four states in any given year. The dummy variable, *High*, equals to one if a firm has material subsidiaries in at least four different states in a given year, and it equals zero otherwise. We modify the baseline regression model by adding two variables to the specification, namely *High* and an interaction term, *Social capital* × *High*. Table 10 reports the results.

[Insert Table 10 here]

Across all models, the coefficients on *Social capital* remain negative and statistically-significant at the 1% level, indicating a negative relation between social capital and corporate tax avoidance among firms that do not have high geographical diversification. We are particularly interested in the coefficient on the interaction term, *Social capital* × *High*, because it captures the incremental effect of social capital on geographically-diversified firms. In Models 1 and 2, we find that the variable of interest, *Social capital* × *High*, is positive and statistically significant at the 1% level and the 10% level, respectively. In Model 3 where *DTAX* is the dependent variable, the corresponding coefficient is positive, although it is not statistically significant at the conventional levels. These empirical regularities suggest that the negative relation between social capital and corporate tax avoidance does attenuate for firms with very high geographical diversification.

7.2. Effects of civic norms and social networks: an exploratory analysis

So far, our findings suggest that social capital in US counties, as captured by the strength of civic norms and the density of social networks, provide environmental influences constraining corporate tax avoidance of companies headquartered in the counties. Our argument—one that follows the convention of social capital theory of Coleman [1988], Putnam [1993], and Woolcock [1998]—is that both strong civic norms and dense social networks are needed to cultivate such an environment. Nevertheless, it is plausible that norms and networks could have separate and distinct effects on corporate tax avoidance. In this section, we perform an exploratory analysis to provide tentative evidence on this issue.

Our main test variable, *Social capital*, is the first principal component from a factor analysis based on *Pvote*, *Respn*, *Assn*, and *Nccs*. Following Rupasingha, Goetz, and Freshwater [2006], we use the first principal component from a factor analysis based on *Pvote* and *Respn* to

capture the strength of civic norms in a county, creating the *Civic norm* variable. We use the first principal component from a factor analysis based on *Assn* and *Nccs* to capture the density of social networks in a county, creating the *Social network* variable.

Table 11 presents results from three regressions based on the baseline model while using *Civic norm* and *Social network* in place of the original test variable, *Social capital*. We continue to use *TA_ETR*, *TA_CETR*, and *DTAX* as the corporate avoidance measures. Across all models, the estimates on *Civic norm* and *Social network* are negative; in five of six cases the estimates are also statistically significant at the critical levels of 10% or 5%. These findings tentatively indicate that both civic norms and social networks provide external social influences constraining corporate tax avoidance.[13]

[Insert Table 11 here]

8. Conclusion

We provide a comprehensive empirical analysis on the relation between social capital and a specific corporate behavior, namely corporate tax avoidance. We use empirical measures to capture broad consequences of tax avoidance practices that reduce the firm's taxes relative to its pre-tax accounting income. The results indicate that firms headquartered in US counties with higher levels of social capital, as captured by strong civic norms and dense social networks, have

[13] We also examine the associations between social capital and tax avoidance measures based on decomposed federal, foreign, and state effective tax rates of corporations (Gupta and Mills [2002], Dyreng, Lindsey, and Thornock [2013]). If social environments in local areas are more likely to affect corporate behaviors with greater local ramifications, one would expect a significant relation with respect to state taxes and perhaps a less significant, or even insignificant, relation with respect to foreign taxes. We find a significant and negative relation between federal tax avoidance and social capital. As well, there is a significant and negative relation between foreign tax avoidanc and social capital. However, the relation between social capital and state tax avoidance is statistically insignificant at conventional levels. These results indicate that there could be complex interactions between social capital and corporate tax avoidance practices that specifically relate to foreign, federal, or state taxes. We thank the referee for providing insights and guidance on these issues.

higher tax rates and lower discretionary permanent book-tax differences. These results provide evidence that social capital helps to cultivate a social environment surrounding corporate headquarters that deters corporate tax avoidance practices. Further, they point to an important insight that civic norms and social networks in society help to cultivate an environment that constrains business practices that are inconsistent with the prescribed values and standards associated with the norms.

The implications are quite broad because tax avoidance practices, particularly those which we examine in our main analysis, do not necessarily imply illegal or even improper corporate activities. Given that tax laws are subject to varied interpretations, our tax avoidance measures likely reflect the consequences of those tax decisions that are squarely in compliance with the law, as well as those that are taking advantage of the law's varied interpretations. Accordingly, if social capital matters in corporate decisions related to taxes, it could also matter in non-tax-related corporate behaviors that are incongruent with the prescribed values of civic norms. We leave these potential issues for future research to explore.

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Table 1
Summary statistics

The sample contains 63,807 firm-year observations during 1990–2012. Tax avoidance variables are *TA_ETR*, *TA_CETR*, and *DTAX*. *TA_ETR* is (-1) times effective tax rate. *TA_CETR* is (-1) times cash effective tax rate. *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference. *Social capital* is a county-level social capital index based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. Appendix B describes the NRCRD data and the procedures used for constructing *Social capital*. Other variables used in baseline regressions are defined in Appendix A.

