Engagement of the Elderly in Time Banking: The Potential for Social Capital Generation in an Aging Society

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ABSTRACT. Community currency systems attempt to empower the economically marginalized and build social capital. This research explores the role of the elderly in a local voluntary organization. The elderly are potentially very important contributors, yet we know little about their participation in these local exchange networks. Eighty-seven months' worth of transaction data from a "time bank," which has had a total of 950 members, was examined in social network analyses. Measures of quantitative engagement in the system were constructed. The elderly were found to be as active as other members. Qualitative characteristics of the network were also explored. The organization is rather homogeneous, yet exchanges within it tend to connect diverse actors. Male and female seniors

undertransact with themselves and with one another, generating bridging social capital. The evidence presented suggests that the participation of the elderly in local currencies is mutually beneficial.

KEYWORDS. Social networks, social capital, volunteering, informal economy, community currencies, elderly

INTRODUCTION

It is well known that the American population is becoming increasingly older. Along with this aging, declining social capital and the potential of voluntary organizations have been salient topics in an era of scarce governmental resources. This paper explores the role of the elderly in a local currency system. It seeks to assess the extent to which "time banks" can serve as a source of social integration for the aged. Community currencies attempt to empower the economically marginalized and build social capital. These alternative local economies create a network of people through a currency that can be used to obtain a variety of services. In this research, transaction data from a sizable time bank are analyzed to determine the extent and quality of elders' engagement in this system. The aged are argued to be ideal participants since they are often in need of services, have free time to give, and can benefit from intergenerational interactions (Boyle, 1999; Cahn, 2000). While an aging population may place increased strain on major social institutions, it may also present unique opportunities in the voluntary sector.

The research questions to be addressed here include the following: Are the elderly more active time bank participants? Do the aged generate different forms of social capital than the nonelderly? With whom do the elderly choose to transact? The first question frames the exploration of the quantitative dimensions of seniors' participation. If social capital is understood as "social networks and the associated norms of reciprocity" (Putnam, 2000, p. 21), then it is possible to count ties and quantitatively determine which groups are generating the most social capital within this system. Time banking is a formalized version of generalized reciprocity: "I'll do this for you without expecting anything specific back from you, in the confident expectation that someone else will do something for me down the road" (Putnam, 2000, p. 21).

The second and third research questions require consideration of the qualities of elders' trading networks. That is, what type of social capital is

being generated? Network measures representing "bonding" and "bridging" social capital will be constructed. Bonding ties tend to be strong and exclusive, creating social solidarity (Putnam, 2000; Halpern, 2005). Here, network density and reciprocation rates will serve as indicators. Bridging social capital refers to more inclusive situations in which people are linked to others who are different from themselves. Such diverse networks often yield new information and resources and are the basis for Granovetter's (1973) well-known "strength of weak ties" argument. In the case of elderly time bankers, diverse ties can also be seen positively—a source of social integration—as they represent interactions outside of their age cohort. Bridging ties will be considered in analyses of who trades with whom. This will also allow consideration of the network principle of homophily (see McPherson, Smith-Lovin, & Cook, 2001). To what extent do time bankers exchange with others who are like themselves? The paper begins with an overview of community currency in the United States and the role of the elderly in these local economies and similar voluntary organizations.

COMMUNITY CURRENCIES AND SERVICE CREDIT BANKING PROGRAMS

In the past two decades, local currencies have been a growing form of community engagement in the United States. While all systems differ somewhat, each is premised on creating a local currency as a medium for the exchange of services and goods. Unlike conventional bartering (in which two actors trade directly with one another), local currencies expand commerce by connecting a network of people (and often businesses). Participants publicize the goods or services they wish to offer and/or obtain through a directory, newsletter, notice board, or Web site. Interested parties contact one another, negotiate the transaction, and then arrange it. The recipient "pays" and the provider receives credit that can be used for making purchases from other participants in the system.

Advocates argue that these local associations permit people to effectively utilize their time and skills by providing services or selling goods outside of the mainstream cash economy. The retired, unemployed, and underemployed can be full participants in these alternative economies. Since national currencies are a scarce commodity, community currencies have the potential to increase one's purchasing power. Instead of formal, bureaucratic employment relations based on economic capital, local

currencies are voluntary organizations that can redefine "work" (Seyfang, 2001a), foster community relations, and build social capital. By supporting the talents of local residents and businesses, community currencies keep money in the community and strengthen the local economy.

There are three basic types of community currency systems: local exchange trading systems (LETS), time banks, and hours systems (Meeker-Lowry, 1996). LETS began in British Columbia in the early 1980s and have been the most widespread form of local currency schemes. While never being widely pursued in the United States, it is estimated that there have been thousands of LETS systems started across the world (Cohen-Mitchell, 2000; UNILETS Online, 2007). Researchers have concluded that LETS activity peaked in the mid-1990s, and a substantial proportion of LETS are no longer operating (Seyfang, 2002; North, 2003). Low trading volumes and high administrative costs have plagued many systems (see Aldridge & Patterson, 2002).

