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THE DEMAND FOR SOCIAL INTERACTION

Henry Saffer

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ABSTRACT

In this paper social interaction is modeled as a consumer good. Social interaction may provide an externality in the form of social capital, but the primary reason that individuals engage in social interaction is that these activities directly yield utility. It is important to note that some measures of social interaction show declines while many do not. A model of household production is employed to derive the demand for social interaction. The model shows that the demand for social interaction is a function of its price, the price of other goods and income. The role of children and marriage in social interaction can also be explained in the model. The theory is tested with data from the General Social Survey (GSS) and the results show that social interaction can be explained as the consequence of utility maximizing behavior by individuals. Increases in education generally increase memberships but reduce visiting with relatives and friends. Increases in income generally increase memberships and some forms of visiting. The model predicts 70 percent, or more, of the time trends in social interaction. These results are in contrast to social capital theorists who have focused on the declines in social interaction and who have attributed these changes to factors such as increased community heterogeneity and increased television viewing.

Henry Saffer
NBER
365 Fifth Avenue, 5th Floor
New York, NY 10016-4309
hsaffer@gc.cuny.edu

1. Introduction

Robert Putnam's influential book entitled Bowling Alone (2000) provided considerable visibility for the issue of declining participation in groups such as Masons and League of Women Voters. Putnam, as well as a number of economists, are interested in what is known as social capital. Social capital lacks a precise definition but is usually thought of as related to the level of trust between the members of a community. Since social capital is also difficult to measure, prior empirical research has used social interaction as the empirical proxy for social capital. These prior studies included independent variables measuring demographics and the ability to capture returns from investment in social capital.

Two points must be made clear at the outset. First, this paper is about social interaction and not about social capital. Since the two concepts have been linked in the prior research a clear definition of social interaction will be helpful before proceeding. Social interaction excludes engagement between individuals living in the same household and is limited to non-commercial activities. The engagement is in either organized membership groups such as a sports club or in visiting friends or family at homes or in other locations. Second, although Putnam popularized the view that social interaction is on the decline, there is evidence to the contrary. Aggregated data from the General Social Survey (GSS) show that membership in some groups has been increasing although visiting with friends and family has been declining.

Unlike the social capital theorists, Arrow (2000) argues that the rewards from social interaction are intrinsic and social interaction is not pursued because of future economic gains. The model presented in this paper takes Arrow's view that individuals engage in social interaction if these activities directly yield utility. Investment could also be included as a secondary motivation for social interaction. That is, the hope of capturing some future returns

could be an additional reason individuals engage in social interaction. This allows for an alternative interpretation for some of the independent variables as investment variables. Since the investment approach has been well represented in other studies it is not considered in this study. In this study, utility is the motivation for social interaction and an empirical demand model is used to explain its determinants. The study of the determinants of social interaction has relevance since social interaction is believed to have a causal influence on both physical and mental health (Cohen, 2004). No prior empirical study has emphasized the role of demand in the study of social interaction.

The following sections of this paper review the empirical economics literature on social interaction. Next, a model of household production is described. This model predicts the effect of changes in wages, education, children, marriage and other variables on the level of social interaction. Using data from the General Social Survey, the theory is tested with specifications derived from the household production model. Finally, the demand model's ability to explain the time trends in social interaction are calculated.

2. Prior Studies

There are two important prior reviews of economic research on social capital that are relevant to the discussion of social interaction. In addition, there are three prior econometric studies which have used data on social interaction as proxies for social capital and are therefore also relevant.

Manski (2000) provides an excellent overview of the history of research in social interaction. The first issue is whether this topic is appropriate for analysis with the methods of economics. Manski recounts the narrowing of economics in the 1920s with research on social

interaction left to sociologists. However, with work such as Becker (1974), economists have returned to the study of social interaction. Becker shows that social interaction can be viewed as the result of maximization by economic agents. Manski goes on to note that newer work on social capital tends to lack clarity in definitions of outcomes and that the econometric work lacks clear connections to economic theory.

Sobel (2002) provides a second review and notes the lack of a consistent definition for social capital and specifically questions whether the concept of social capital even has the properties needed to be considered capital. He argues that memberships are an input in the creation of social capital rather than measures of social capital. An individual may require some level of social capital (i.e. trust) before even joining a group. This would make social capital causal on memberships. Sobel also argues that a decline in memberships does not prove that social capital has declined. The functions once done through memberships may be replaced by market or institutional mechanisms, which are different but can be equally effective. Also, decreases in the price of electronic communications have made it possible to reduce the in-person time needed to create social capital. Sobel also argues that work relationships may be another opportunity to improve the links in a community.

An empirical study by La Porta et al. (1997) uses an international data set to measure the effect of self-reported trust on government efficiency, the provision of infrastructure, civic participation and some measures of health and education. The empirical models include only two variables, income and trust. This is interesting since other formulations make civic participation the measure of trust. The samples are quite small and are between 26 and 40 observations. Both variables are mostly always positive and significant. In the case of infant mortality they are negative and significant. There is a question of endogeneity between trust and

the outcome measures. The authors also estimate models which replace trust with a measure of hierarchical religion. The argument is that hierarchical structures reduce the horizontal bonds. How these empirical models relate to economic theory is not evident.