Variables	N	Mean	S.D.	Min	P25	P50	P75	Max
Panel A: Variables used in baseline regressions								
TA_ETR	63,807	-0.288	0.181	-1.000	-0.382	-0.330	-0.186	0.000
TA_CETR	63,807	-0.257	0.223	-1.000	-0.362	-0.240	-0.072	0.000
DTAX	32,241	0.030	0.218	-0.977	-0.015	0.002	0.030	1.942
Social capital	63,807	-0.530	0.869	-3.578	-1.193	-0.486	0.050	7.339
Size	63,807	5.913	2.081	0.940	4.452	5.894	7.303	11.020
M/B	63,807	2.604	2.897	-4.490	1.178	1.850	3.062	18.530
Leverage	63,807	0.224	0.205	0.000	0.041	0.189	0.352	0.939
Cash holding	63,807	0.135	0.166	0.000	0.019	0.063	0.190	0.749
NOL	63,807	0.256	0.436	0.000	0.000	0.000	1.000	1.000
Change NOL	63,807	0.0002	0.060	-0.236	0.000	0.000	0.000	0.168
ROA	63,807	0.071	0.088	-0.141	0.020	0.052	0.100	0.547
Equity income	63,807	0.0009	0.005	-0.008	0.000	0.000	0.000	0.039
PPE	63,807	0.299	0.280	0.000	0.081	0.228	0.431	1.306
Intangible assets	63,807	0.128	0.211	0.000	0.000	0.030	0.168	1.400
Dummy(*Foreign income*)	63,807	0.263	0.440	0.000	0.000	0.000	1.000	1.000
Median income	63,807	10.425	0.337	9.329	10.201	10.389	10.610	11.654
Income inequality	63,807	1.323	0.158	1.035	1.236	1.291	1.364	1.970
Dummy(Urban)	63,807	0.679	0.467	0.000	0.000	1.000	1.000	1.000
Education	63,807	3.323	0.339	1.686	3.127	3.325	3.546	4.231
Age	63,807	3.524	0.074	3.114	3.481	3.517	3.575	3.995
State corporate tax rate	63,807	0.068	0.031	0.000	0.055	0.077	0.090	0.138
Panel B: Additional variables used in sensitivity and auxiliary analyses								
Dummy(Shelter)	36,567	0.229	0.420	0.000	0.000	0.000	0.000	1.000
Dummy(Tax haven)	12,772	0.448	0.497	0.000	0.000	0.000	1.000	1.000
Log(UTB)	6,812	2.080	2.326	-6.908	0.516	2.072	3.689	8.944
Civic norms	63,807	0.111	0.931	-2.999	-0.655	0.132	0.819	3.246
Social network	63,807	-0.573	0.778	-2.264	-1.126	-0.758	-0.256	9.451
Organ donation	55,415	0.041	0.017	0.001	0.031	0.038	0.047	0.129
Log(Distance)	63,807	5.727	0.952	0.095	5.288	5.576	6.604	7.193
Ethnicity homogeneity	63,807	0.663	0.123	0.326	0.597	0.660	0.719	0.986
Religious adherence	63,704	0.549	0.128	0.143	0.447	0.551	0.640	1.000
Corporate irresponsibility	22,070	0.103	0.259	0.000	0.000	0.000	0.000	1.000

Table 2

Baseline regressions: the relation between social capital and corporate tax avoidance

The sample contains 63,807 firm-year observations during 1990–2012. The dependent variable is *TA_ETR*, *TA_CETR*, or *DTAX*. *TA_ETR* is (-1) times effective tax rate. *TA_CETR* is (-1) times cash effective tax rate. *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference. By definition, a higher *TA_ETR*, *TA_CETR*, or *DTAX* implies a greater extent of corporate tax avoidance. *Social capital* is based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. All variables are defined in Appendix A. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
Social capital	-0.005***	-0.007***	-0.004***
	(-3.25)	(-3.23)	(-2.72)
Size	-0.004***	-0.006***	-0.010***
	(-5.46)	(-8.75)	(-9.43)
M/B	0.001***	0.002***	-0.001
	(2.74)	(4.51)	(-1.31)
Leverage	0.055***	0.086***	0.051***
	(7.64)	(9.71)	(4.72)
Cash holding	0.025**	0.026*	-0.005
	(2.36)	(1.90)	(-0.45)
NOL	0.022***	0.054***	0.027***
	(7.30)	(13.68)	(7.17)
Change NOL	-0.148***	-0.294***	0.223***
	(-5.06)	(-10.53)	(4.38)
ROA	-0.043**	0.206***	0.472***
	(-2.51)	(13.09)	(11.94)
Equity income	0.736***	1.113***	-0.536*
	(3.09)	(3.95)	(-1.82)
PPE	-0.018**	0.058***	-0.019**
	(-2.36)	(5.98)	(-2.41)
Intangible assets	-0.042***	-0.007	0.089***
	(-7.38)	(-1.18)	(7.52)
Dummy(Foreign income)	-0.005	-0.005	-0.002
	(-1.58)	(-1.37)	(-0.51)
Income per capital	-0.017	0.007	0.013
	(-1.61)	(0.37)	(0.88)
Income inequality	0.001	-0.023*	-0.004
	(0.11)	(-1.66)	(-0.34)
Dummy(Urban)	-0.000	-0.002	0.005
	(-0.14)	(-0.51)	(1.18)
Education	0.024***	0.019*	-0.006
	(3.28)	(1.80)	(-0.66)
Age	0.020	-0.010	-0.005
	(1.03)	(-0.31)	(-0.20)
State corporate tax rate	-0.020	-0.036	-0.013
	(-0.57)	(-0.63)	(-0.33)
Industry and year dummies	Yes	Yes	Yes
Number of observations	63,807	63,807	32,241
Adjusted R^2	0.127	0.121	0.071