The growth of LETS in the late 1980s inspired a community activist to establish a printed local currency system in Ithaca, New York, in 1991 (see Glover, 2000). Ithaca Hours is a paper currency the value of which is linked to the U.S. dollar. Since its founding, thousands of individuals and hundreds of businesses have exchanged the currency. This model spread rapidly across the United States during the 1990s. As of 2004, 82 hours systems had been attempted across the United States. However, only 17 (a 20.7% survival rate) were still active (Collom, 2005). Maintaining dedicated administrators, ongoing recruitment of participants, a lack of useful services, and insufficient resources have hindered these systems (Collom, 2007).

Time Banks USA (formerly known as the Time Dollar Network) was started in Miami, Florida, in the mid-1980s by a law professor (see Cahn & Rowe, 1996; Cahn, 2000; Jacobson, MacMaster, Thonnings, & Cahn, 2000). This model is flexible, and there is a wide range of different programs. Participants earn and spend the egalitarian electronic currency (time dollars) that is measured in the amount of time required to provide a service rather than the monetary value of the service. A staff is required to recruit participants, provide orientation, match providers and recipients as needed, track the hours, and distribute statements to members.

The earliest time banks were "service credit banking" programs. These agency-based programs are mostly intragenerational, recruiting older people to help other older people remain independent and in their homes (Coughlin & Meiners, 1990; Meiners, Treat, & McKay, 1996). Today, most time banks continue to be based in existing institutions (such as

hospitals, schools, churches, or social service agencies) and target the socially and economically marginalized—the young, the elderly, the poor, and the disabled (Seyfang & Smith, 2002).

Neither service credit banking programs nor institution-based time banks should technically be considered "community currencies." Local currency systems have open memberships (not targeting specific groups) and seek to build social capital *and* improve the local economy. However, some time banks are stand-alone, "neighbor-to-neighbor" networks that look very similar to LETS or hours systems as alternative economies. Since these systems are intergenerational, they may be more beneficial to elderly participants. Overall, there are currently 59 time banks in the United States (Time Banks USA, 2007). Time Banks UK began in 1998 and currently has 82 active programs and another 37 in development (Time Banks UK, 2007).

There has been little scientific, empirical analysis of community currency in the United States (see Jacob, Brinkerhoff, Jovic, & Wheatley, 2004a, 2004b; Collom, 2005), and only one study reports data on the age of participants (Lasker et al., 2006). LETS have been studied more extensively. In a U.K. case study, Seyfang (2001b) found that 16% of the members are retired, and these participants are the least active in the system. The most comprehensive study of LETS in the United Kingdom is based on a 1999 membership survey of 26 systems (Williams et al., 2001). The findings indicate that 11.8% of LETS members are in the age range of 60 to 69 years, and another 4.7% are 70 years or older. So, the elderly do join U.K. LETS in substantive numbers, but the degree and quality of their participation remain unknown. This is also the case with time banks in the United Kingdom. The most notable study presents survey data from 12 systems (Seyfang & Smith, 2002). While the distribution of member age is not reported, 42% of participants are retired. In a recent case study of a time bank in Pennsylvania, Lasker and colleagues (2006) found that 34% of participants are aged 65 years or older, and 83.1% of members are female. Regarding engagement, no association was found between members' age and their self-reported frequency of exchange within the system.

Some research has also been conducted on service credit banking. The findings send mixed messages concerning the efficacy of these programs for the elderly. Feder, Howard, and Scanlon (1992) surveyed participants from six programs and found high satisfaction and success in the recruitment of new volunteers. Operating costs for these programs are nontrivial, however, and the direct benefits are difficult to quantify. Ozawa and Morrow-Howell (1993) evaluate a service credit program in Missouri.

Satisfaction with the program was very high, but only 48.5% of the elderly members had actually provided services in the 6 months prior to the study. Murray (2000) reports on six service credit programs set up in managed care organizations. Financial sustainability and information management (tracking the credits) proved to be major challenges, and four of the six sites abandoned their programs. In her review, Dentzer (2002) concluded that these experiments were closer to being failures than successes. By 2001, only one service credit bank appeared to be successful: Elderplan's Member to Member (M2M) Program, started in 1987. M2M participants are very active—43% receive or provide services at least weekly. Since its inception, over 150,000 hours of service have been provided to almost 7,000 older adults (Kyriacou & Blech, 2004).

