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AN ECONOMIC APPROACH TO SOCIAL CAPITAL*

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A standard optimal investment model can be used to analyse an individual's decision to accumulate social capital. We analyse six facts that support the predictions of this individual-based approach: (1) social capital first rises and then falls with age, (2) social capital declines with expected mobility, (3) social capital rises in occupations with greater returns to social skills, (4) social capital is higher among homeowners, (5) social connections fall sharply with physical distance, (6) people who invest in human capital also invest in social capital. We fail to find robust evidence that social capital investments fall with the value of time or that geographic/religious groups generate social capital complementarities.

A growing body of research documents significant correlations between 'social capital' variables, such as membership in organisations, and important economic outcomes.[1] Putnam (1993) jump-started the research on social capital when he found a strong correlation between measures of civic engagement and government quality across regions in Italy. Many authors have contributed to this literature. For example, Knack and Keefer (1997) find that a one-standard deviation increase in a survey-based measure of country-level trust increases economic growth by more than one-half of a standard deviation. LaPorta *et al.* (1997) find that across countries, a one-standard deviation increase in the same measure of trust increases judicial efficiency by 0.7 of a standard deviation and reduces government corruption by 0.3 of a standard deviation. Goldin and Katz (1999) argue that social capital in the American Midwest facilitated the rise of the high school.

This empirical research on the effects of social capital has a clear theoretical basis. Economists understand the role that repeated social interaction plays in solving free rider problems and reducing opportunism e.g., Greif (1993). The literature on repeated games (Abreu, 1988; Fudenberg and Maskin, 1986; Kreps *et al.*, 1982) explains why cooperation becomes easier when individuals expect to interact more often in the future. Social connection can substitute for missing, or expensive, legal structures in facilitating investment and other financial transactions (Arrow, 1972).

But while we have theory and evidence on the *effects* of social capital, we are just beginning to identify the underlying mechanisms that *create* social capital in the first place. Our leading source of knowledge is Putnam's (2000) exhaustive empirical survey of the potential causes of an ongoing decline in social capital in the United States.

Theoretical work on the underlying mechanisms that create social capital has also begun. But, there does not yet exist a commonly accepted theoretical

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[1] Section 2 discusses the relative merits of different measures of social capital (e.g., membership in organisations and survey measures of trust).

framework within economics for thinking about the determinants of investment in social capital.[2] We believe that this lack of consensus exists because economists have by and large adopted social capital frameworks that are based on *aggregate* analyses like those of Putnam, who defines social capital as networks. In the first paper of the current symposium, Bowles and Gintis, argue that the expression social capital should be replaced by the concept of *community*, which 'focuses on what groups do rather than what people own'.[3] Indeed, the post-Coleman (1990) literature has almost universally viewed social capital as a community-level attribute. Because economists find it difficult to think of communities as decision-makers, such aggregate definitions may serve as barriers to the development of an economic framework for modelling the causes of investment in social capital.

In this paper we analyse the formation of social capital using a model of optimal *individual* investment decisions. Our approach contrasts with group-based analyses, which emphasise institutions, norms, conventions, social preferences, and aggregate/group outcomes rather than the investment decisions of individual actors.[4] For convenience, we will call our optimisation-based analysis of individuals an 'economic approach', but we note that economics is not the only social science to utilise these principles.[5]

In our analysis, we define individual social capital as a person's social characteristics – including social skills, charisma, and the size of his Rolodex – which enables him to reap market and non-market returns from interactions with others. As such, individual social capital might be seen as the social component of human capital.[6] We assume that individual social capital includes both intrinsic abilities (e.g., being extroverted and charismatic) and the results of social capital investments (e.g., a large Rolodex). We lump these forms of social capital together because they are practically indistinguishable. For example, it is hard to know whether an attribute like popularity is an innate ability or something that the individual has worked to develop.

We sometimes divide individual social capital into different externality-based subcategories. For example, individual membership in a network tends to generate a positive externality while individual status may generate a negative externality (when status is a zero sum game). Aggregate social capital is a function of these many different types of individual social capital.

[2] DiPasquale and Glaeser (1999) and Alesina and LaFerrara (2000) both provide models of social capital investment. However, these models tend to focus on quite specific aspects of this investment (homeownership and ethnic heterogeneity respectively).

[3] Note, however, that Bowles and Gintis provide a theoretical microfoundation for their approach which integrates methodological individualism with social preferences.

[4] Group-based approaches sometimes use optimisation as an organising principle, but optimisation tends to be more commonly used in the individual-based approach. Indeed, optimisation and individual-based analysis are sometimes treated as synonyms within the social science literature. For one example of research that drives a wedge between these concepts, consider models from the behavioural economics literature. These models are individual-based but often assume that behaviour is sub-optimal (or quasi-rational), (Thaler, 1991).

[5] Economists have simply adopted these organising principles more frequently than researchers in other fields.

[6] Bowles and Gintis (2001) also argue that social skills are an important subcomponent of individual human capital. Bowles and Gintis argue that schooling plays a central role in developing such skills.

In theory, aggregate social capital incorporates all of the cross-person externalities generated by the different types of individual social capital. Hence, aggregate social capital measures social characteristics that yield market and nonmarket returns to a society. Our definition of aggregate social capital is thus quite close to the usual definitions of social capital. Unfortunately, the path from individual to aggregate social capital is difficult, because of the extraordinary importance of social capital externalities. The complexity of aggregation means that the determinants of social capital at the individual level may not always determine social capital at the society-level. For example, consider a stereotypical used car salesman who has lots of individual social capital (i.e., he is good at selling lemons to naive customers), but who generates little net social capital because of his negative social capital externalities.

This paper attempts two tasks. First, we describe an economic approach to investment in social capital. Essentially, our framework adapts the traditional models of investment in human and physical capital. Second, we present some basic evidence testing the implications of this framework. Little of our evidence is conclusive and much of it is already known. Our contribution comes from linking the evidence with a simple economic model of social capital investment.

Empirically, we first analyse the predictive power of commonly used group-level variables. For example, including 49 state dummies explains 1.4% of the variation in the number of organisation memberships across individuals. Even with 1,075 group dummies constructed by interacting metropolitan areas and religious groups we explain only 10.6% of the variation in organisation membership. We conclude that group-level variables on their own are unlikely to predict most of the variation in social capital.