Table 3
Sensitivity analysis: the effect of omitted variables

The sample contains 63,807 firm-year observations during 1990–2012. The regression models are

TA_ETR, *TA_CETR*, or *DTAX = f* (*Social capital*, *firm attributes*, *county demographics*, *state corporate income tax rate*, *firm fixed-effects*, and *year dummies*), and

TA_ETR, *TA_CETR*, or *DTAX = f* (*Social capital*, *firm attributes*, *county demographics*, *state corporate income tax rate*, *county fixed-effects*, and *year dummies*), respectively for Panel A and Panel B.

TA_ETR is (-1) times effective tax rate, *TA_CETR* is (-1) times cash effective tax rate, *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference, and *Social capital* is based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. Firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics include *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. All variables are defined in Appendix A. For brevity, we report the estimates for *Social capital* only. Standard errors are clustered at the county level. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
Panel A: Firm fixed-effect			
Social capital	-0.008***	-0.013***	-0.012*
	(-2.68)	(-3.25)	(-1.86)
All controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	63,807	63,807	32,241
Adjusted R^2	0.328	0.298	0.138
Panel B: County fixed-effect			
Social capital	-0.010***	-0.013***	-0.010*
	(-3.32)	(-3.60)	(-1.77)
All controls	Yes	Yes	Yes
County fixed effects	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	63,807	63,807	32,241
Adjusted R^2	0.062	0.092	0.065

Table 4

Sensitivity analysis: the effect of religiosity and corporate irresponsibility

The regression models for Models 1 to 3 and for Models 4 to 6 are

TA_ETR, *TA_CETR*, or *DTAX = f* (*Social capital, Religious adherence, firm attributes, county demographics, state corporate income tax rate, industry dummies, and year dummies*) and

TA_ETR, *TA_CETR*, or *DTAX = f* (*Social capital, Religious adherence, Corporate irresponsibility, firm attributes, county demographics, state corporate income tax rate, industry dummies,* and *year dummies*), respectively.

Religious adherence is the fraction of a county's population that claims affiliation with an organized religion. *Corporate irresponsibility* equals one if a firm has more than three negative social ratings in a year and it equals zero otherwise. Negative social ratings are aggregated across the seven categories of corporate activities evaluated by KLD Research & Analytics. In all models, firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. All variables are defined in Appendix A. In Models 1 to 3, the sample contains 63,704 firm-year observations during 1990–2012. Due to additional data requirement for *Corporate irresponsibility*, sample sizes reduce in the other models. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. For brevity, we report the estimates for *Social capital* and the additional control variables only. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*	*TA_ETR*	*TA_CETR*	*DTAX*
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Social capital	-0.004***	-0.007***	-0.004***	-0.004**	-0.008***	-0.011***
	(-3.05)	(-3.16)	(-2.78)	(-2.38)	(-3.30)	(-3.60)
Religious adherence	-0.002**	-0.004**	0.000	-0.002*	-0.002	-0.003
	(-2.36)	(-2.56)	(0.33)	(-1.77)	(-1.27)	(-1.57)
Corporate irresponsibility				0.013**	0.005	0.017***
				(2.41)	(1.01)	(2.64)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	63,704	63,704	32,172	22,070	22,070	11,429
Adjusted R^2	0.127	0.121	0.071	0.140	0.134	0.061

Table 5

Using organ donation as an alternative proxy for social capital

The sample contains 55,415 firm-year observations during 1990–2012 for which state-level organ donation data are available. The dependent variable is *TA_ETR*, *TA_CETR*, or *DTAX*. *TA_ETR* is (-1) times effective tax rate, *TA_CETR* is (-1) times cash effective tax rate, and *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference. *Organ donation* is the state-level per capita registered organ donor multiplied by 1,000. Other controls are as specified in the baseline model and they are defined in Appendix A. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
Organ donation	-0.126*	-0.205*	-0.217**
	(-1.72)	(-1.84)	(-2.06)
Size	-0.005***	-0.006***	-0.009***
	(-5.70)	(-8.63)	(-9.22)
M/B	0.001***	0.002***	-0.001
	(3.31)	(4.67)	(-1.24)
Leverage	0.050***	0.084***	0.048***
	(6.66)	(8.93)	(4.17)
Cash holding	0.027***	0.031**	-0.009
	(2.64)	(2.15)	(-0.70)
NOL	0.022***	0.058***	0.030***
	(6.64)	(14.57)	(7.32)
Change NOL	-0.136***	-0.288***	0.280***
	(-4.30)	(-9.16)	(5.22)
ROA	-0.068***	0.213***	0.424***
	(-3.75)	(13.32)	(10.95)
Equity income	0.618**	0.973***	-0.730**
	(2.55)	(3.27)	(-2.35)
PPE	-0.015*	0.055***	-0.022***
	(-1.93)	(5.36)	(-2.81)
Intangible assets	-0.047***	-0.006	0.104***
	(-8.30)	(-0.91)	(7.78)
Dummy(Foreign income)	-0.007**	-0.005	-0.002
	(-2.13)	(-1.21)	(-0.47)
Income per capital	-0.012	0.014	0.022*
	(-1.01)	(0.73)	(1.65)
Income inequality	-0.006	-0.034*	-0.021*
	(-0.55)	(-1.73)	(-1.72)
Dummy(Urban)	-0.000	-0.002	0.005
	(-0.05)	(-0.63)	(1.29)
Education	0.018**	0.008	-0.010
	(2.49)	(0.73)	(-1.22)
Age	0.001	-0.041	-0.031
	(0.05)	(-1.17)	(-1.29)
State corporate tax rate	-0.030	-0.055	-0.011
	(-0.83)	(-0.83)	(-0.24)
Industry and year dummies	Yes	Yes	Yes
Number of observations	55,415	55,415	28,349
Adjusted R^2	0.131	0.121	0.072