Time banks, the most successful form of local currency systems, may be more efficacious in generating economic and social capital for the elderly than service credit banking. First, community currencies offer a much greater variety of services. Since they are agency-based, service credit banks tend to offer a narrower range of services. Successful local currency systems have lengthy directories and business participants that provide the elderly with greater opportunities to spend and earn the currency. Second, by definition, local currencies are more heterogeneous organizations since they are community-based rather than agency-based. For the elderly, community currencies may facilitate interactions outside of one's age group. Since age homophily—the tendency to interact with people in the same age group—is quite strong in the United States (McPherson et al., 2001), community currencies may serve a social integration function for the elderly.

RESEARCH QUESTIONS FOR AN EXPLORATORY ANALYSIS

The existing literature provides little guidance for the research questions addressed here: Are the elderly more active time bank participants? Do the aged generate different forms of social capital than the nonaged? With whom do the elderly choose to transact? Therefore, a broader literature review on age, volunteering, and social networks was conducted. This research will be treated as exploratory, given the lack of consistent evidence that could justify hypotheses (see Glanville, 2004). Since community currencies are voluntary organizations, the research literature on volunteering may be useful for the first research question.

Existing research on the demographic profile of volunteers finds a curvilinear age effect, indicating that the aged are less likely to volunteer than the nonelderly (Wilson & Musick, 1997; Wilson, 2000; Prisuta, 2004). More relevant for this project is the *frequency* with which the elderly participate in voluntary organizations after they have joined. In her analysis of the 1975 through 1998 DDB Needham Life Style Surveys, Goss (1999) found that being a member of the 1910–1930 birth cohort is a significant predictor of the frequency of volunteering. In addition to this generational effect, an aging effect is found: "[S]ince 1975 there has been a dramatic increase in the frequency of volunteering by seniors . . . (they) have become twice as altruistic as they used to be, whereas everyone else has stayed the same" (Goss, 1999, p. 389; see also Gallagher, 1994, p. 573; Center for Health Communication, Harvard School of Public Health, 2004, p. 20). Yet for this research, the findings of Goss (1999) conflict with Seyfang's (2001b) LETS case study, indicating that the retired are the least active in the local currency system (assuming that the retired members are mostly elderly people) and with Lasker and colleagues' (2006) finding of no association between age and engagement.

The two remaining research questions concern the quality of the transaction networks of the aged. Several studies indicate that older Americans have smaller social networks overall (Marsden, 1987; Lin, Ye, & Ensel, 1999; McPherson, Smith-Lovin, & Brashears, 2006) and that the aged have less frequent contact with their network members (Morgan, 1988; Antonucci & Akiyama, 1987). Studies concerning density and reciprocity within networks are most useful here in predicting whether the elderly are more likely to generate particular forms of social capital. In Marsden's (1987) analysis of the 1985 General Social Survey, network density was found to rise with age. Older Americans are more likely to discuss important matters with alters who know one another. Twenty years later, this appears to have changed. In their analysis of the 2004 General Social Survey, McPherson and associates (2006) found that older American adults have less dense discussion networks.

There has also been some research on reciprocity within networks of the aged. The elderly tend to desire independence and autonomy and are less enthusiastic about receiving help than providers are about giving it (Lee, 1985). In such unbalanced power relations, the inability to reciprocate can detract from the quality of life of the elderly (see also Krause, Herzog, & Baker, 1992). In a study of three generations of women, Brody, Johnsen, Fulcomer, and Lang (1983) found that members of the oldest

generation were most apt to dislike receiving help from those whom they are not able to assist in return. The elderly appear to value reciprocity greatly, suggesting that they would generate more bonding social capital than the nonaged. Nonetheless, the recent evidence of their less dense discussion networks suggests that this question should be treated as exploratory too.

Trying to predict with whom the elderly will choose to transact is equally difficult. While age homophily is quite strong in the United States (McPherson et al., 2001), there is little basis to expect differences between the aged and the nonaged. Glanville's (2004) major findings on the relationship between voluntary association type and network structure do not provide any clues either. She finds that neighborhood (as opposed to external) organizations are more likely to generate dense and homogeneous networks, while instrumental (as opposed to expressive) organizations create more diverse, bridging ties. Yet local currency systems are both neighborhood and instrumental organizations.

In addition to elder status, sex is particularly addressed in this research. Two-thirds of time bank participants and two-thirds of LETS members in the United Kingdom are women (Williams et al., 2001; Seyfang & Smith, 2002). As in the Pennsylvania case study (Lasker et al., 2006), an even larger sex disparity was found at the time bank to be analyzed here. Men and women are likely to have differing experiences within local currencies (see Raddon, 2003). Moreover, previous research indicates that elderly men and women differ in their types of volunteerism and community participation (Moen & Fields, 2002; Liu & Besser, 2003).