Our economic approach makes numerous predictions that are born out by the data. First, lifecycle effects predict that social capital rises and then declines with age, just like other forms of capital. Second, mobility drives down social capital returns and hence social capital investment. Third, individuals who work in occupations for which social skills are relatively important accumulate more social capital. Fourth, homeownership reduces mobility and therefore raises investment in neighbourhood-specific social capital (DiPasquale and Glaeser, 1999). Fifth, physical distance and travel costs reduce social connection (Glaeser and Sacerdote, 1999; Putnam, 2000). Sixth, variation in patience across individuals generates a reduced form correlation between social capital accumulation and investment in other forms of capital, including education (which is the subject of Nie *et al.* (1996) and Helliwell and Putnam (1999)).

Two predictions of the economic model do not do as well empirically. First, the model predicts that individuals with a high value of time (i.e., high wage) will accumulate less social capital. We discuss several reasons for this misprediction, including the possibility that social skills are necessary for pecuniary success or are complements to other forms of human capital. Second, social capital complementarities predict that social capital covaries within peer groups, a pattern that we do not observe in the data once we use an instrumental variables estimator. This last finding simultaneously undercuts the group-level approach and our economic approach, because both paradigms predict such group-level effects.

Our empirical analysis does not address the fundamental causality issues raised by Durlauf (2002). But, the economic approach to social capital does predict most of the reduced form correlations in the data. The economic model of investment provides, as it did with physical and human capital, a logical framework to understand the relative sizes of capital stocks. As economists begin to explore the domain of social capital it makes sense not to overlook the basic model which has been so effective in understanding other forms of capital.

1. An Economic Approach to Social Capital

In this Section, we present a simple model of investment in social capital. This model is almost identical to the standard models of investment in physical and human capital. However, our treatment of social capital as an individual characteristic sharply differentiates us from the bulk of the modern literature on social capital, which treats social capital as the characteristic of a community. Our treatment of social capital as an individual characteristic does, however, have many precedents. For example, in 1904, Henry James uses the term social capital to refer to the social resources of a female character in *The Golden Bowl.* Loury (1977) also views social capital as an individual characteristic (the set of social resources that aid in the accumulation of human capital).

Given our individual approach to social capital, we start with a simple investment problem. Individual social capital is represented as a stock variable, S, and aggregate per-capita social capital is represented as a stock variable $\hat{S}$. Each individual receives a per-period utility flow of $S\,R(\hat{S})$, where $R(\hat{S})$ is a differentiable function with aggregate per-capita social capital as its argument.

The flow pay-off to the individual, $S\,R(\hat{S})$, reflects both market returns and non-market returns. Market returns may include higher wages or better employment prospects for a socially skilled person. Non-market returns may include improvements in the quality of the individual's relationships, improvements in his health, or even direct happiness. The literature on social capital strongly argues that there are positive complementarities to accumulation of social capital across individuals; nothing is gained by belonging to a club that has no other members. To capture these effects we assume $R'(\hat{S}) > 0$.

The social capital stock follows the dynamic budget constraint, $S_{t+1} = \delta S_t + I_t$. Because of depreciation, the stock of social capital falls to proportion $\delta < 1$ of its previous value. Hence, $1 - \delta$ is the depreciation rate.[7] The level of investment, I_t, has a time cost $C(I_t)$, where $C(\cdot)$ is increasing and convex. The opportunity cost of time is w, representing the wage rate or the value of leisure time if labour supply is inelastic.[8] We assume that individuals have a known lifespan of T periods and that they

[7] A more general model would include time-dependency of the depreciation rate of social capital, reflecting the effects of changes in the mortality rates of the other members of one's social network and changes in one's own physical and mental ability. An increasing depreciation rate would sharpen our predicted decrease in social capital investment in late life.

[8] In a more general model, $C(I_t)$ and w_t would depend on S_t, but we simplify our analysis by excluding these dependencies. Including these dependencies would not change our comparative statics results.

discount the future with discount factor β. We also assume that with probability θ the individual leaves his community. When people move, the value of their social capital depreciates, falling to proportion $\lambda < 1$ of its previous value. This decline is meant to capture the idea that much of social capital investment is community specific. Let $\phi = (1 - \theta) + \theta\lambda$. Hence, ϕ represents the depreciation factor arising from mobility.

The individual's maximisation problem can now be expressed as:

$$\max_{I_0, I_1, \ldots, I_T} \sum_{t=0}^{T} \beta^t \left[S_t R(\hat{S}_t) - wC(I_t) \right],$$

$$\text{s.t. } S_{t+1} = \delta\phi S_t + I_t, \quad \forall t.$$

The equation that describes the evolution of the capital stock incorporates the expected depreciation that arises from mobility. The individual maximises his objective function, taking aggregate per-capita social capital, $\hat{S}$, as fixed.

The first-order condition associated with this investment problem is given by:

$$wC'(I_t) = \frac{1 - (\beta\delta\phi)^{T-t+1}}{1 - \beta\delta\phi} R(\hat{S}). \tag{1}$$

This first-order condition implies the following comparative static results. Social capital investment (1) rises with the discount factor, β, (2) declines with mobility, θ, (3) declines with the opportunity cost of time, w, (4) increases with the occupational returns to social skills, $R(\cdot)$, (5) declines with the rate of social capital depreciation, $(1 - \delta)$, (6) rises in communities with more aggregate social capital, $\hat{S}$, (7) declines with the rate of social capital depreciation due to relocation, $(1 - \lambda)$, and (8) declines with age, t. These are not surprising results, and most would hold for any type of capital.

All but one of these comparative statics hold for the stock of social capital as well as the investment flow into social capital. The only exception is age. This exception arises if an individual's social capital endowment is sufficiently low at birth. At the beginning of the lifecycle the individual will engage in social capital accumulation, but towards the end of life the benefits from investment go to zero and will not justify the costs (if costs are positive). Hence, late in life investment will not offset depreciation.[9] Thus, we would expect the stock of social capital to have a midlife peak although the flow of new social capital falls monotonically with age.[10]

It is also important to note that with sufficiently high mobility, age should not affect social capital accumulation, since all households are likely to have short (local) horizons regardless of their age. However, age effects will exist if geographic dislocation does not cause complete depreciation in one's social capital stock ($0 < \delta$ in the notation of our model).

Two special properties of social capital stand out. First, social capital tends to be highly community specific. As such, residential mobility should be a key deter-

[9] Moreover, if investment is not bounded at zero, the individual may choose negative gross investment.

[10] This result also depends on our assumption that the functions $C(I_t)$ and $R(\hat{S})$ do not vary over the lifecycle.

minant of investment in social capital. There is, of course, a strong parallel with Becker's (1964) focus on firm-specific human capital, which depreciates when individuals leave their current job. Likewise, social capital depreciates when individuals leave their community. Naturally, in a more complete model the mobility decision would itself be endogenous and would be predicted to decline as individuals accumulate community-specific social capital.