Table 6

The relation between social capital and aggressive tax avoidance based on tax rates

The sample consists of 63,807 firm-year observations for the period 1990–2012. The regression model is

Aggressive tax avoidance = f (*Social capital*, *firm attributes*, *county demographics*, *state corporate income tax rate*, *industry dummies*, and *year dummies*),

where aggressive tax avoidance is *Low_ETR*, *Low_CETR*, *ETR_Dodger*, *CETR_Dodger*, *TA_ETR5*, or *TA_CETR5*. *Low_ETR* (*Low_CETR)* equals one if a firm's ETR (CETR) in a given year ranks in the bottom quintile of the corresponding distribution among firms with the same two-digit SIC code, and zero otherwise. *ETR_Dodger* (*CETR*_Dodger) equals to one if a firm has a positive pre-tax profit and a zero ETR (CETR) in a given year, and zero otherwise. *TA_ETR5* is the ratio of total tax expense scaled by total pre-tax income net of total special items averaged over a five-year period. *TA_CETR5* is the ratio of total tax paid scaled by total pre-tax income net of total special items averaged over a five-year period. *Social capital* is the county-level social capital index constructed based on the data from the Northeast Regional Center for Rural Development at the Pennsylvania State University. Firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. These variables are defined in Appendix A. Estimates are based on regressions with standard errors adjusted for heteroskedasticity and within county clustering. For brevity, we report the estimates for *Social capital* only. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*Low_ETR*	*Low_CETR*	*ETR_Dodger*	*CETR_Dodger*	*TA_ETR5*	*TA_CETR5*
	Logit	Logit	Logit	Logit	OLS	OLS
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Social capital	-0.128***	-0.139***	-0.119***	-0.061*	-0.004***	-0.008***
	(-4.89)	(-4.59)	(-3.01)	(-1.72)	(-2.66)	(-3.98)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	63,807	63,807	63,807	63,807	51,156	48,939
Pseudo R^2	0.162	0.176	0.278	0.242		
Adjusted R^2					0.252	0.206

Table 7

Using headquarter relocation setting to explore the relation between social capital and tax avoidance

The sample contains 284 firms with a single headquarter relocation during 1995–2010. Of these, 145 firms have a social-capital-increasing relocation and 139 firms have a social-capital-decreasing relocation. Based on a sample of 2,280 firm-year observations, we estimate the following regressions:

TA_ETR, *TA_CETR*, or *DTAX* = *f* (*After*, *Social_capital_increasing relocation*, *After* × *Social_capital_increasing relocations*, *firm attributes*, *county demographics*, *state corporate income tax rate*, and *industry dummies*),

where *After* is a dummy variable that equals one if the observation is from the period after the relocation; it equals zero if the observation is from the period before the relocation. *Social_capital_increasing relocation* is a dummy variable that equals one if a firm relocated its headquarter to a county with a higher level of social capital; it equals zero if a firm relocated its headquarter to a county with a lower level of social capital. *TA_ETR* is (-1) times effective tax rate, *TA_CETR* is (-1) times cash effective tax rate, and *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference. In all models, firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. These variables are defined in Appendix A. Panel A presents the results from the regressions above. For brevity, we only report the estimates for *After*, *Social_capital_increasing relocation*, and their interaction term. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Panel B presents diagnostics comparing all firm attributes and the three tax avoidance measures between the 145 firms with social-capital-increasing relocation and the 139 firms with social-capital-decreasing relocation in the year immediately prior to the relocation event. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Panel A: Regression results

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
After	0.036***	0.060***	0.020
	(2.48)	(3.35)	(0.60)
Social_capital_increasing relocation	0.018	0.010	0.024
	(1.02)	(0.57)	(0.59)
After × *Social_capital_increasing relocation*	-0.045**	-0.057**	-0.074*
	(-2.15)	(-2.48)	(-1.73)
All controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	2,280	2,280	1,102
Adjusted R^2	0.090	0.088	0.072