Costa and Kahn (2003) assume that social capital is measured by memberships, time spent with family and friends and volunteering. They highlight the effect of income, racial and birthplace heterogeneity, gender and marital status in explaining the trends in the dependent variables. They also include age, race, education, number of children and region variables but do not report the results for these variables. The data they use are from the Current Population Survey, the GSS and the Americans' Use of Time Survey. They conclude that between 33 and 77 percent of the decline in the dependent measures are due to the increase in wage inequality. Again the dependent variables are measures of social interaction and are assumed to measure social capital. The connection between the empirical models and economic theory is based on the assumption that heterogeneity reduces the incentive to invest in social capital.

Glaeser, Laibson and Sacerdote (2002) argue that a standard optimal investment model can be used to study social capital. They model the investment as an individual decision with costs and expected benefits. They document the validity of memberships as a measure of social capital with correlations between memberships and measures of community mindedness. However, these correlations are not large and may be due to third factors. That is, there may be some third factor, such as trust, that is causal on both memberships and community mindedness. They use data from the GSS and note that some memberships have an important consumption aspect. The dependant variable used in the regressions is total number of memberships. The independent variables are age, female, married, number of children, black, income, education,

peer group memberships, home ownership and sociability of occupation. These variables are included as measures of investment costs and the ability to capture returns.

The work by Putnam (2000), which is limited to descriptive statistics, is also important because of the extensive documentation of the changes in memberships and the questions with regard to this issue that are raised. He argues that memberships in organized groups are proxies for social capital. Putnam (2000) reports data for memberships in specific organizations over the past 30 to 50 years and concludes that there is a clear downward trend. He asserts that the decrease is due to TV watching and the aging of the civic generations born between 1910 and 1940.

3. Derivation of the Demand for Social Interaction

A model of demand for social interaction can be derived from the theory of household production developed by Becker (1965). This theory emphasizes the role of time in consumption and that time is a limited resource. Becker redefined the goods that consumers derive utility from as goods that are produced by consumers with inputs of their own time and with inputs of market goods. For convenience, let these consumer "produced" goods be called Z goods. In Becker's theory, Z goods enter the utility function, which is otherwise a conventional utility function.[1]

Social interaction is also a Z good. It is a good because it directly produces utility. Individuals engage in social interaction because they enjoy it. Some social interaction may be undertaken with the goal of networking for future gain and some social interaction may have externalities in the form of social capital. However, social interaction is engaged in primarily

because it directly yields utility. Social interaction is a Z good because it is produced with time and market goods by households or individuals. To meet with friends or relatives, or belong to a group which has meetings, takes time. Depending on the activity, market goods, such as membership fees and dues and going out for dinner are also needed. Social interaction yields utility and is produced by individuals which makes it a Z good.

The Z production function is convex and assumes that there are alternative input combinations which can produce the same output. The cost constraint, F, in Z production includes money income and the value of time spent in Z production. Money income is equal to price (p) times market goods (x). The price of time is generally assumed to be the wage rate. The price of market goods is determined in the market. The price of each Z_i good (Π_i) is assumed to be equal to the marginal cost of producing another unit of Z_i. The marginal cost of Z production is equal to the wage over the marginal product of time plus the price of market goods over the marginal product of market goods.

Which Z goods get produced, and in what quantities, is determined by utility maximization. Given the consumer's utility map, the prices of Z goods and full income, the utility maximizing levels of all Z goods are determined. The optimal input mix of market goods and time used to produce these Z goods is also determined.

(1) $U = U(Z_i, Z_j) + \lambda (F - \Pi_i Z_i - \Pi_j Z_j)$,

A demand for Z_i can be derived from this optimization problem. The demand for Z_i, like any other good, depends on its own price, the price of other Z goods, full income and taste.

(2) $Z_i = Z(\Pi_i, \Pi_j, F, \text{Taste})$

[1] As an example, entertainment is a Z good, which is produced with market goods, such as movie tickets and the consumer's time spent in travel and in watching the movie.

As the own price of Z_i rises the quantity demanded of Z_i will fall. The price of Z_i is a positive function of the wage and price of market goods and a negative function of the marginal product of time and marginal product of market goods. The effect of the price of Z_j depends on relationship between the two Z goods. As full income rises, the demand for Z_i will rise assuming that Z_i is a normal good.

4. Empirical Specification

The General Social Surveys (GSS) are used to empirically estimate the demand function for social interaction. The GSS is funded by the National Science Foundation and designed as part of a program of social indicator research, replicating questionnaire items and wording in order to facilitate time-trend studies. The sample frame includes all English-speaking persons 18 years of age or older, living in the United States. The data were collected between February and April for the years 1972-1978, 1980, 1982-1991, 1993, 1994, 1996, 1998, 2000, and 2002. The data set includes over 43,000 individuals, though, not all questions are asked each year. When the data are limited to the years in which the relevant questions were asked, the sample size is approximately 16,000, depending on the dependent variable. The GSS is well suited for this empirical problem since it has both a time series and cross sectional dimension and includes a number of questions on membership in religious and Service organizations and questions on social activities. The GSS also includes a number of economic and demographic variables.

There are 22 empirical dependent variables measuring social interaction derived from the GSS. The first 17 dependent variables measure membership in organizations. These variables do not measure the amount of time required to be a member. The memberships are: 1) Fraternal Groups, 2) Service Clubs, 3) Sport Groups, 4) Political Clubs, 5) Youth Groups, 6) School

Service Groups, 7) Hobby or Garden Clubs, 8) Literary, Art, Discussion or Study Groups, 9) Professional or Academic Societies, 10) Church Affiliated Groups, 11) Farm Association, 12) Greek Society, 13) Veterans Association, 14) Union Organization, 15)Nationality Association, 16) Other Memberships and 17) Number of Memberships. The next five variables are visiting activities and measure the number of times per year the individual spends a social evening with: 18) Parent, 19) Sibling, 20) Other relative, 21) Neighborhood friend and 22) Other friend. Variables one through 16 are dichotomous and the remainder are continuous.