Second, social capital is thought to have strong interpersonal complementarities. This may also be true for both physical and human capital, but our priors suggested to us that these complementarities would be particularly strong in the case of social capital.

These complementarities suggest that there may be large social multipliers. In other words, the effects of the change in a parameter for an individual may be much smaller than the effect of the change in the same parameter for the aggregate. This may be particularly important in trying to understand the massive changes in the levels of social capital over time. These aggregate multiplier effects will be difficult to measure using cross-sectional analysis, since the aggregate level of social capital is by definition held constant when cross-sectional variation is used to identify empirical effects.

To make these points more concretely, we modify (1), so that T is infinite, and examine steady state levels of social capital. In the steady state $I = (1 - \delta)S$, implying that for an individual change in wages (holding community levels of social capital constant):

$$\frac{\partial S}{\partial w} = -\frac{C'[(1 - \delta)S]}{(1 - \delta)wC''[(1 - \delta)S]}.$$

For an aggregate change in wages, we can think about the case of a homogenous community where $S = \hat{S}$. In this case:

$$\frac{\partial \hat{S}}{\partial w} = -\frac{C'[(1 - \delta)S]}{(1 - \delta)wC''[(1 - \delta)S] - R'(\hat{S})/(1 - \beta\delta\phi)} = \frac{1}{1 - \frac{\partial \hat{S}}{\partial S}}\frac{\partial S}{\partial w}, \tag{2}$$

where $1/[1 - (\partial S/\partial \hat{S})]$ is the social multiplier. When increases in aggregate social capital strongly increase individual investment in social capital, then it is likely that the aggregate elasticity of social capital with respect to any parameter (in this case the opportunity cost of time) will be much higher than the micro-elasticity of social capital with respect to the same variable. This naturally makes us cautious about using methodologies where we multiply a micro-elasticity estimate by the change in the aggregate level of the variable to predict changes in the time pattern of aggregate social capital.

These complementarities raise the possibility that there exist multiple equilibria in the levels of social capital investment. In some communities, the level of investment is high and the return to investment is consequently high. In other communities, no one invests and the return to investment is low. The literature on social capital often emphasises the importance of historical conditions in determining the level of social capital in a community, eg, Putnam (1993). Multiple equilibria models explain how small differences in initial conditions can generate large divergence in long-run levels of social capital.

1.1. *The Aggregation Process*

Micro-level analysis of social capital investment provides a new application of standard economic theory. In Section 2, we test these implications empirically. Before proceeding to the empirics, we first discuss the connection between individual social capital and the more widely studied concept of aggregate social capital.

We define aggregate social capital as the average of individual social capitals, adjusting for all of the relevant externalities. We believe that the size and sign of these externalities vary dramatically across different categories of individual social capital. While a full understanding of these heterogeneous externalities is far beyond the scope of this paper, we now briefly discuss two broad classes of social capital investment and their connection to aggregation.

Joining a social network may be one of the most common forms of social capital investment. These networks could be specific organisations, such as bowling leagues, or broad classes of individuals with a common social characteristic, such as the ability to speak French. Both enrolling in bowling clubs and learning to speak French diminish social distance between the individual and some social group. This leads to information flows, which usually serve both the investor and the other members of the network. Diminished social distance also creates trust, loyalty, altruism, and cooperation. It is hard to know whether these social behaviours are preference-based or incentive-based, and this distinction will not matter for our analysis.[11] Whether members of a social network like each other or view themselves as playing a repeated game, their social network creates co-operative, socially efficient outcomes. For example, networks have the ability to punish and reward their members.[12] These instruments make it possible for the network to elicit good behaviour from its members.

Network membership often has strong positive externalities. The entire network benefits from each new membership, so the aggregate social capital (at least at the network level) will exceed the naïve sum of individual investments, see Lazear (1999). Of course, if the network is itself undertaking activities which hurt other people (think of the old Teamsters' union), there may be positive externalities within the network but negative externalities toward society as a whole. In this case, the level of aggregation becomes critical.

Joining networks is only one of many important forms of social capital investment. We believe that the accumulation of status or influence should also be seen as a form of social capital. Status might be seen as a measure of social influence that enables its possessors to reward and punish others. Glaeser *et al.* (2000) find evidence suggesting that status variables appear to be strong forms of individual social capital in the sense that they enable some people to extract larger rents from a voluntary non-market transaction. Ball *et al.* (1998) show that this is true when status is assigned exogenously and the transaction is market-based.

[11] See Bowles and Gintis (2002) for a model that incorporates both preference-based and incentive-based motives.

[12] At the very least, ostracism creates one sort of punishment, although this works better for a bowling club than for the network of French speakers.

Individuals accumulate status in many ways: e.g., displaying material wealth, flaunting visual attractiveness, or demonstrating athletic prowess. If status is a relative measure, one person's accumulation necessarily decreases the status of others. Being the most popular kid on the schoolyard brings special rewards, and two people cannot simultaneously hold that title. Increases in individual status may not raise community levels of social capital.

Networks and status are only two of the many forms of social capital. However, they illustrate some important aggregation issues that will repeatedly arise in the analysis of social capital investment. Our individual-based approach has both advantages and disadvantages as a framework for the measurement of aggregate social capital. By focussing on individuals we have the advantage of studying the agents who ultimately make endogenous decisions about social capital accumulation. Hence, we view the individual-based approach as the right social capital framework in which to do policy analysis, which requires a theory of how people respond to changes in incentives. On the other hand, the individual approach requires complex and detailed analysis. To evaluate the level of aggregate social capital it will often be much easier to use reduced form representations of the social capital of a community than to aggregate up from individual social capital.

Understanding the link between individual and aggregate social capital is important, difficult and, for the moment, best left to future research. However, most of our empirical analysis on individual organisation memberships can be extended to analyse aggregate social capital if one assumes that group membership generates non-negative network externalities.[13] For example, policies that raise home ownership will increase group membership and hence increase aggregate social capital.

2. Evidence

The empirical work on social capital has focused on two types of evidence. First, researchers use a survey question about trust that asks: 'Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?' Combining survey evidence with laboratory experiments, Glaeser *et al.* (2000) have raised significant questions about the reliability of this survey measure. Subjects who report that they are trusting, do not act more trusting in a standard trust game.[14] Furthermore, even if this widely studied survey question does capture trust, it is not obvious that individual trust and individual social capital are conceptually the same. Individuals who are more trusting may or may not be able to extract surplus from social interactions. If trust is not repaid, then being more trusting will be individually counterproductive. It is much more natural to think of a link between aggregate trust or trustworthiness and aggregate social capital. Individual trust may not benefit the trustor, but it almost always benefits the trustee. For all of these reasons, we do not feel comfortable using the trust question as a measure of *individual* social capital.