DATA AND METHODS

Transaction data from a time bank are analyzed in this paper. As previously discussed, time banks exist in a number of different forms. For this analysis, a stand-alone time bank was selected that is not part of a larger organization and does not have a specific constituency. The time bank chosen is one of the "neighbor-to-neighbor" models (Cahn & Rowe, 1996) and is quite similar to the typical hours systems and LETS.[1] The goal here is to analyze participation by the elderly within a community currency and to assess the potential for social integration. Such intergenerational interaction is not possible within service credit banks and is diminished within institution-based time banks since they cater to a particular constituency.

A copy of the time bank's database containing membership and transaction records was obtained, cleaned, and prepared for analysis. The data analyzed covers 87 months (29 quarters) of trading activity (January 1998 through March 2005). In this period, 15,379 transactions were made by 759 members. For descriptive purposes, Table 1 lists the top 10 services exchanged within this time bank as a whole, the top 10 services provided by elderly participants, and the top 10 services received by seniors in the system. Health care and transportation services are most popular in this time bank (each has been exchanged a total of 972 times). Elderly participants do not appear to differ substantially from the membership as a whole in the services that they exchange. The exceptions are that seniors do not tend to provide or receive acupuncture, gift wrapping, or computer assistance services, while these services are popular in the system.

Table 2 provides descriptive statistics of the variables employed in the analysis. This time bank has had a total of 950 members since its inception (though not all have engaged in transactions). As in most, this time bank comprises both individual and organizational members. The organizations tend to be businesses or nonprofit agencies, and they play an important role in the system, providing participants with greater opportunities to earn and use their time credits. The descriptive statistics indicate that 12% (113) of members who have ever joined this system are organizations. Since the primary unit of analysis in this study is individuals, organizational members will be excluded in most of the forthcoming analyses.

TABLE 1. Top 10 services exchanged in time bank (no.), 1998–2005

All Services Exchanged		Services Provided by Seniors		Services Received by Seniors	
Health care services	972	Health care services	188	Transportation	175
Transportation	972	Clerical	145	Health care services	69
Clerical	903	Massage	133	Haircuts	38
Massage	824	Assistance to office	66	Massage	38
Acupuncture	328	Transportation	54	Garden/yard work	34
Gift wrapping	312	English tutoring	51	Moving assistance	23
Computer assistance	293	Bulk mailing	39	Purchased item	22
Minor home repair	275	Housekeeping	33	Organizing/general	22
Tickets to event	256	Sold item	31	Tickets to event	20
Haircuts	252	Postering	27	Minor home repair	19

TABLE 2. Descriptive statistics of time bank characteristics, 1998–2005

	No.	Min	Max	Mean	SD
Organization	950	0	1	0.12	0.324
Males	837	0	1	0.24	0.430
Age	837	6	92	45.04	13.14
Elderly	837	0	1	0.08	0.275
Quarter joined	837	1	29	15.85	8.19
Quarters participated	837	1	29	10.65	7.01
Average no. of transactions per quarter	837	0.00	38.86	1.99	3.61
Average transactions (logged)	837	−0.30	1.60	0.17	0.40
Average no. of contacts per quarter	837	0.00	8.00	0.64	0.84
Average contacts (logged)	837	−0.30	0.93	−0.02	0.24
Left system	837	0.00	1.00	0.34	0.47
Network density	837	0.00	100.00	28.09	32.97
Density (logged)	837	−0.30	2.00	0.82	0.95
Percentage of contacts reciprocated	837	0.00	1.00	0.09	0.18
Reciprocation (logged)	837	−0.30	0.18	−0.24	0.10
External-internal index	837	−1.00	1.00	0.22	0.59

Only 24% (205) of the individual time bank members are male. Clearly, sex is important in determining who joins. Participants in this time bank range in age (as of 2005) from 6^2 to 92 years, and the average is 45 years (year of birth was not available for 87 cases; these missing values were replaced with the mean). The computed senior citizen dummy variable indicates that 8% (69) of individual participants are aged 65 or older. Census 2000 data for the city in which this system operates indicate that 13.9% of the residents of this city are aged 65 or older. This underrepresentation is not surprising given that seniors are more likely to be socially isolated. Since this time bank does not recruit specific types of constituents, the elderly are more likely to lack the social ties that may bring them into such an organization. The next variable identifies the quarter in which the participants joined the system. It ranges from 1 (January–March 1998) to 29 (January–March 2005). Length of membership time is also measured in quarters. The average member has been in the system for roughly 2.5 years (10.65 quarters).

The first set of indicators of member engagement taps into more quantitative dimensions of participation, while the second set concerns more qualitative characteristics. Thus, the first analyses compare magnitude of engagement or general social capital creation. Each individual's average number of transactions (providing or receiving services) per quarter is

computed to control for the time bias of a total transactions measure. Membership length is positively correlated with total transactions here (the longer members are in the system, the more transactions they have been involved in). The average number of exchanges ranges from 0 to 38.86 per quarter, with a mean of 2. The variable is positively skewed, as 18% (154) of individual members have never given nor provided a service. Therefore, a logarithmic transformation of the transactions variable was computed for use in the analyses.