Panel B: Diagnostics of the sample firms			
Variables	*Social_capital_increasing Relocation* = 1	*Social_capital_increasing Relocation* = 0	*t*-statistic for difference in means
	Mean (S.D.)	Mean (S.D.)	
TA_ETR	-0.269 (0.190)	-0.277 (0.210)	0.32
TA_CETR	-0.214 (0.210)	-0.236 (0.220)	0.75
DTAX	0.022 (0.025)	0.041 (0.039)	0.44
Size	5.522 (2.280)	5.288 (2.230)	-0.21
M/B	2.954 (4.680)	2.483 (3.010)	0.83
Leverage	0.314 (0.210)	0.308 (0.232)	0.25
Cash holding	0.085 (0.113)	0.113 (0.159)	-1.51
NOL	0.276 (0.449)	0.312 (0.465)	-0.57
Change NOL	-0.013 (0.075)	0.002 (0.156)	-0.91
ROA	0.061 (0.096)	0.072 (0.095)	-0.85
Equity income	0.001 (0.006)	0.001 (0.006)	0.01
PPE	0.377 (0.379)	0.347 (0.316)	0.63
Intangible asset	0.179 (0.252)	0.147 (0.217)	0.99
Dummy(foreign income)	0.314 (0.466)	0.267 (0.443)	0.75
Number of observations	145	139	

Table 8
Using instrumental-variable two-stage regressions

The sample contains 63,807 firm-year observations for the period 1990–2012. Model 1 presents the first-stage regression results. The regression model is

Social capital = f (*Log*(*Distance*), *ethnicity homogeneity, firm attributes, county demographics, state corporate income tax rate, industry dummies*, and *year dummies*),

where *Social capital* is the county-level social capital index constructed based on the data from the Northeast Regional Center for Rural Development at the Pennsylvania State University. *Log (Distance)* is the natural logarithm of the closest distance between a county and the US-Canadian border. *Ethnicity homogeneity* is a Herfindahl index calculated across four basic Census tract ethnic categories including Hispanic, non-Hispanic black, non-Hispanic white, and Asian in a county in a given year. Firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. All variables are defined in Appendix A. Models 2-4 present the second-stage regression results. The regression model is

TA_ETR, *TA_CETR*, or *DTAX = f* (*Fitted social capital, firm attributes, county demographics, state corporate income tax rate, industry dummies*, and *year dummies*),

where *Fitted social capital* is the predicted value of social capital based on the first-stage regression, and other variables are as defined before. For brevity, only estimates for *Fitted social capital*, *Log (Distance)*, and *Ethnicity diversity* are reported. Estimates in all models are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*Social capital*	*TA_ETR*	*TA_CETR*	*DTAX*
	Model 1	Model 2	Model 3	Model 4
Fitted social capital		-0.010***	-0.013**	-0.010**
		(-2.82)	(-2.07)	(-2.03)
Log(*Distance*)	-0.268***			
	(-81.64)			
Ethnicity homogeneity	1.461***			
	(57.17)			
All controls	Yes	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes	Yes
Number of observations	63,807	63,807	63,807	32,241
Adjusted R^2	0.465	0.127	0.120	0.071
Cragg-Donald *F*-statistic	32.28			

Table 9

The relation between social capital and alternative measures of tax aggressiveness

The sample consists of 63,807 firm-year observations for the period 1990–2012. The regression model is

Alternate measure of tax aggressiveness = f (*Social capital*, *firm attributes*, *county demographics*, *state corporate income tax rate*, *industry dummies*, and *year dummies*),

where alternate measure of tax aggressiveness is *Log(UTB)*, *Dummy(Tax haven)*, or *Dummy(Shelter)*. These measures are unlikely to be influenced by tax policies of state governments. *Log(UTB)* is the natural logarithm of (1 + TXTUBEND), where TXTUBEND is the end-of-year unrecognized tax benefit balance in a given year. *Dummy(Shelter)* equals one if the firm's estimated sheltering probability based on the Wilson [2009] model ranks in the top quartile of the corresponding distribution in a given year, and zero otherwise. *Dummy(Tax haven)* equals one if a firm has at least one subsidiary located in a tax haven country, and zero otherwise. *Social capital* is the county-level social capital index constructed based on the data from the Northeast Regional Center for Rural Development at the Pennsylvania State University. Firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. These variables are defined in Appendix A. Estimates are based on regressions with standard errors adjusted for heteroskedasticity and within county clustering. For brevity, we report the estimates for *Social capital* only. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*Log (UTB)* OLS	*Dummy(Shelter)* Logit	*Dummy(Tax haven)* Logit
	Model 1	Model 2	Model 3
Social capital	-0.110**	-0.098***	-0.263***
	(-2.06)	(-2.77)	(-3.36)
All controls	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes
Number of observations	6,812	36,567	12,772
Adjusted R^2	0.636		
Pseudo R^2		0.198	0.184

Table 10

Does geographical diversification attenuate the negative relation between social capital and tax avoidance?

The regression model is

TA_ETR, *TA_CETR*, or *DTAX* = *f* (*Social capital*, *High*, *Social capital*× *High*, *firm attributes*, *county demographics*, *state corporate income tax rate*, *industry dummies*, and *year dummies*),