Empirical proxies for the theoretical variables in the Z demand function can also be defined with questions from the GSS. The price of Z_i is a function of the wage, the price of the market goods used in production of Z_i, the marginal product of time and the marginal product of the market goods. The hourly wage is defined as real personal income per year divided by hours of work per year. A concern with the wage variable is that it can not be computed for individuals who are not at work. One approach to this problem is to define a wage-employment interaction term. A dichotomous variable measuring employment, E, is defined as equal to one for individuals who are employed. The model is specified to include both E and E*W. This specification sets the wage equal to zero if the individual is not employed. The marginal products of time and market goods are assumed to be a positive function of education (Michael, 1973). The real price of market goods is assumed to be controlled by the cross sectional and time fixed effects variables.

Full income is equal to the wage times total time plus other income. Other income can be spouse's income or non-labor income from such sources as government transfers and earnings from assets. With the wage held constant in the regression, full income can increase as spouse's income or non-labor income increases. Empirically, total real family income is used to measure

full income. An increase in total real family income will increase the demand for Z goods that are normal.

Additional control variables include economic and demographic variables and fixed effects variables. A child variable is defined as equal to one for households that have children under 18 living at home. Marriage is a dichotomous variable equal to one for individuals who are married or living as a married couple. Additional dichotomous demographic variables are: male, white and black. These variables are equal to one if the individual is a member of the group defined by the variable name. Age is a continuous demographic variable. Another demographic variable is rural which is defined as equal to one for individuals who report living in rural areas. In rural areas there may be a greater need for community participation such as volunteer fireman. Fixed effects variables include dichotomous geographic region and year variables. Table 1 contains the mean values of all variables used in the regressions excluding the fixed effects variables.

The empirical demand function can be written as:

(3) Z_i = Z(education, family income, employment, employment*wage, married, children, gender, age, race, rural, fixed effects variables).

One problem with the wage as an empirical proxy for the price of Z_i is that it is not specific to any Z_i. When the wage increases it raises the marginal cost of time in all Z production which is equal to an increase in the price of all Z goods. However, the increase in the price will be proportional to the time intensiveness of the Z good. This will have a negative effect on the demand for time intensive Z goods. However, for market goods intensive Z goods the real price will fall and increase the demand for these Z goods.

A similar problem exists for education as an empirical proxy for Π_i. The effect of education is more complex since an increase in education increases both the marginal product of time and the marginal product of market goods in all Z production. If education increases the marginal product of time by the same percentage that it increases the marginal product of market goods there still can be a change in the relative price of Z goods. Education will change the relative price of Z goods if the effect on Z_1 is different than the effect on Z_2. There is also a real income effect of an increase in education since a reduction in all Z prices increases real full income.

Education may increase the marginal product of time more than the marginal product of market goods. An increase in education would lower the price of time intensive Z goods relative to the price of market goods intensive Z goods. In this case education has a positive effect on the demand for time intensive Z goods and a negative effect on the demand for market goods intensive Z goods. However, if education increases the marginal product of market goods more than the marginal product of time, then an increase in education would increase the price of time intensive Z goods relative to the price of market goods intensive Z goods. In this case education has a negative effect on the demand for time intensive Z goods and a positive effect on the demand for market goods intensive Z goods.[2]

The prices of substitute and complementary Z goods can not be measured independently. However, the level of these goods can act as proxies for their prices. An increase in the level of a substitute will have a negative effect on the dependent variable, and an increase in the level of a complement will have a positive effect on the dependent variable.

[2] Changes in Wage and Education also create substitution in consumption effect. Michael (1973) discusses these effects in more detail.

In the spirit of Becker's theory of time allocation, children and marriage can also be viewed as Z goods.[3] This adds more of a theoretical explanation for the inclusion of these variables rather than the usual appeal to taste. To develop this idea, there are aspects of having children, being married and being at work that have the properties of Z goods. Children or child development requires time and market goods and children directly yield utility (usually). The child variable measures the presence of children at home and is a proxy variable for the price of the child Z good. Similarly, marriage can directly yield utility (usually), requires time specifically spent on the marriage relationship and market goods that might not be otherwise purchased. This makes marriage a Z good also. The marriage variable is included as a proxy for the price of the marriage Z good.

While children and marriage are more likely to be substitutes with social interaction, some social interaction may be complementary with these variables. For example children may be complementary with School and Youth groups. An increase in children at home might have a positive effect on membership in School and Youth groups.

5. Results

Table 2 presents the regression results for the 22 dependent variables. All equations include the same set of independent variables and both probit and OLS are used for estimation depending on whether the dependent variable is dichotomous or continuous. Marginal effects are reported for the probit specifications. All specifications include dichotomous time variables and nine dichotomous region variables which are not reported in the table. The first 16

[3] Use of the level rather than price does not create endogeneity since individuals may change their level of social interaction due to children, marriage or hours of work, but the decision to have children, be married and hours of work are not, generally, a function of social interaction.

dependent variables measure membership in organizations and are dichotomous. The next six dependent variables are continuous measures of total number of memberships and the number of visits per year to relatives and friends.