Another quantitative measure of engagement in the system is the average number of member contacts per quarter (the total number of participants with whom each member has transacted divided by the number of quarters participated). This may be independent of the number of transactions since some participants engage in repeat transactions with the same members (having a high number of exchanges but a low number of contacts). One individual in this time bank exchanges with an average of 8 different members per quarter. The average member has fewer than 1 (0.64) unique contact per quarter on average (when length of membership time is not controlled for, the overall average number of member contacts is about 7). This variable was also logged given its skewed distribution.

By the end of the data collection period (March 31, 2005), 34% (288) of all those individuals who had ever joined the system had left at some point and were no longer members. According to the membership coordinator, most of this attrition can be traced to two trends: some people join the system and then move away from the area; others join and never engage in any transactions, eventually dropping out.

The final set of measures is more concerned with the quality or the type of engagement in this system. First, ego network density was computed for each individual's "neighborhood." This measures the extent to which the members with whom one exchanges are engaging in transactions with one another. Some participants are located in highly connected regions of the overall network, while others are in sparse areas. Those in dense networks have more bonding social capital. Density is expressed as a percentage. If a member's contacts have never exchanged with one another, that member's network density is 0%. If all of the contacts have transacted with each other, density is 100%. Individuals in this network have an average density of 28% (a logged version of the variable will be used in the analyses).

Another important indicator of bonding social capital is reciprocation. When a member provides a service to one from whom he or she has previously received a service, that relationship becomes reciprocal. Reciprocation

is significant—it further develops a social relationship; it represents "success" since these two participants have chosen to interact again, and the relationship becomes more egalitarian. A variable was constructed to measure the percentage of all member contacts that are reciprocal relationships. On average, 9% of member contacts are reciprocal (again, a logged variable was also computed).

Finally, the external-internal (E-I) index, a common measure in network analysis, was computed for each participant (see Krackhardt & Stern, 1988; Hanneman & Riddle, 2005). This measure concerns the attributes of who one is tied to—whether his or her alters are in the same group as ego (internal ties) or in a different group (external ties). In this case, five groups were defined, based on the most important member attributes for this study: organizational status, elder status, and sex. The groups are female non-seniors, female seniors, male non-seniors, male seniors, and organizations. An individual's E-I score is the number of ties he or she has external to his or her own group minus the number of ties internal to that group divided by total number of ties. The index ranges from –1 (all ties internal) to +1 (all ties external). Internal ties are homophilous, as participants are exchanging with other members from their same group. External ties are a form of bridging social capital. The average E-I index score is 0.22, leaning slightly to the external ties side. The main findings are presented in the next section.

FINDINGS

The first analysis considers the more quantitative dimensions of engagement in this time bank. The multiple regression models seek to predict the average number of transactions per quarter (logged), the average number of member contacts (logged), and membership status (active versus left system). The main independent variables of interest are elderly status and sex. Two models are estimated for each dependent variable. The first models include the main effects; the second models include interaction terms designating senior versus non-senior status by sex. Two control variables are also included: quarter joined and quarters partici-pated. The major assumptions of ordinary least squares regression are not violated in the models.

All of the models are presented in Table 3. The control variables are both moderately strong positive predictors of the average transactions variable. Those who joined this time bank later engage in a higher number

TABLE 3. Multiple regressions of quantity and quality of time bank engagement on age, sex, and control variables, 1998–2005

	Transactions		Contacts		Membership Status	
	β	β	β	β	OR#	OR#
Quarter joined	0.253***	0.252***	0.262***	0.262***	0.002***	0.002***
Quarters participated	0.404***	0.403***	0.260***	0.259***	0.002***	0.002***
Elderly (nonelderly = 0)	0.031	–	−0.004	–	0.387	–
Males (females = 0)	0.017	–	−0.003	–	2.889	–
Female seniors (FNS = 0)	–	0.052	–	0.013	–	0.575
Male non-seniors (FNS = 0)	–	0.031	–	0.007	–	3.023+
Male seniors (FNS = 0)	–	−0.015	–	−0.027	–	.000
R^2	0.093	0.095	0.046	0.047	0.691	0.692

	Density		Reciprocation		External-Internal Ties	
	β	β	β	β	β	β
Quarter joined	0.030	0.030	−0.105*	−0.105*	−0.100**	−0.102**
Quarters participated	0.402***	0.402***	0.175***	0.175***	−0.056	−0.058
Elderly (nonelderly = 0)	0.033	–	0.033	–	0.279***	–
Males (females = 0)	0.007	–	0.085**	–	0.394***	–
Female seniors (FNS = 0)	–	0.042	–	0.016	–	0.292***
Male non-seniors (FNS = 0)	–	0.015	–	0.075*	–	0.410***
Male seniors (FNS = 0)	–	−0.001	–	0.066*	–	0.205***
R^2	0.149	0.150	0.075	0.076	0.245	0.254

Note. N = 837. #Odds ratios from logistic regression. ***$p < .001$; **$p < .01$; *$p < .05$; +$p < .10$. FNS = Female non-seniors.

of average transactions. As membership grows across time, there are greater opportunities for transactions. Thus, those who entered this bank later came into a thriving system. Those who participate longer in the system also engage in more transactions on average. Apparently, it takes some time to become integrated into this network.