where *TA_ETR* is (-1) times effective tax rate. *TA_CETR* is (-1) times cash effective tax rate. *DTAX* is the Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference. *Social capital* is based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. The dummy variable, *High*, equals to one if a firm has material subsidiaries in at least four different states in a given year, and it equals zero otherwise. The data for material subsidiary are based on Exhibit 21 disclosures in 10-K filings as required by the SEC. They are collected and provided by Dyreng Scott via his personal website: https://sites.google.com/site/scottdyreng/Home/data-and-code. In all models, firm attributes are *Size*, *M/B*, *Leverage*, *Cash holding*, *NOL*, *Change NOL*, *ROA*, *Equity income*, *PPE*, *Intangible assets*, and *Dummy*(*Foreign income*). County demographics are *Median income*, *Income inequality*, *Dummy(Urban)*, *Education*, and *Age*. These variables are defined in Appendix A. The sample contains 58,320 firm-year observations during 1990–2012. For brevity, we report the estimates for *Social capital*, *High*, and *Social capital* × *High* only. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
	Model 1	Model 2	Model 3
Social capital	-0.007***	-0.009***	-0.006***
	(-3.66)	(-3.48)	(-3.03)
High	0.003	-0.003	0.006
	(1.21)	(-0.70)	(1.60)
Social capital × *High*	0.005***	0.005*	0.004
	(2.86)	(1.70)	(1.51)
All controls	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes
Number of observations	58,320	58,320	29,564
Adjusted R^2	0.131	0.123	0.070

Table 11

Exploring the relative effects of civic norms and social networks

This table presents a modified version of the baseline model in which *Social capital* is replaced with *Civic norm* and *Social network*. *Civic norm* is the first principal component from a factor analysis based on electoral turnout and census response rate to capture the civic norms in the county. *Social network* is the first principal component from a factor analysis based on the total number of non-profit organizations and the total number of all other associations in the county. All other variables are defined in Appendix A. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and within county clustering. *t*-statistics, in parentheses, are based on two-sided tests. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Variables	*TA_ETR*	*TA_CETR*	*DTAX*
Civic norm	-0.003*	-0.005**	-0.003*
	(-1.94)	(-2.56)	(-1.96)
Social network	-0.002	-0.003*	-0.002*
	(-1.62)	(-1.90)	(-1.84)
Size	-0.004***	-0.006***	-0.010***
	(-5.43)	(-8.69)	(-9.42)
M/B	0.001***	0.002***	-0.001
	(2.73)	(4.49)	(-1.31)
Leverage	0.055***	0.086***	0.051***
	(7.67)	(9.74)	(4.73)
Cash holding	0.025**	0.026*	-0.006
	(2.38)	(1.91)	(-0.46)
NOL	0.022***	0.054***	0.027***
	(7.26)	(13.67)	(7.16)
Change NOL	-0.148***	-0.294***	0.223***
	(-5.06)	(-10.54)	(4.38)
ROA	-0.043**	0.206***	0.471***
	(-2.52)	(13.09)	(11.94)
Equity income	0.734***	1.112***	-0.530*
	(3.08)	(3.94)	(-1.80)
PPE	-0.018**	0.058***	-0.019**
	(-2.37)	(5.92)	(-2.42)
Intangible assets	-0.042***	-0.007	0.089***
	(-7.36)	(-1.17)	(7.51)
Dummy(Foreign income)	-0.005	-0.005	-0.002
	(-1.57)	(-1.36)	(-0.51)
Income per capital	-0.015	0.009	0.014
	(-1.38)	(0.50)	(0.93)
Income inequality	-0.007	-0.037*	-0.011
	(-0.55)	(-1.88)	(-0.70)
Dummy(Urban)	-0.000	-0.001	0.005
	(-0.07)	(-0.42)	(1.18)
Education	0.023***	0.019*	-0.005
	(3.24)	(1.77)	(-0.64)
Age	0.018	-0.011	-0.004
	(0.92)	(-0.34)	(-0.16)
State corporate tax rate	-0.015	-0.025	-0.005
	(-0.43)	(-0.42)	(-0.12)
Industry and year dummies	Yes	Yes	Yes
Number of observations	63,807	63,807	32,241
Adjusted R^2	0.127	0.121	0.071

Figure 1
Spatial distribution of social capital

Spatial distribution is based on the rank of the *Social capital* measure in 2005. A low value in the rank (Low = 1) indicates a ranking at the bottom 20% of the distribution. A high value in the rank (High = 5) indicates a ranking at the top 20% of the distribution. A darker shade in the following snapshots indicates a higher rank in the corresponding variable.