The wage variable is a proxy for the price of Z goods, but is not specific to the dependent variable. When the wage increases it raises the price of more time intensive Z goods relative to the price of less time intensive Z goods. An increase in the wage will have a negative effect on the time intensive Z goods and a positive effect on market goods intensive Z goods. The results show that in 7 of 22 equations the wage variable is significant. It is negative for Service, Youth, Sport, School, Hobby, Parents and Siblings which suggests that these are relatively time intensive activities. Wage is positive for Professional which suggests that this is not a time intensive group activity. Professional groups may require membership dues but perhaps only require limited amounts of time.[4]

Education is also a proxy for price and is also not specific to the dependent variable. The results show that in all 22 equations the education variable is significant. It is positive and significant for all membership activities excluding Union. A negative sign for Union membership would occur if Union membership, like Professional membership, is not time intensive. However, Education is negative and significant for all visiting activities.

The positive effect of education on memberships and negative effect on visiting is an interesting result, especially in light of the very high significance level of this variable. To explain these results assume that all social interaction, excluding Unions and Professional groups, are time intensive. The relative magnitudes of the effect of education on the marginal products of time and market goods determine whether the coefficient is positive or negative. For

time intensive goods, if education has a greater effect on the marginal product of time, the coefficient will be positive. If education has a greater effect on the marginal product of market goods then the coefficient will be negative. The results thus suggest that education has a greater effect on the marginal product of time in membership activities and a greater effect on marginal product of market goods in visiting activities. This may be due to the fact that Membership activities are more goal oriented than visiting activities. More educated individuals can apply their greater human capital to assist a membership organization in meeting their goals. If this were the case, then education would have a greater effect on the marginal product of time in membership activities than in visiting activities and lower the relative price of membership activities but raise the relative price of visiting activities.

Family income is included as a proxy for other income and is significant in 18 regressions. Family income is positive in 17 regressions and negative only for Neighborhood Friend. The sign of this variable indicates that most social interactions are normal Z goods. There is no distinction between memberships and visiting activities.

Recall that children and marriage can be given a Z good interpretation. As Z goods they may be substitutes or complements with social interaction. Quantities are used in place of prices for these goods. If children were a substitute with social interaction then this variable would have a negative effect. However, children could also be a complementary Z good with social interaction and, in this case, the sign would be positive. The results are negative in four of the models, are positive in seven models and otherwise insignificant. The complementary Z goods are Service, Youth Groups, School Groups, Church Groups, and visiting Parents and Siblings. The Church groups maybe a parenting activity that is undertaken in the hopes of imparting an

[4] The employed variable was included primarily because non-employed individuals have no wage information. The

ethical system in children. The Youth group activities are parenting activities which help children acquire social skills. Parent and Sibling visits are complementary too suggesting that families with children are likely to visit these relatives. The substitute activities are Fraternal, Greek Society and visiting with Neighborhood Friend and Other Friend. These activities are undertaken in place of time spent with children.

If social interaction and marriage were substitutes then marriage would have a negative sign and if they were complementary then the sign would be positive. The results are negative in 13 specifications. This includes all the visiting activities which all have significant t-values. That is, visits with relatives and friends are substitutes for marriage. This suggests that individuals who are married may build their social lives around their spouse and spend less time with relatives and friends. The results are positive in five models including the Church membership variable. This suggests a complementary relationship between Church groups and marriage.

The remaining variables have less of an economic interpretation. These variables are age, race, gender and rural. Age is positive in 11 out of 17 membership activities and negative for all visiting activities. Age is also negative for Sport, Youth and School memberships. Older individuals are more likely to belong to organized groups and less likely to participate in visiting. An age squared term was tried and was generally insignificant, or if significant, the linear age term became insignificant. Black is significant in 14 regressions and positive for 11 and negative for three. Blacks are more likely to belong to a Church Group and less likely to belong to Professional and Farm organizations. Blacks are also more likely to visit relatives and neighborhood friends. For gender, males are more likely to belong to Fraternal, Sports and Farm

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results show that employment has mainly a strong negative effect on visiting.

organizations more likely to visit friends. Males are less likely to belong to Church Groups, School, Literary and Professional organizations than women. Rural was included since it might measure greater need for community participation which would imply a positive effect on social interaction. Rural residence has a positive effect on Service and Church Group, Total Memberships, Hobby and Farm groups. Rural residence generally also has a positive effect on visiting relatives and neighborhood friends.

As an overall test of the models' significance a Wald or F test is calculated for the key independent variables in all 22 regressions. The key variables are all the non-fixed effects variables. The results of these tests are reported in table 2 and show that the key variables are significant as a group.

This paper argues that social interaction is best viewed primarily as a consumption good rather than as an investment good. The investment approach taken by Glaeser, Laibson and Sacerdote (2002) is a good paper to use to compare these two approaches. Their paper is good for comparison since they use data from the GSS to explain memberships. They include variables for age, gender, race, income, education and variables which measure social skills and home ownership. Detailed results are presented only for the dependent variable Total Memberships. This variable is also included in table 2. The variables in common to their study and this study are the same with respect to sign and significance which is expected since the data are the same and the specifications are very similar. The home ownership results included in the investment model might act as a proxy for income as much as the possibility of capturing returns from investment in social capital. The demand models show that social interaction is a normal good so that if homeownership measured income, it would also be positive. The sociability of

occupation variable is not based on individual responses but rather a single question from the 1970 survey and the occupation codes from that survey.