Neither the main nor interaction effects of elderly status and sex are statistically significant predictors of the average number of transactions completed. The elderly engage in no more or fewer transactions than the nonelderly on average. These models explain 9.3% of the variance in transactions. The average number of member contacts model has similar findings. Both control variables are positively associated, but age and sex

have no significant effects. The last dependent variable measuring quantitative engagement is membership status. This is a logistic regression predicting who has left the system. The odds ratios (near zero) for the control variables indicate strong negative relationships. Those who joined earlier are more likely to be inactive, and those who participated for shorter durations are more likely to have exited the system. The members who left the system in the early quarters may have been frustrated with the lack of offerings in the new time bank. Of the elderly status and sex variables, only one is (barely) significant. Male non-seniors are more likely to have exited the system than female non-seniors. These participants have no fewer transactions or contacts than others, so it will be interesting to see whether any of the other findings shed light on why this group may be more likely to exit. These models explain approximately 70% of the variance in membership status.

The next set of models in Table 3 focuses on indicators concerning the quality or the type of engagement in this time bank. The first ones demonstrate a strong positive association between quarters participated and ego network density. Those who have participated longer have denser ego networks. We learned earlier that the longer members participate, the more transactions they engage in and the more contacts they accumulate. It is interesting that density increases with time and (indirectly) the size of one's network. Density usually decreases as the size of a network increases (it is more difficult for people to maintain ties with the same proportion of alters as a network grows). Thus, with more experience in the time bank, members begin exchanging with others who are highly connected. None of the elderly status or sex variables is significant in determining density.

The reciprocation rate is considered next. In the first model, it is seen that those who joined the system earlier are more likely to have a greater percentage of their exchanges reciprocated. This could be a function of the overall size of the network. When there were fewer participants, there was less choice in whom to transact with. The time participated variable has a positive association: The longer members participate, the higher the reciprocation rate. This is unexpected given the dynamics surrounding network size. As members participate longer (in a growing system), they have a greater variety of other members with whom they can transact. If alters were randomly selected in a growing network, reciprocation rates would decrease since there are more alters that could potentially be chosen. Yet in this case, reciprocation increases. Therefore, members are purposely choosing to transact again with the same participants.
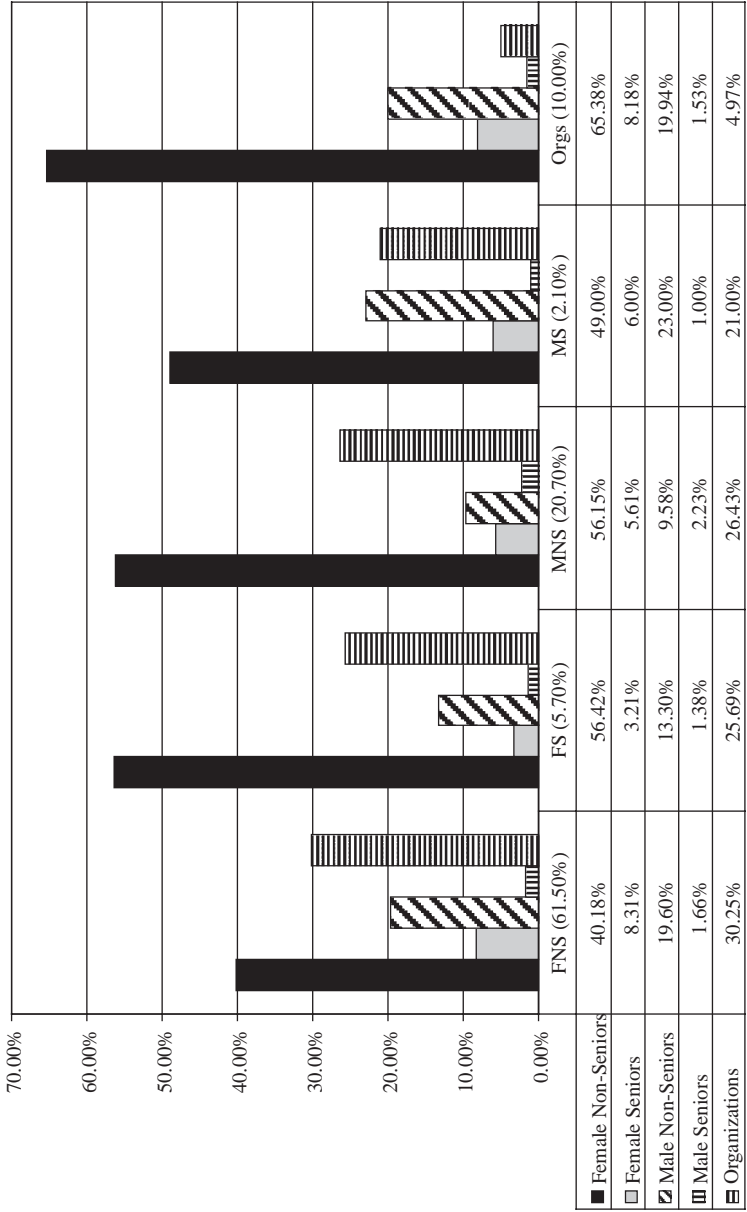
The first reciprocation model also demonstrates that men have slightly higher reciprocation rates than women. This could be due to a number of factors. The ratio of men to women in this system is 1 to 3. When any individual randomly searches for a transaction, odds are that the transaction will be provided by a woman. The evidence so far has indicated that this is not a random network, however. The services that men offer in the system may be more popular and in demand, yet men do not engage in any more transactions than women. So, participants are purposely choosing to transact again with men. There are certainly different trader profiles that exist in this system. Some are more experimental, preferring more variety (less reciprocation) in whom they trade. Others prefer the comfort of a familiar face. This "familiar face" phenomenon is biased toward men somehow. If reciprocation is a form of bonding social capital, men are statistically more likely to generate it in this system. The second model does not differ from the first. The fact that both male interaction terms are significant indicates that this is a main effect due to sex and not age.