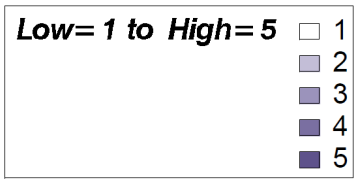
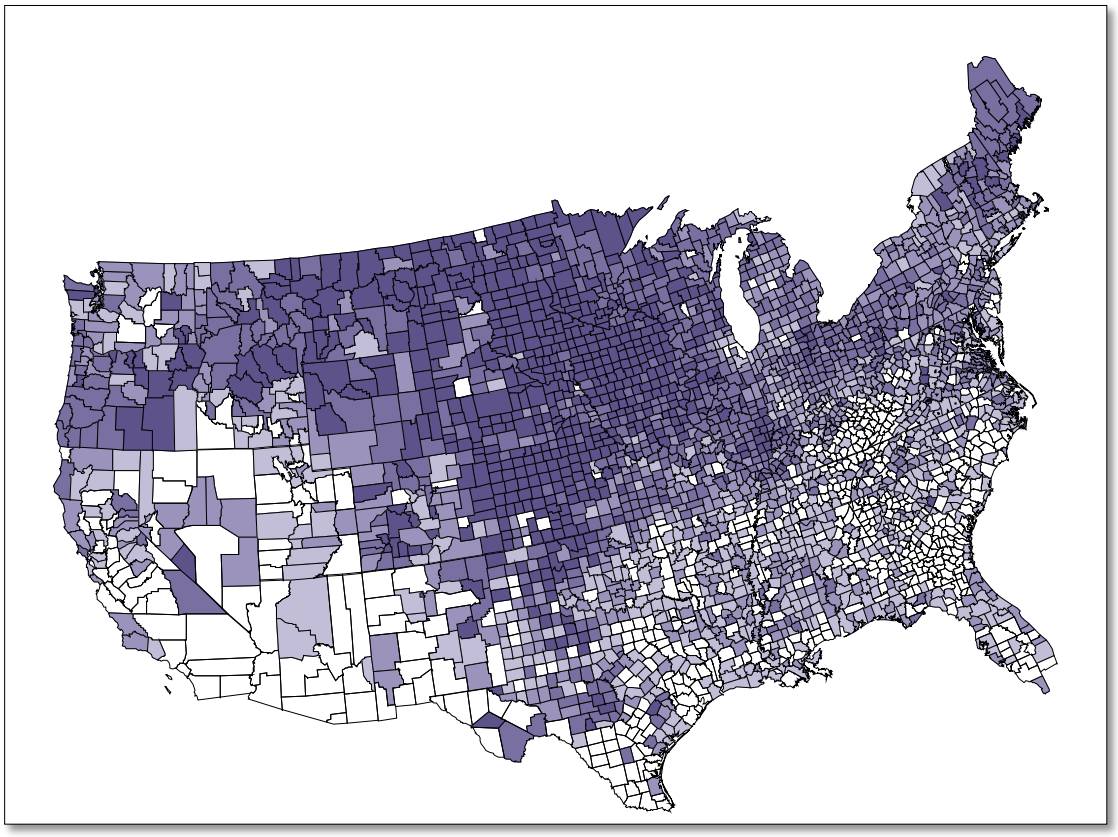


Figure 1-1: Spatial Distribution of Social Capital



Appendix A: Variable definitions

This appendix presents definitions of the variables in the baseline regression model. Data for tax avoidance measures and firm attributes are from Standard and Poor's Compustat database. Social capital data is from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. The county-level demographic data is from the Bureau of Economic Analysis and the US Census Bureau. Data for state statutory tax rates are from Council of State Governments Knowledge Center.

Variable	Definition
Measures of tax avoidance (Dependent variables for baseline regressions):	
TA_ETR	Effective tax rate (ETR) is total tax expense (TXT) divided by pre-tax income, which is measured as the difference between pre-tax book income (PI) and special items (SPI). ETR is set as missing when the denominator is zero or negative. We truncate ETR to the range [0,1]. TA_ETR is defined as (-1) times ETR.
TA_CETR	Cash effective tax rate (CETR) is defined as cash tax paid (TXPD) divided by pre-tax book income (PI) less special items (SPI). $CETR_{it}$ is set as missing when the denominator is zero or negative. We truncate CETR to the range [0, 1]. TA_CETR is defined as (-1) times CETR.
DTAX	Frank, Lynch, and Rego [2009] discretionary permanent book-tax difference for a firm in year t-1. $DTAX_t$ is the $\varepsilon_{i,t}$ from the following regression estimated by two-digit SIC code and fiscal year: $PERM_{i,t} = \beta 0 + \beta 1\ INTANG_{i,t} + \beta 2\ UNCON_{i,t} + \beta 3\ MI_{i,t} + \beta 4\ CSTE_{i,t} + \beta 5\ \Delta NOL_{i,t} +$ $\beta 6\ PERM_{i,t-1} + \varepsilon_{i,t,}$ where $PERM_{i,t} = BI_{i,t} - [(CFTE_{i,t} + CFOR_{i,t}) / STR_{i,t}] - (DTE_{i,t} / STR_{i,t})$, and $PERM_{i,t-1}$ is PERM for firm i in year t-1. Compustat variables used in the calculations are based on firm-year level observations. The Compustat variables (in parentheses) are as follows. BI is pre-tax book income (PI); CFTE is current federal tax expense (TXFED); CFOR is current foreign tax expense (TXFO); DTE is deferred tax expense (TXDI); STR is statutory tax rate; INTANG is goodwill and other intangibles (INTAN); UNCON is income (loss) reported under the equity method (ESUB); MI is income (loss) attributable to minority interest (MII); CSTE is current state income tax expense (TXS); ΔNOL is change in net operating loss carry forwards (TLCF). Following Frank, Lynch, and Rego [2009], we handle missing values as follows. If minority interest (MII), current foreign tax expense (TXFO), income from unconsolidated entities (ESUB), or current state tax expense (TXS) is missing on Compustat, we set MI, CFOR, UNCON, or CSTE to zero. If current federal tax expense (TXFED) is missing on Compustat, we set the value of CFTE to: total tax expense (TXT) less current foreign tax expense (TXFO) less current state tax expense (TXS) less deferred tax expense (TXDI). If information for goodwill and other intangibles (INTANG) is missing on Compustat, we set the value for INTANG to zero. If INTANG = C, then we set the value of INTANG to that for goodwill (GDWL).