Glaeser, Laibson and Sacerdote do not include variables for real wages, children or marriage. In the consumption approach these variables have a theoretical basis for inclusion in the empirical model. The signs of the children and marriage variables are explained by their roles as complements or substitutes with social interaction. For example, marriage often has a negative effect on social interaction indicating that they are substitute Z goods. The real wage variable used in the demand model allows for identifying Professional Memberships as organizations which probably do not involve much social interaction. The investment model does not consider heterogeneity in the inputs of time and market goods across different social interaction activities. As a result the investment model can not explain differential effects of variables such as education on different types of social interactions. The demand model allows for an explanation of why education increases memberships but reduces visiting activities.

6. Time Trends

Although the Wald tests and the F tests for the key demand variables associated with the 22 regressions in table 2 show that these variables are significant as a group, it is also interesting to evaluate the demand model's ability to explain changes over time in social interaction.[5] To simplify this exercise the 22 dependent variables are combined into three aggregate dependent variables. These three aggregate dependent variables are Number of Memberships, Friend Visits and Relative Visits. The Number of Memberships is defined as the total number of memberships excluding Union and Professional Memberships. Union and Professional Memberships are

excluded since they don't appear to be time intensive as are the other membership groups. The Friend Visits include all the friend dependent variables in table 2 and the Relative Visits include all of the relative dependent variables in table 2.

The time trends in these three aggregate variables can be examined by computing their annual mean values. These values are presented in Figures 1 through 3. These data do not show a smooth trend perhaps due in part to sampling error. To find the pattern in these data, a trend line was created from a regression of the dependent variable on a polynomial function of time. The smallest polynomial order that produced a relatively high R^2 was selected. For Number of Memberships this was a fourth order polynomial and a second order polynomial for the other two variables. The R^2 for these trend lines are shown in each figure.

To estimate how well the demand model explains the trends in social interaction the data must be divided into subperiods in which the trend is in the same direction. The demand model can then be used to evaluate the change in social interaction from the beginning to the end of each subperiod. The trend line for Number of Memberships declines from 1974 to 1980, is relatively flat from 1980 to 1987 and then increases until the end of the sample period. The trend line for Relative Visits increases from 1978 to 1988 and then declines until the end of the sample period. The trend line for Friend Visits decreases through the entire sample period. These turning points in the trend lines for Number of Memberships and Relative Visits define subperiods for these two variables. Since the trend line for Friend Visits is always downward sloping there is no need for subperiods.

To estimate the effect of the key independent variables, a set of regression coefficients for the three new dependent variables are needed. These three regressions are presented in table

[5] The key independent variables are education, employment, real wage, family income, children, marriage, male,

3. The annual mean values of the key variables are multiplied by the respective regression coefficients and summed to compute a predicted value for the dependent variable. This calculation is made for the first and last year of each subperiod and the change during the subperiod in the predicted dependent variable is calculated. The change in the actual dependent variable for the same subperiod is also calculated. A ratio of the predicted change to the actual change is presented in table 4. The closer this ratio is to one, the better the demand model's prediction of social interaction. This ratio can be greater than one since the excluded fixed effects variables might be generally negative. The results show that the demand model predicts 95 to 99 percent of the trend in memberships, 72 to 80 percent of the trend in relative visiting and 70 percent of the trend in friend visiting.

7. Conclusions

This paper argues that an important reason individuals pursue social interaction is the utility derived from these activities. The results show that social interaction and the trends in social interaction can be explained as the consequence of utility maximizing behavior by individuals who face resource constraints. These results are in contrast to social capital theorists who have attributed the declines in social interaction to community heterogeneity and other factors such as increased television viewing. Both the consumption and investment motivations are reasons for social engagement. The inclusion of the consumption motivation provides a more realistic model and a richer interpretation of factors affecting social interaction than is provided in the prior research.

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black, age and rural.

It is also significant to note that not all social interactions have declined in the past 30 years. When memberships are aggregated there has been an increase since 1984. Individuals may have changed the organizations that they belong to but in the aggregate there is no decline in memberships. There are less bowling leagues but there may also be more soccer parents. However, visiting relatives has been declining since the mid 1980's visiting friends has been declining for the past 30 years. The effects that these decreases might have on physical and mental health would be an interesting subject for future research.

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Table 1 Means

Variable Name	Variable Definition	Mean Value
Fraternal	Membership in Fraternal Group	0.0989
Service	Membership in Service Club	0.0989
Sport	Membership in Sport Group	0.1942
Veteran	Membership in Veterans' Association	0.0726
Political	Membership in Political Club	0.0416
Union	Membership in Union Organization	0.1376
Youth	Membership in Youth Group	0.0973
School	Membership in School Service Group	0.1367
Hobby	Membership in Hobby or Garden Club	0.0953
Greek	Membership in Fraternity of Sorority Society	0.0483
Nationality	Membership in Nationality group	0.0339
Farm	Membership in Farm Organization	0.0391
Literary	Membership in Literary, Art, Discussion or Study Group	0.0908
Professional	Membership in Professional or Academic Society	0.1470
Church	Membership in Church Affiliated Group	0.3588
Other membership	Membership in Other Organization	0.1047
Church attendance	Number of times per year attends church	21.4185
Total Memberships	Total number of memberships	1.7768
Parents	Number of times per year visits Parent	59.764
Siblings	Number of times per year visits Sibling	43.3575
Other relatives	Number of times per year visits Other Relative	67.0048
Neighborhood friend	Number of times per year visits with Neighborhood Friends	46.5972
Other friend	Number of times per year visits Other Friend	41.1207
Bar visit	Number of times per year visits a Bar or Tavern	17.8146
Education	Years of education	12.5373
Employed	Individual reports that they are employed either full-time or part-time)	.5277
Real wage per hour	Real wage per hour (mean includes individuals who are employed)	$10.92
Black	Individual is black	0.1372
Rural resident	Individual reports residence in rural area	0.2065
Married	Individual reports that they are married	0.5573
Male	Individual is male	0.4384
Age	Self-reported age	45.2197
Real Family Income	Self-reported real family income	$30,576
Number of Memberships	Number of memberships excluding Union and Professional	1.1915
Relative Visits	Number of times per year visits parents, siblings or other relatives	171.4277
Friend Visits	Number of times per year visits neighborhood or other friend	87.6869