The final models predict the E-I ties index. Those who joined this time bank later are more likely to have contacts that are internal to their own age/sex group. Since this is a system that has grown across time, it is interesting that later cohorts are more likely to trade with others like themselves when there are plenty of choices. This finding supports McPherson and Smith-Lovin's (1987) argument that choice homophily (choosing to exchange with those in one's own group) increases with the size of the voluntary organization. For the first time, the quarters participated variable is not significant. With whom members trade is more a function of the stage the system is in rather than how long the members have been participating.

The main and the interaction effects of the elderly status and sex variables are all significant. Senior members are more likely to have external ties than nonelderly participants. Men are more likely to have external ties than women. The interaction terms in the last model indicate that all the age/sex groups are more likely than female non-seniors to have external ties. McPherson and Smith-Lovin's (1987) size argument may help to explain this finding. Female non-seniors are the largest group in this time bank, and the other groups have fewer in-group choices based on their smaller sizes. The next analysis will allow further exploration of homophily in this network. This last model explains one-quarter of the variance in the E-I index.

The final research question to be considered here is: With whom do the elderly transact? Figure 1 identifies with whom each group transacts. The

FIGURE 1. Transactional Contact Among and Between Five Groups in Time Bank, 1998–2005.

	FNS (61.50%)	FS (5.70%)	MNS (20.70%)	MS (2.10%)	Orgs (10.00%)
Female Non-Seniors	40.18%	56.42%	56.15%	49.00%	65.38%
Female Seniors	8.31%	3.21%	5.61%	6.00%	8.18%
Male Non-Seniors	19.60%	13.30%	9.58%	23.00%	19.94%
Male Seniors	1.66%	1.38%	2.23%	1.00%	1.53%
Organizations	30.25%	25.69%	26.43%	21.00%	4.97%

proportion of the network that each group comprises is provided in parentheses next to the abbreviated labels. Since female non-seniors are the largest group in the system (at 61.5%), they are the most frequent group transacted with by all the other groups. If transactions occurred randomly, we would expect the distributions to be rather equal across the rows of the data table. That is, each group's contacts would represent the population as a whole. In this scenario, the homophily that exists would be "induced homophily," representing the composition of the organization (see McPherson and Smith-Lovin, 1987). Yet the regression analysis of the E-I index has already shown that disparity exists, suggesting that there is bias in member's choices. This analysis is more specific and highlights the important role of organizations (which were excluded from the regression analysis).

All four groups of individuals overtransact with organizations. While organizations make up 10% of the time bank membership, they range from being to 21% of male seniors' contacts to 30.25% of female non-seniors' contacts. Individual members have two to three times more contact with organizations on average than their population size warrants. Part of this is due to the fact that many members have transacted with the time bank itself (providing assistance to the office or receiving transportation services, for example). Female non-seniors are most likely to provide and/ or consume the types of services organizations are exchanging.