[13] Unfortunately, some groups do not generate positive externalities (eg, Ku Klux Klan or Al Qaeda).

[14] However, individuals that say they are more *trusting*, do behave in a more *trustworthy* manner. Hence, aggregate tabulations of this survey question may successfully measure social capital at the community level.

The second empirical approach to social capital emphasises evidence on organisation membership. Putnam (2000) presents the most complete analysis of this evidence. For our empirical work, we use responses to organisation membership questions from the General Social Survey (or GSS). In the United States, The General Social Survey is a repeated annual cross-section of 1,200 to 2,500 respondents. We use data from 1972 to 1998.

The GSS does not actually record the number of memberships per respondent, but rather the number of *types* of organisations to which a respondent belongs. Thus an individual who is a member of a religious organisation and a veterans' organisation would have a membership value of two. A person who is a member of three fraternal organisations has a value of one. The membership measure also does not take into account the size of the network within an organisation or the intensity of participation. Finally, the membership measure does not evaluate explicitly the sociality of the organisation. An ideal social capital measure would address all of these problems and touch on aspects of social capital that are not fully captured in group membership (e.g., skill in negotiating with strangers). Unfortunately, to our knowledge, a broad and accurate measure of social capital does not exist either in the GSS or any other survey. Despite these drawbacks, our organisation membership measure strongly predicts other measures of social capital. We report below that organisation membership strongly predicts an individual's past efforts to work in the community to solve local problems.

It is not obvious if organisation membership reflects the stock of an individual's social capital (S) or the level of investment (I). We tend to think of organisation membership as a stock variable, since it is often much harder to join an organisation than to maintain ongoing membership (e.g., joining a fraternity requires social lobbying and initiation rites). In most cases, the stock-flow distinction is immaterial since the comparative statics for the stock of capital and the flow of investment are identical. The comparative statics only differ when age is varied. We discuss the interpretation of organisation membership when we get to that analysis.

GSS respondents report that they belong to 1.78 types of organisations on average. The standard deviation is 1.89. Of the GSS respondents, 55% report a membership value of either zero or one and 95% report a value less than or equal to five. The maximal value is 16. Appendix Table 1 reports the full distribution of responses.

Despite the limitations of the organisation membership measure, it correlates well with most measures of community-mindedness available in the GSS.[15] The correlation with working to solve local problems is 0.29. The correlation with forming a new group to work on a local problem is 0.27. The correlation with contacting a local government regarding a local problem is 0.36. Appendix Table 2 reports a correlation table that shows that our membership in organisations measure predicts a wide range of social capital measures.

We have also checked to see whether the empirical properties of our membership measure are driven by participation in organisations that reflect social capital

[15] We are restricted to using questions about community contributions that were asked during the years that the membership in organisations questions were asked.

and not by participation in organisations that might arguably represent consumption activities. We formed a sub-measure of organisation membership that does *not* include sports groups, literary or art discussion groups, fraternal groups, school fraternities or sororities, or hobby or garden clubs. All of these organisations have some very important consumption aspects. Omitting these groups produces a sub-measure of organisation membership that has the same statistical properties as the original measure of membership in organisations. For example, the correlation of the sub-measure with working to solve local problems is 0.30. The correlation with forming a new group to work on a local problem is 0.28. The correlation with contacting a local government regarding a local problem is 0.34. All of these correlations are almost identical to those reported in the previous paragraph. Indeed, all of the correlations in Appendix Table 2 almost perfectly match the correlations generated with the sub-measure. Moreover, all of the empirical work that follows was also replicated with the sub-measure and no results meaningfully changed.

2.1. *Individuals and Groups*

Before analysing our model, we first evaluate the predictive power of group level effects. In the bulk of our empirical work, these group level effects are control variables. However, in most of the social capital literature, group effects at the state, regional, and country-level are the principal topic of study, reflecting the preconception that social capital is a group-level attribute and can be studied at some high level of aggregation.[16] To evaluate the practical predictive power of this approach, we begin by asking how much of the individual variation in social capital levels is driven by the large geographic (and religious) social groups of which one is a member.

In Table 1, we report the relationship between group dummies and variation in organisation membership. In each specification, we include a different set of dummy variables and report the associated R^2 statistic. For example, in the first regression we include 49 state dummies. These state dummies explain 1.4% of the variation in the dependent variable. The second regression uses Primary Sampling Unit (PSU) dummy variables. Primary sampling units are metropolitan areas for urban respondents and multi-county agglomerations for non-urban respondents. This set of 284 dummy variables explains 3.9% of the individual variation in social capital.

Perhaps individual social capital differences are really explained by membership in specialised social groups, which are only weakly associated with geographic regions like states or cities. To explore this possibility the third regression includes dummies for denomination membership. On their own these dummies yield an R^2 of 2.3%.

In regression (4), we allow 479 dummy variables including the interaction of the 49 states and 11 religious denominations. In this case, we treat a state–religion group as a separate social cluster and find that all of these dummies explain 6.1%

[16] For example, see Guiso *et al.* (2000), Knack and Keefer (1997) and Putnam (1993).

Table 1

R^2 *from OLS of Number of Memberships on Group Dummies*

	Dependent variable: number of memberships					
Regression	(1)	(2)	(3)	(4)	(5)	(6)
Fixed effects	State	PSU	Religion	State × Religion	State × Race × Religion	PSU × Religion
R^2	0.014	0.039	0.023	0.061	0.080	0.106
Number of observations	19,313	19,313	19,265	19,253	19,253	16,825
Number of dummies	49	284	11	479	864	1,075

Note. Column 6 excludes PSU × Religion cells with fewer than 5 observations.

of the variation across people in organisation membership. In regression (5), we use state by religion by race dummy variables and find that the R^2 rises to 8.0%.

Finally, in the last regression we interact the PSU and religion variables (for example, Presbyterians in Phoenix would be represented with their own dummy variable). To avoid overfitting, we eliminate groups with fewer than five members. In this case, we have 1,075 dummy variables, yielding an R^2 statistic of 10.6%.[17] Hence, after adding more than 1,000 (admittedly coarse) geographic and religious dummy variables, almost 90% of individual variation remains unexplained. Perhaps better measurement of geographic neighbourhoods would dramatically improve these results.