Table 2
Social Interaction Regressions

Variables	Fraternal	Service	Sport	Political Club	Youth	School	Greek	Literary	Profess-ional	Church Group	Other Memberships
Education	0.0105 (13.96)	0.0161 (19.10)	0.0156 (13.04)	0.0075 (14.60)	0.0096 (11.15)	0.0203 (20.71)	0.0114 (26.54)	0.0194 (25.24)	0.0403 (45.78)	0.0251 (17.33)	0.0092 (10.34)
Employed	0.0036 (0.67)	0.0101 (1.74)	0.0308 (3.89)	0.0031 (0.87)	0.0108 (1.98)	0.0114 (1.84)	-0.0036 (-1.35)	-0.0042 (-0.85)	0.0325 (6.33)	0.0117 (1.20)	-0.0138 (-2.28)
Employed* Real Wage	0.0003 (1.49)	-0.0006 (-2.17)	0.0012 (-3.17)	-0.0002 (-1.01)	-0.0005 (-1.75)	-0.0009 (-2.63)	0.00009 (-0.85)	-0.0002 (-1.05)	0.0006 (3.09)	-0.0003 (-0.55)	0.0001 (0.56)
Real Family Income	4.33e-04 (4.77)	7.49e-04 (7.96)	1.51e-03 (11.24)	2.15e-04 (3.80)	4.60e-04 (4.85)	4.51e-04 (4.15)	2.11e-04 (5.10)	3.96e-04 (4.85)	7.90e-04 (9.67)	4.66e-04 (2.55)	2.84e-04 (2.67)
Children at Home	-0.0144 (-2.77)	0.0104 (1.86)	0.0035 (0.47)	-0.0016 (-0.46)	0.0562 (10.00)	0.1332 (19.62)	-0.0056 (-2.22)	-0.0062 (-1.27)	-0.0044 (-0.89)	0.0600 (6.12)	-0.0011 (-0.18)
Married	0.0162 (3.31)	-0.0061 (-1.14)	-0.0174 (-2.29)	-0.0080 (-2.38)	-0.0044 (-0.81)	-0.0094 (-1.51)	-0.0058 (-2.20)	-0.0334 (-6.93)	-0.0256 (-5.02)	0.0678 (7.34)	-0.0107 (-1.87)
Male	0.0647 (14.28)	-0.0003 (-0.07)	0.1037 (15.97)	0.0050 (1.75)	-0.0052 (-1.13)	-0.0734 (-14.08)	-0.0019 (-0.85)	-0.0410 (-10.02)	-0.105 (-2.50)	-0.1209 (-14.90)	-0.0101 (-2.02)
Black	-0.0025 (-0.35)	-0.0078 (-1.04)	-0.0375 (-3.79)	0.0056 (1.16)	0.0290 (3.93)	0.0212 (2.61)	0.0093 (2.46)	-0.0113 (-1.77)	-0.0293 (-4.52)	0.1649 (12.96)	-0.0160 (-2.06)
Age	0.0027 (18.26)	0.0014 (8.69)	-0.0035 (-15.62)	0.0007 (7.59)	-0.0013 (-7.84)	-0.0004 (-2.36)	-0.00008 (-1.04)	0.0006 (4.19)	0.00003 (0.20)	0.0063 (23.12)	0.0015 (9.04)
Rural	0.0029 (0.55)	0.0130 (2.24)	-0.0077 (-0.98)	-0.0018 (-0.50)	0.0071 (1.25)	0.0052 (0.81)	-0.0048 (-1.67)	-0.0089 (-1.73)	-0.0073 (-1.34)	0.0407 (4.15)	-0.0014 (-0.22)
Wald Test	88.45 [0.00]	40.95 [0.0057]	58.20 [0.00]	29.89 [0.0943]	30.91 [0.0752]	37.12 [0.0163]	56.32 [0.00]	67.81 [0.00]	34.50 [0.0320]	386.59 [0.00]	54.47 [0.0001]
R-Square	0.1083	0.0695	0.0954	0.0710	0.0632	0.1188	0.1870	0.1188	0.3078	0.0744	0.0323
Sample Size	16,011	16,014	16,033	16,010	16,006	16,005	16,001	16,002	16,007	16,038	15,524

The t-values are in parentheses. All regressions also include eight region dichotomous variables and between 13 and 20 time dichotomous variables depending on the available data. Significance level for Wald tests in brackets.