Measure of social capital (Test variable for baseline regressions):	
Social capital	*Social capital* is calculated based on the data from the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. See Appendix B for details.
Control variables:	
Size	Natural logarithm of the market value of equity (PRCC_F×CSHO) for a firm at the beginning of a year.
M/B	Market-to-book ratio for a firm in a given year, measured as market value of equity (PRCC_F × CSHO), scaled by book value of equity (CEQ).
Leverage	Leverage for a firm in a given year, measured as long-term debt (DLTT) scaled by lagged assets (AT).
Cash holding	Cash holding for a firm in a given year, defined as cash and marketable securities (CHE) divided by lagged assets (AT).
NOL	A dummy variable coded as one if loss carry forward (TLCF) for a firm is positive and zero otherwise.
Change NOL	Change in loss carry forward (TLCF) for a firm in a given year, scaled by lagged assets (AT).
ROA	Return on assets for a firm in a given year, measured as operating income (PI – XI) scaled by lagged assets (AT).
Equity income	Equity income in earnings (ESUB) for a firm in a given year, scaled by lagged assets (AT).
PPE	Property, plant, and equipment (PPENT) for a firm in a given year, scaled by lagged assets (AT).
Intangible assets	Intangible assets (INTAN) for a firm in a given year, scaled by lagged assets (AT).
Dummy(Foreign income)	Foreign income (PIFO) for a firm in a given year, scaled by lagged assets (AT). Missing values in PIFO are set to zero.
Median income	Natural logarithm of the median per capita household income in a county during a year.
Income inequality	The ratio of the mean per capita household income in a county during a year to *Median income*.
Dummy(Urban)	A dummy variable coded as one if a county is a metropolitan area and zero otherwise.
Education	Natural logarithm of 100 times the percentage of people 25 years old and above with at least one year of college in a county in a given year.
Age	Natural logarithm of median age of the residents in a county during a year.
State statutory tax rates	The highest marginal rate as reported in the state corporate income tax schedule in a given year.

Appendix B: Constructing social capital measures

This appendix describes the procedure and the variables involved in constructing the *Social capital*, *Civic norm*, *Social network* variables. The following table lists the variables provided by the Northeast Regional Center for Rural Development (NRCRD) at the Pennsylvania State University. The NRCRD reports the variables and their data in two different datasets. The old dataset, OLD_NRCRD, reports data for 1990, 1997, and 2005. The new dataset, NEW_NRCRD, reports data for 1997, 2005, and 2009. All of the variables listed in the following table, except *Nccs* and *Assn*, are based on the corresponding 1990 data from the OLD_NRCRD and the 1997, 2005, and 2009 data from the NEW_NRCRD. Following Rupasingha, Goetz, and Freshwater [2006], *Social capital* is the first principal component from a principal component analysis based on *Pvote*, *Respn*, *Nccs*, and *Assn*. *Civic norm* is the first principal component based on *Pvote* and *Respn*. *Social Network* is the first principal component based on *Nccs* and *Assn*. These variables are estimated in 1990, 1997, 2005, and 2009. Data for missing years are back-filled using estimate in the preceding year in which data are available. For example, we fill in missing data for *Social capital* from 1991 to 1996 using *Social capital* estimate in 1990.

Variable	Definition
Principal factors:	
Pvote	Percentage of voters who voted in presidential elections
Respn	Response rate to the Census Bureau's decennial census
Nccs[1]	Sum of tax-exempt non-profit organizations divided by populations per 10,000
Assn[2]	Sum of social organizations divided by populations per 100,000
Social organizations:	
Relig	Number of religious organizations
Civic	Number of civic and social associations
Bus	Number of business associations
Pol	Number of political organizations
Prof	Number of professional organizations
Labor	Number of labor organizations
Bowl	Number of bowling centers
Fitns	Number of physical fitness facilities
Golf	Number of public golf courses
Sport	Number of sport clubs, managers, and promoters

[1]*Nccs*: We observe significant discrepancies in the reported *Nccs* values between the OLD_NRCRD and the NEW_NRCRD in 1997. There are two reasons. First, the OLD_NRCRD includes all non-profit organizations but the NEW_NRCRD excludes non-profit with an international reach. Second, the OLD_NRCRD data might be incomplete as it reports many counties with very few non-profit organizations in 1990. Accordingly, we use the 1997, 2005, and 2009 *Nccs* data from NEW_NRCRD and estimate the 1990 *Nccs* data as follows.

Estimated 1990 *Nccs* = 1997 *Nccs* ÷ (1 + Average growth rate of *Nccs* between 1997 and 2005 and between 2005 and 2009), where *Nccs* data from the left-hand side of the equation are based on data from NEW_NRCRD. We use this procedure because there is an upward trend in the number of non-profit organizations from 1997 to 2009 as reported in NEW_NRCRD. The mean number of non-profit organizations in NEW_NRCRD is 354, 443, and 495 for the years of 1997, 2005 and 2009, respectively.

[2]*Assn*: We use the data for the 10 types of social organizations as listed in the table above to calculate the sum of social organizations because these are the organizations that are consistently reported in both the OLD_NRCRD and the NEW_NRCRD. The OLD_NRCRD include additional information for organizations such as membership sports and recreation clubs in 1990 and 1997, but NEW_NRCRD no longer carries the information for these organizations in 2005 and 2009. Accordingly, we use the 2005 and 2009 *Assn* data from NEW_NRCRD and calculate the 1990 and 1997 *Assn* using the 10 types of social organizations provided in the OLD_NRCRD and NEW_NRCRD, respectively.

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