All together, these results suggest that variation in social capital investment is imperfectly modelled solely with geographic or religious group effects. Moreover, we show below that group-level memberships fail to generate robust social capital complementarities. However, our emphasis on individual level variation does not preclude group-level effects. We use state dummies and religion dummies in *all* of the regression analysis that follows, although none of the results are sensitive to their inclusion.

2.2. *Social Capital and the Lifecycle*

In this Section we begin testing the implications of the economic model of individual investment in social capital. If we take organisation membership as a proxy for the stock of social capital, then the model predicts an inverted u-shaped profile of social capital over the lifecycle. Fig. 1 plots the empirical relationship between age and organisation membership, combining data from all of the GSS cross-sections (1972–98).[18] Putnam (2000) shows a strikingly similar figure, and this age relationship is well known in the social capital literature. The inverted u-shape is striking and is predicted by the model.

Table 2 evaluates these life-cycle effects controlling for numerous demographic variables, including birth year. The age effects continue to be large and statistically

[17] If we do not eliminate any groups, we have 2,227 dummy variables, yielding an R^2 statistic of 16.7%.

[18] This figure does not control for state and religious group effects. An analogous plot that does control for those effects has nearly an identical shape.

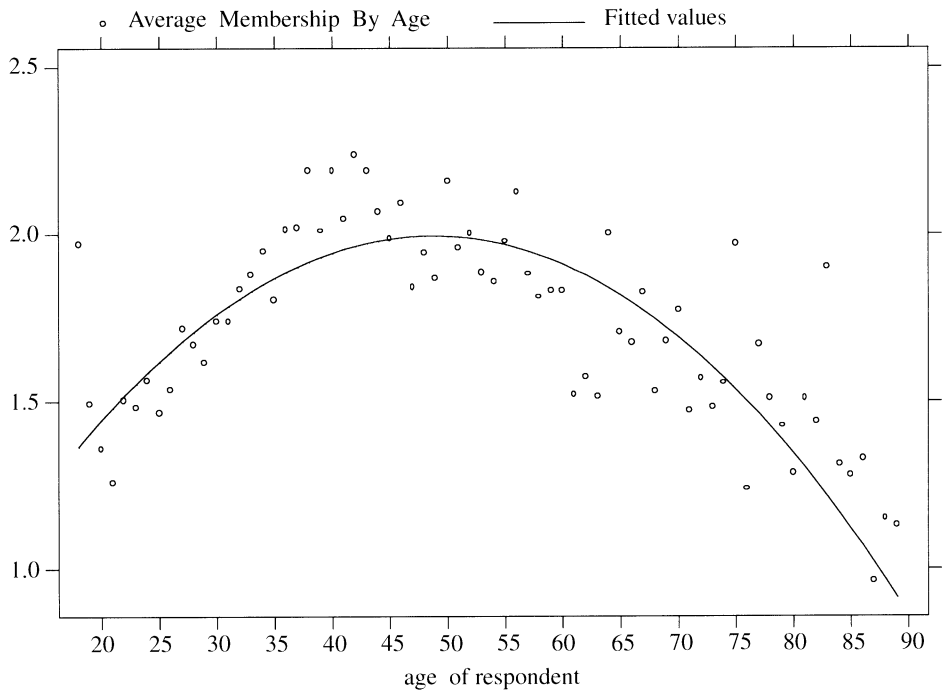

Fig. 1. *Age and Social Capital*
The figure shows the average number of memberships in each category. The curve shows the fitted values from a regression of memberships on age and age squared

significant. As Table 2, regression (1) shows, individuals between 40 and 49 years of age belong to 0.51 more organisations than individuals over 60, and belong to 0.20 more organisations than people in their 20s.[19]

These age estimates do not change when we add other right-hand-side variables. For example, we include linear cohort effects (regression 1), linear year effects (regression 2), cohort dummies (not reported), and year dummies (not reported). In all cases, the time effects were roughly the same.[20]

In addition, the decline for older adults does not depend on health effects. If we look only at persons who claim to be in good health, the decline still persists. Furthermore, it seems unlikely that health could explain the decline before age 60.

We include education as a control variable in regressions (3)–(6). This additional control variable reduces the magnitude of the age effects, but does not change the broad pattern of age effects. Including education dramatically raises

[19] The negative coefficient on the female gender dummy does *not* represent a child-rearing effect. The estimated female effect does not change when we include an interaction term that multiplies the female dummy with the number of children in the household.

[20] Due to the linear dependency between age, birth-year and time, we cannot control simultaneously for cohort (birth-year) effects and time effects.

Table 2

OLS of Memberships on Demographics, Job Characteristics

	Total number of memberships					
	(1)	(2)	(3)	(4)	(5)	(6)*
Constant	16.033	30.374	31.538	29.011	31.052	32.177
	(3.652)	(4.705)	(3.487)	(3.717)	(3.561)	(3.582)
Age 18–29	0.316	−0.076	0.270	0.213	0.259	0.272
	(0.094)	(0.039)	(0.089)	(0.094)	(0.091)	(0.091)
Age 30–39	0.485	0.181	0.349	0.296	0.345	0.357
	(0.078)	(0.040)	(0.074)	(0.079)	(0.076)	(0.076)
Age 40–49	0.512	0.289	0.386	0.361	0.387	0.399
	(0.065)	(0.043)	(0.061)	(0.065)	(0.062)	(0.063)
Age 50–59	0.331	0.190	0.270	0.282	0.266	0.270
	(0.053)	(0.045)	(0.050)	(0.053)	(0.051)	(0.051)
Female	−0.238	−0.233	−0.234	−0.232	−0.236	−0.235
	(0.027)	(0.027)	(0.026)	(0.027)	(0.026)	(0.026)
Black	0.010	0.032	0.120	0.104	0.123	0.121
	(0.044)	(0.043)	(0.042)	(0.044)	(0.042)	(0.042)
Log of income	0.616	0.631	0.300	0.291	0.293	0.293
	(0.029)	(0.029)	(0.029)	(0.030)	(0.029)	(0.029)
Income missing	0.894	0.932	0.455	0.425	0.436	0.428
	(0.088)	(0.088)	(0.084)	(0.089)	(0.086)	(0.086)
Birth year	−0.008		−0.017	−0.016	−0.017	−0.018
	(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
Year of survey		−0.015				
		(0.002)				
Education			0.212	0.215	0.211	0.212
			(0.005)	(0.005)	(0.005)	(0.005)
Average sociability of person's occupation				0.073		
				(0.019)		
Average membership in peer group**					0.052	−0.032
					(0.018)	(0.050)
R^2	0.08	0.08	0.17	0.17	0.17	0.17
Number of observations	19,245	19,313	19,202	16,926	18,593	18,504

Notes: All regressions include state dummies and religious denomination dummies. Regression 4 shows the relationship between social capital (number of memberships) and average sociability of the individual's occupation (see text for a description of the construction of the sociability variable). Regression 4 uses standard errors clustered by occupation. Regressions 5 and 6 report the effects of peer groups. Peer groups are defined as religion by PSU cell (e.g. Methodists in Cleveland). All peer group averages exclude the individual. *Regression 6 is 2SLS. **The instruments are the peer group averages for education, age, and marital status.

the R^2 statistic. Without education, the R^2 value hovers around 0.08, but with education the value rises to approximately 0.17.