Table 2
Continued
Social Interaction Regressions

Variables	Veteran	Union	Nationality	Hobby	Farm	Total Memberships	Parents	Siblings	Other Relatives	Neighbor-hood Friend	Other Friend
Education	0.0024 (3.93)	-0.0048 (-5.12)	0.0046 (10.44)	0.0103 (11.91)	0.0014 (3.18)	0.2078 (41.00)	-4.0999 (-10.21)	-3.0076 (-10.54)	-2.9582 (-12.30)	-1.2528 (-5.89)	-0.4768 (-2.93)
Employed	-0.0005 (-0.10)	0.0759 (11.76)	0.0014 (0.44)	-0.0027 (-0.45)	-0.0045 (-1.49)	0.0877 (2.53)	-6.8774 (-2.80)	-9.1536 (-4.79)	-7.4253 (-4.62)	-18.2730 (-12.85)	-6.4432 (-5.92)
Employed* Real Wage	-8.22e-03 (-0.05)	0.0004 (1.55)	0.0001 (0.95)	-0.0008 (-2.44)	-0.00001 (-0.09)	0.0016 (0.94)	-0.1987 (-1.69)	-0.2004 (-2.14)	0.0094 (0.13)	-0.0294 (-0.45)	-0.0732 (-1.47)
Real Family Income	-9.91e-05 (-1.19)	3.74e-05 (0.31)	8.13e-05 (1.56)	6.32e-04 (6.43)	2.01e-04 (3.95)	8.86e-03 (13.61)	0.0002 (4.65)	0.00007 (2.04)	-0.00005 (-1.57)	-0.0001 (-4.29)	0.0009 (4.36)
Children at Home	-0.0062 (-1.42)	0.0035 (0.55)	0.0002 (0.06)	-0.0070 (-1.26)	-0.0001 (-0.05)	0.2033 (5.94)	5.0970 (2.11)	8.5589 (4.52)	1.4902 (0.92)	-3.6831 (-2.57)	-10.9558 (-9.99)
Married	0.0154 (3.88)	0.0181 (2.93)	-0.0078 (-2.59)	-0.0102 (-1.88)	0.0085 (3.03)	-0.0541 (-1.66)	-30.5874 (-12.14)	-25.6249 (-14.15)	-8.1386 (-5.30)	-24.9031 (-18.34)	-23.1831 (-22.31)
Male	0.0816 (20.18)	0.1074 (19.36)	0.0045 (1.76)	-0.0097 (-2.05)	0.0178 (6.93)	0.1531 (5.34)	-2.9681 (-1.42)	-3.3181 (-2.10)	-8.2822 (-6.22)	7.4907 (6.36)	7.7861 (8.64)
Black	-0.0144 (-2.56)	0.0461 (5.26)	0.0232 (5.20)	-0.0288 (-3.94)	-0.0210 (-4.96)	0.1469 (3.37)	26.00 (8.29)	29.1230 (12.27)	21.2691 (10.65)	7.0057 (3.96)	-2.8013 (-2.07)
Age	0.0019 (15.54)	0.0006 (3.07)	0.0004 (5.14)	0.0002 (1.42)	0.0004 (4.58)	0.0154 (16.32)	-1.1676 (-14.18)	-0.8977 (-17.00)	-0.5722 (-12.91)	-0.5565 (-14.19)	-0.9635 (-32.11)
Rural	0.0074 (1.75)	-0.0239 (-3.69)	-0.0086 (-2.61)	0.0123 (2.11)	0.0541 (14.93)	0.0958 (2.77)	16.3517 (6.26)	8.8350 (4.58)	8.1014 (4.88)	6.2942 (4.29)	-4.3753 (-3.89)
Wald/F Test	45.48 [0.0015]	372.97 [0.00]	65.80 [0.00]	31.31 [0.0686]	91.58 [0.00]	7.76 [0.00]	5.29 [0.00]	2.73 [0.00]	6.19 [0.00]	4.27 [0.00]	2.78 [0.00]
R-Square	0.1136	0.0924	0.0645	0.0333	0.1096	0.1624	0.0893	0.0925	0.0418	0.0578	0.0937
Sample Size	16,017	16,016	15,989	16,005	15,989	16,149	8,728	11,061	21,078	21,060	21,074

The t-values are in parentheses. All regressions also include eight region dichotomous variables and between 13 and 20 time dichotomous Variables depending on the available data. Significance level for Wald tests and the F tests in brackets.

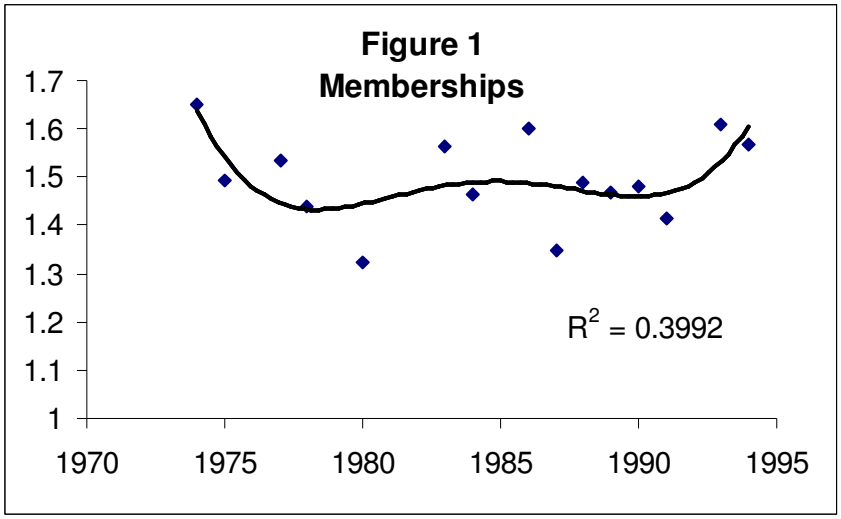
Figure 1
Memberships
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
1970
1975
1980
1985
1990
1995
R2 = 0.3992