If the reader prefers to view organisation membership as a proxy for the flow of social capital investment rather than the stock of social capital, then the rise in membership between 18 and 40 contradicts the predictions of the model. However, the high mobility rates of the young and their greater tendency to be single without children explain a significant fraction of the relatively low rates of group membership among the young.

2.3. *Social Capital and Mobility*

Because social capital depreciates when an individual leaves his neighbourhood, the model predicts a negative relationship between expected mobility and social capital investment. To evaluate this implication, we first create an expected mobility measure. We do not have an exogenous variable that affects only predicted mobility and has no other plausible effects on social capital. So we use age, marital status and family status to create a predicted mobility variable. We form an indicator variable that measures whether a respondent has moved in the past year.[21] We regress this indicator variable on age, marital status and family status.

Fig. 2 shows a plot of organisation membership on expected mobility.[22] We find a statistically strong relationship (t-statistic over seven) that is also quantitatively meaningful. It is certainly possible that this relationship is due to other connections between age, marital status and social capital. Nevertheless, Fig. 2 shows that another prediction of the model is consistent with the data. Finally, we expect that other measures of social capital might have an even stronger relationship to mobility since some of the organisations in our memberships variable may have little to do with geographic location (e.g., professional or academic societies).[23]

2.4. *Social Capital and the Returns to Social Skills*

The economic model also predicts that higher returns to social capital will induce higher rates of investment.[24] While we do not directly observe individual differences in the returns to social capital, we do have information on individual occupations and the sociability of occupations. We test the hypothesis that individuals in relatively social occupations acquire more social capital. This hypothesis is motivated by the assumption that individuals in social occupations have more to gain by acquiring social capital.

To measure occupational sociability we use a GSS survey question that was included only on the 1970 survey: 'How important do you personally consider [the following] job characteristics?' We focus on the listed job characteristic that describes sociability: 'A lot of contact with other people'. Survey responses range from one to seven. Using the 1970 responses, we created a ranking of occupations by 'sociability'. Table 3 gives the top and bottom five occupations by sociability. The least sociable occupations (e.g., textile operatives, billing clerks) appear to require little social capital, and hence offer low returns to social capital investment. The

[21] Naturally, probability of a prospective move would be a preferable LHS variable but it is not available.

[22] This figure does not control for state and religious group effects. An analogous plot that does control for those effects has nearly an identical shape.

[23] Even professional organisation memberships should be negatively correlated with mobility. Mobility covaries with career changes, which will reduce the value of professional memberships. In addition, some professional organisations are local in nature (e.g., state and city bar associations).

[24] Of course, substitution and income effects go in opposite directions. But substitution effects are likely to dominate if other investment vehicles exist (stocks, bonds, physical capital, and other forms of human capital etc...).

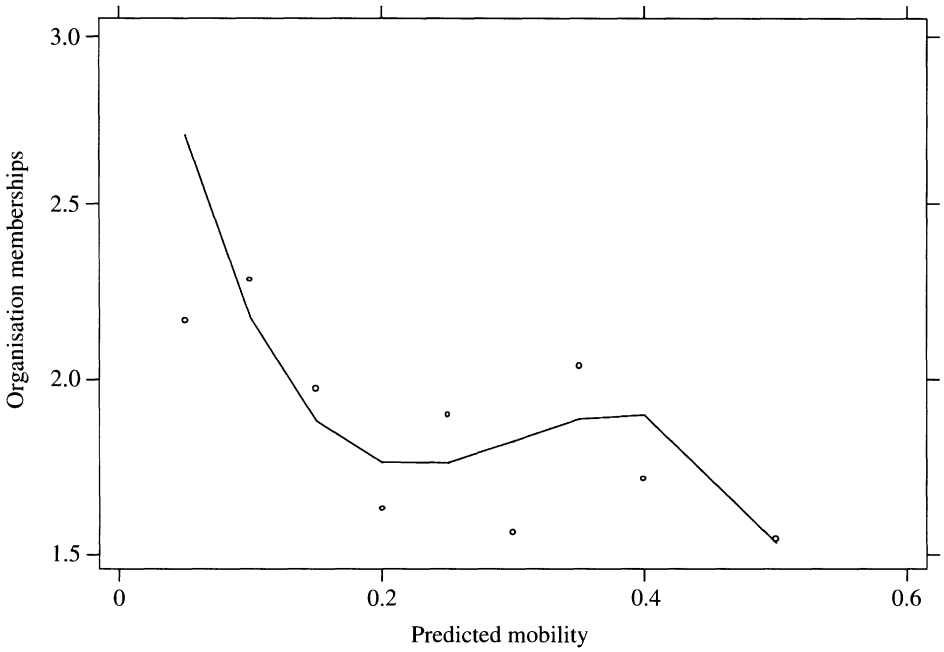

Fig. 2. *Predicted Mobility and Social Capital*
The figure shows the average number of memberships for a given probability of moving in the next year. The probability of moving is predicted using the coefficients from a probit regression of moving behaviour on marital status, number and age of children, and own age. For the averages shown, the predicted probability is broken into 9 cells. The curve with fitted values comes from a regression of memberships on the probability of moving, probability of moving squared and probability of moving cubed.

Table 3

Reported Sociability By Occupation: Top and Bottom 5

Occupation name	Occupation code (1970)	Ave(contact w/ people on job)	*N*
Bottom 5 Sociability			
Textile operative–knitter	672	1.50	56
Textile operative–winder	681	2.00	23
Billing clerk	303	2.50	46
A/c & heating repairman	470	2.67	46
Musician/composer	185	3.00	41
Top 5 Sociability			
Physicians	65	7.00	53
Clergymen	86	7.00	56
Food counter/fountain worker	914	7.00	85
Health aide	922	7.00	98
Policemen & detectives	964	7.00	96

Note: Ave(contact w/people on job) is mean response to 'How important do you personally consider these job characteristics: A lot of contact w/other people?' (1–7).

Table 4

Relation Between Social Capital and Contact W/People on Job

Ave sociability of person's occupation	Total number of memberships		
	Mean	Number of observations	Standard deviation
2	1.06	49	2.37
3	1.54	230	1.63
4	1.50	343	1.59
5	1.60	2,233	1.73
6	1.75	11,968	1.89
7	2.00	2,218	2.10

Note: The table shows the mean number of memberships stratified by how important the person believes sociability is to his or her occupation.

most sociable occupations (eg, physicans, clergymen) require a great deal of social capital and offer high returns to social capital investment.

Table 4 divides the occupations by average sociability and lists average organisation membership for these different subgroups. Individuals in more sociable occupations invest much more in social capital. In the fourth regression of Table 2, we regress an individual's organisation membership on the average sociability of his occupation. Raising the sociability of one's occupation from 2 to 6 raises organisation membership by 29%.

Omitted variables may drive these observed correlations. Suppose that the cost of sociability varies across individuals. Some people have a hard time making new friends, while others do so effortlessly. Individuals with low sociability costs should endogenously select occupations with high levels of sociability and should invest in social capital/networks. This complementary economic mechanism predicts the observed correlation between occupational sociability and social capital. If sociability costs are at least partly inherited, then this mechanism also explains the observed correlation between parental occupation and the social capital accumulation of offspring.

2.5. *Social Capital and Homeownership*

Social capital also correlates strongly with homeownership. Because of high transaction costs in the real estate market, homeowners tend to be relatively less mobile, and low levels of mobility predict high levels of social capital. Homeownership also creates incentives to invest in the particular forms of social capital that are complementary to residential capital, like neighbourhood watch organisations or civic associations. Thus, homeownership generally raises social capital investment, and is predicted to encourage particularly social capital investment that increases the value of local property values.

DiPasquale and Glaeser (1999) investigate the relationship between homeownership and social capital. They find significant connections between homeownership and a rich variety of social capital and citizenship variables. The homeownership-social capital connection survives individual fixed effects estimation: DiPasquale and Glaeser compare the same person over time as they switch

from being renters to owners and back. They find that about one-half of the connection between homeownership and social capital comes from the reduced mobility effects associated with homeownership.

In Table 5, we document the strength of the connection between homeownership and social capital. We show the coefficient on homeownership for the full set of organisation types. In each of the individual organisation regressions, we report marginal coefficients from a probit regression evaluated at sample means. We control for a rich set of other demographic characteristics in these regressions. In every case except for veterans' groups the coefficient on homeownership is positive.

By looking at all of these coefficients, we can determine if homeownership plays a particularly important role in predicting membership in organisations that complement residential capital. The evidence seems mixed. The political group

Table 5

Membership on Education and Home Ownership

Dependent Variable	Coefficient on Education	Coefficient on Home Ownership	Number of Observations	
Membership:				
Total number of memberships	0.2198	0.3231	18,601	5,703
	(0.0046)	(0.0588)		
Member of church group	0.0288	0.0508	18,476	5,670
	(0.0014)	(0.0156)		
Member of fraternal group	0.0105	0.0193	18,457	5,669
	(0.0007)	(0.0079)		
Member of service club	0.0163	0.0253	18,453	5,666
	(0.0007)	(0.0092)		
Member of veteran's group	0.0018	−0.0070	18,448	5,665
	(0.0005)	(0.0061)		
Member of political club	0.0072	0.0080	18,438	5,662
	(0.0004)	(0.0058)		
Member of labour union	−0.0060	0.0185	18,453	5,665
	(0.0009)	(0.0091)		
Member of a sports group	0.0171	0.0239	18,460	5,668
	(0.0011)	(0.0122)		
Member of youth group	0.0107	0.0226	18,432	5,659
	(0.0007)	(0.0082)		
Member of school service group	0.0211	0.0400	18,433	5,658
	(0.0008)	(0.0096)		
Member of hobby or garden club	0.0097	0.0292	18,430	5,657
	(0.0008)	(0.0090)		
Member of school fraternity/sorority	0.0113	0.0102	18,429	5,657
	(0.0005)	(0.0063)		
Member of nationality group	0.0041	0.0054	18,420	5,657
	(0.0004)	(0.0052)		
Member of farm organisation	0.0018	0.0065	18,416	5,656
	(0.0003)	(0.0034)		
Member of literary or art discussion or study group	0.0189	0.0003	18,429	5,661
	(0.0007)	(0.0076)		
Member of professional or academic society	0.0401	0.0367	18,436	5,661
	(0.0009)	(0.0107)		
Member of any other group	0.0082	0.0198	17,917	5,632
	(0.0008)	(0.0098)		

First row is OLS; Remaining rows show $\partial y/\partial x$ from probits. Includes controls for log(income), income missing, black, female, year of birth, age category dummies, married, number of children, state dummies, religious denomination dummies, and log city population.

coefficient is not large, but the school service coefficient is the largest among all of the organisation types. While the connection between home ownership and social capital is quite robust, it is not obvious that this connection holds particularly strongly among those forms of social capital that seem likeliest to raise property values. The homeownership effect works most strongly through its negative effects on expected mobility.

2.6. *Social Capital and the Opportunity Cost of Time*

The economic model also predicts that investment in social capital should decline as the opportunity cost of time rises. This prediction is not supported by the data. The relationship between income (or education) and social capital investment is uniformly positive (see Table 2). This might not be surprising, if one imagines that the same people who invest in standard forms of human capital (e.g. college educations) also invest in social capital. Human capital and social capital may be complements. Likewise, relatively patient individuals may invest in all forms of capital. These confounding mechanisms make it nearly impossible to examine the relationship between social capital and the opportunity cost of time.

Two pieces of evidence, both in Putnam (2000), however, support the economic predictions about time-scarcity effects. First, non-working wives invest more in social capital than working women. Second, Putnam (2000) argues that exogenous increases in the availability of television appear to decrease social capital investment. The availability of television raises the opportunity cost of socialising. These two facts weakly support the view that investment in social capital is driven in part by the opportunity cost of time.

2.7. *Social Capital and Spatial Proximity*

Spatial proximity influences the cost of social capital investment. Glaeser and Sacerdote (1999) investigate the relationship between spatial proximity and social connections, and find that residents of big cities and individuals who live in apartment buildings are more likely to socialise with their neighbours. They are also more likely to go out to dinner. This seems to point to the importance of physical distances in driving social connection. Putnam (2000) provides evidence that urban sprawl is associated with less social capital formation, presumably because of the time cost of travelling long distances.