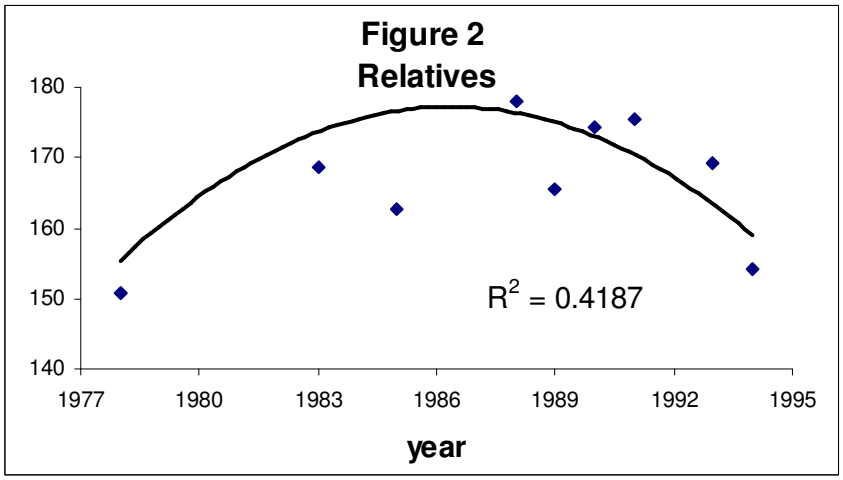
Figure 2
Relatives
180
170
160
150
140
1977
1980
1983
1986
1989
1992
1995
year
R2 = 0.4187

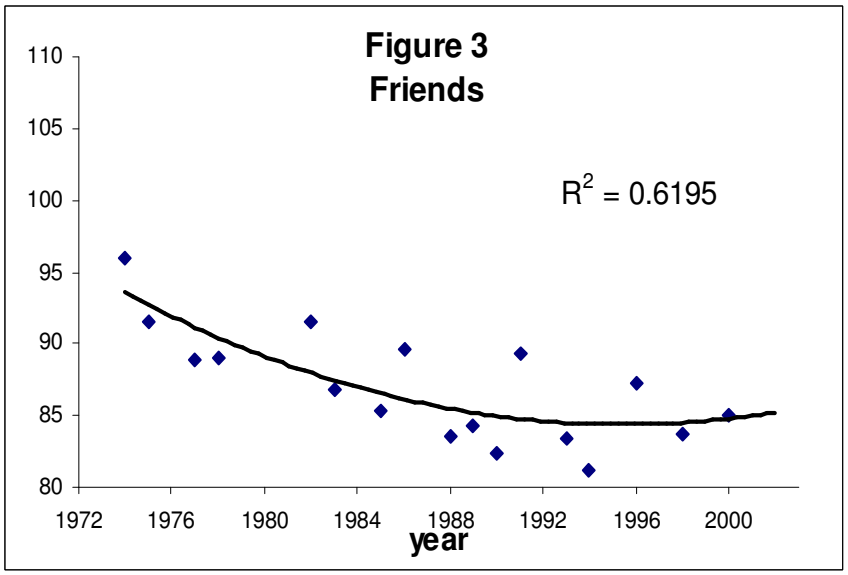
Figure 3
Friends
110
105
100
95
90
85
80
1972
1976
1980
1984
1988
1992
1996
2000
year
R2 = 0.6195

Table 3
Aggregate Social Interaction Variables

Variables	Number of Memberships	Friend Visits	Relative Visits
Education	0.1628 (35.79)	-1.7311 (-6.05)	-11.8596 (-13.08)
Employed	-0.0011 (-0.04)	-24.6617 (-12.90)	-18.8549 (-3.42)
Employed* Real Wage	-0.0021 (-1.30)	-0.1033 (-1.18)	-0.2297 (-0.87)
Real Family Income	7.58e-03 (12.61)	-0.0240 (-0.69)	0.1861 (1.82)
Children at Home	0.2066 (6.56)	-14.6974 (-7.63)	21.0048 (3.88)
Married	-0.0350 (-1.16)	-48.0601 (-26.34)	-65.8953 (-11.66)
Male	0.0504 (1.91)	15.2575 (9.64)	-11.1239 (-2.38)
Black	0.1200 (2.99)	4.3031 (1.81)	93.7964 (13.32)
Age	0.0136 (15.63)	-1.5188 (-28.82)	-3.0752 (-16.53)
Rural	0.1252 (3.93)	1.8732 (0.95)	34.3915 (5.89)
F-test	8.57 [0.00]	3.11 [0.00]	5.82 [0.00]
R-Square	0.1253	0.1020	0.1301
Sample Size	15,967	21,037	8,221

The t-values are in parentheses. All regressions also include eight region dichotomous variables and between 13 and 20 time dichotomous variables depending on the available data. Significance level for the F tests in brackets.

Table 4
Effect of Key Independent Variables
on Trends in Social Interactions

	Number of Memberships		
subperiods	Actual Change	Predicted Change	Predicted Over Actual
1974-1980	-0.168483	-0.160574	0.953
1980-1987	0.02237	0.02218	0.992
1987-1994	0.22182	0.22045	0.994
	Relative Visits		
subperiods	Actual Change	Predicted Change	Predicted Over Actual
1978-1988	27.2064	21.9152	0.806
1988-1994	-23.7076	-17.1643	0.724
	Friend Visits		
period	Actual Change	Predicted Change	Predicted Over Actual
1975-2000	-6.55765	-4.57955	0.698