The most convincing evidence on the role of distance in driving social connection comes from sociology. Festinger *et al.* (1950) published the critical study in this literature, using survey data from individuals who had been randomly assigned living units in different buildings. Festinger *et al.* find that people who are spatially far apart are less likely to form social connections. This natural result provides the clearest evidence for the important role that physical distance plays in deterring social connection.

2.8. *Social Capital and Human Capital*

The economic model predicts that the rate of time preference will determine investment in both human and social capital. Relatively patient individuals will accumulate high levels of both forms of capital. Barsky *et al.* (1997) document a robust empirical connection between experimentally measured patience and human capital. Similar relationships should link patience and social capital. These relationships predict a reduced form correlation between human capital and social capital. Table 5 documents such a positive correlation between education and membership in organisations.

This positive relationship is well known in the social capital literature; see for example, Helliwell and Putnam (1999). There are many interpretations of this evidence. For example, Nie *et al.* (1996) claim that relative status drives social interaction, and that education is a proxy for relative status. However, Helliwell and Putnam (1999) argue against this interpretation, pointing out that peer education *increases* social capital, holding individual education constant. Other explanations for the connection between social capital and human capital include the possibility that we learn social skills in school, or that individuals with high levels of human capital (e.g., good language and communication skills) simply get relatively high levels of utility out of social interaction. The connection between social capital and human capital is one of the most robust empirical regularities in the social capital literature. Better understanding this connection should be a key goal for future research.

2.9. *Social Capital and Interpersonal Complementarities*

As we noted earlier, a key difference between social capital and other forms of capital is that social capital generates relatively strong interpersonal complementarities in investment. People who belong to groups with more social capital will tend to invest more in social capital themselves. To test for this possibility, we use the group categories defined earlier – PSU interacted with religious denomination. In this case, we use religious denomination at age 14 rather than current religious denomination to avoid some of the endogeneity problems that would arise if denomination were endogenously chosen. We then form the average organisation membership in one's social group (i.e. PSU by denomination cell). Naturally, we exclude the individual himself when calculating the average for his peer group.

In Table 2, regression (5), we report the relationship between individual social capital and the social capital in one's peer group. We estimate a coefficient of 0.052 with a t-statistic of 2.9. There are several, well known, problems with this type of estimation (the reflection problem, omitted variables that create a spurious correlation between individual outcomes and peer group outcomes). Under the assumption that the background characteristics of individuals in one's peer group do not have a direct impact on one's social capital investment it is possible to use these background characteristics as instruments for social capital in one's peer group.

In Table 2, regression (6), we use the education, age, marital status, and income of members of each person's peer group as instruments for the social capital of the peer group. All peer group averages exclude the individual whose social capital appears on the left-hand-side of the equation. Using the IV approach, we find that the peer group effect vanishes. This negative IV finding leads us to be agnostic about the relevance of social capital multipliers. The apparent absence of a social multiplier reinforces the broad themes of this paper: individual incentives, not group membership, drive social capital accumulation decisions.

3. Conclusion

Our analysis shows that social capital accumulation patterns are consistent with the standard economic investment model. Individuals accumulate social capital when the private incentives for such accumulation are high. However, profound differences distinguish social capital from other forms of capital. Most of these differences stem from the interpersonal externalities that can be generated by social capital. These externalities make the aggregation process extremely complex. It is not at all clear whether we should think about social capital as networks (with positive externalities) or as status (with negative externalities). While we think that the basic economic model does quite well at helping us understand individual social capital investment, we also believe that future work must develop a new set of tools to address the complicated and important aggregation/externality issues.

Harvard University and NBER
Dartmouth University and NBER

Appendix Table 1

Distribution of Number of Memberships

Number of memberships	Freq.	Percentage	Cum.
0	5,731	29.65	29.65
1	4,953	25.63	55.28
2	3,410	17.64	72.93
3	2,161	11.18	84.11
4	1,342	6.94	91.05
5	749	3.88	94.93
6	447	2.31	97.24
7	255	1.32	98.56
8	138	0.71	99.28
9	77	0.4	99.67
10	31	0.16	99.83
11	12	0.06	99.9
12	10	0.05	99.95
13	3	0.02	99.96
14	2	0.01	99.97
15	1	0.01	99.98
16	4	0.02	100
Total	19,326	100	

Appendix Table 2

Correlation of Number of Memberships With Other Potential Measures of Social Capital

	No. of memberships	Solve local problem	Has formed group RE local problem	Has contacted gov't RE local problem	Believes people can be trusted	Believes people fair	No. of friends	No. of neighbours w/whom discuss	No. of group members w/whom discuss
Number of memberships	1.00								
	19,326								
Works to solve local problems	0.30	1.00							
	1,805	1,811							
Has formed new group to work	0.27	0.41	1.00						
on local problem	1,802	1,807	1,808						
Has contacted local gov't	0.36	0.39	0.32	1.00					
RE local problem	1,805	1,808	1,805	1,811					
Believes most people can be trusted	0.16	0.10	0.07	0.16	1.00				
	15,450	1,802	1,799	1,802	25,833				
Believes most people try to be fair	0.12	0.07	0.06	0.07	0.41	1.00			
	16,157	1,786	1,783	1,786	25,152	26,042			
No. of friends w/whom discuss	0.18	0.13	0.08	0.14	0.15	0.09	1.00		
important matters	1,698	1,699	1,696	1,702	1,695	1,680	3,097		
No. of neighbours w/whom discuss	0.03	0.08	0.04	0.04	−0.01	−0.01	0.25	1.00	
important matters	1,698	1,699	1,696	1,702	1,695	1,680	3,097	3,097	
No. of group members discuss	0.29	0.14	0.17	0.15	0.08	0.08	0.34	0.23	1.00
important matters	1,698	1,699	1,696	1,702	1,695	1,680	3,097	3,097	3,097

Number of observations is shown below each correlation. GSS questions used are as follows: Have you ever worked with others in this community to solve some community problems? Have you ever taken part in forming a new group or a new organisation to try to solve some community problems? Have you ever personally gone to see, or spoken to, or written to – some member of local government or some other person of influence in the community about some needs or problems? Generally speaking would you say that most people can be trusted or would you say that you can't be too careful in life? Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?

We created variables for the number of friends, neighbours and group members with whom the respondent discusses important matters. The maximum possible value in each case is 5. We generated this from responses to the following question: From time to time, most people discuss important matters with other people. Looking back over the past six months, who are the people with whom you discussed matters important to you?

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