Considering the relations among individuals, 40.18% of the contacts of female non-seniors are with others like themselves; 8.31% are with female seniors; 19.6% are with male non-seniors; and 1.66% are with male seniors. The internal ties of female non-seniors are lower than expected, and in addition to organizations, they overtransact slightly with female seniors.

Only 3.2% of the transactions of female seniors occur within their own age/sex group (and they make up 5.7% of the system). Elderly female participants are even less likely to transact with male non-seniors (who make up 20.7% of the network but only 13.3% of the contacts of elderly women). Male non-seniors follow a similar pattern—their internal ties are less than half of what they would be if contacts were evenly distributed across the five groups.

Elderly males are the smallest group in this time bank. While nearly half of their transactions are with female non-seniors, that proportion is lower than the latter's population proportion (61.5%). As in the case with the previous groups, male seniors do have a disproportionately greater number of their contacts with organizations. Interestingly, male seniors are the only group that overtransacts with male non-seniors. While the latter comprise 20.7% of the population, they are 23% of elderly males' contacts.

Finally, organizations make up 10% of the time bank, but only about 5% of their transactions are with other organizations. Organizations over-transact with women (both female non-seniors and seniors). Their percentages of transactions with men are roughly equivalent with the group sizes of male seniors and non-seniors. Overall, Figure 1 demonstrates that female non-seniors have the highest proportion of internal ties (40.18/ 61.5 = 65.3%), while male non-seniors have the lowest proportion of internal ties (9.58/20.7 = 46.3%). Since each group undertransacts with itself, participants in this time bank seem to be exercising choice *heterophily*, choosing to transact with members of other groups. This suggests that participants are generating more bridging social capital through their engagement in this time bank.

DISCUSSION AND CONCLUSION

Declining social capital, the role of volunteering, and the aging of the American population have all been prominent topics in an era of scarce governmental resources. Volunteering is argued to be particularly important for the aged, as it benefits the senior volunteers and society as a whole (see Rowe & Kahn, 1998). Voluntary organizations are important sources of social integration (Berkman, Glass, Brissette, & Seeman, 2000; Pillemer & Glasgow, 2000). Numerous studies indicate that volunteering can improve well-being and lessen the likelihood of depressive symptoms among the elderly (See Thoits & Hewitt, 2001; Musick & Wilson, 2003; Li & Ferraro, 2005). This study has sought to assess the extent to which community currencies are relevant for the elderly.

Several interesting trends were revealed here. First, in this time bank, there is a notable sex disparity in the membership. Women are much more likely to join than men. Also, the elderly are underrepresented in this system according to the composition of the population of the city in which it exists. These findings roughly reflect overall volunteerism rates in the United States. Women are more likely to volunteer than men, and participation in voluntary activity peaks at middle age (Wilson, 2000). Also, McPherson and Smith-Lovin (1987) note that homogeneity within voluntary organizations is not unusual—friendship networks (which tend to be homogeneous) are often the basis for voluntary organization recruitment. Despite their lower numbers, the lack of group differences found in Table 3 indicates that the elderly are as active as other participants once they join. These findings parallel those of Lasker and colleagues (2006), who found

no association between members' ages and their self-reported frequency of exchange. Therefore, community currency coordinators should increase their efforts to include older Americans in these systems. Moreover, governmental support to increase the participation of the aged in time banking may be a wise investment.

In this time bank, men a play unique role. Nonelderly males are more likely to have exited this system than nonelderly females. Yet men have higher rates of reciprocation here, generating more bonding social capital. On the other hand, male non-seniors have the lowest proportion of internal ties, suggesting that they are also generating bridging social capital. Also, male seniors make up the only group that overtransacts with nonelderly males. It would be interesting to see whether the role of men would change if they represented a larger share of the system. Regardless, coordinators may also wish specifically to recruit more men. The analyses presented here also highlight the important role of organizations. All of the groups of individuals overtransact with organizations. The services offered and requested by organizational members appear to be in high demand. As in the case of Ithaca Hours (see Jacob et al., 2004b), the role of organizations here underscores their importance in community currencies.

Focusing on the elderly, it was found that male and female seniors undertransact within their own groups and with one another. Aged participants in this time bank are exercising choice heterophily. That is, the elderly exchange primarily with the nonelderly. The diversity within these exchange networks serves as a source of new information and resources, generates bridging social capital, and functions as a basis for the social integration of senior participants.

As Table 1 demonstrated, the types of services that the elderly provide and receive within this system do not differ substantially from the exchanges of all the participants. Overall, participation in time banking appears to be a very positive experience for the elderly. By interacting outside of their age cohort, the elderly become better integrated into society as a whole and are likely to have an increased sense of efficacy and well-being. And it is important not to overlook the fact that the nonaged are also gaining bridging social capital when they exchange with the elderly.

The diversity of the ego networks of elderly participants suggests that community currency systems are more effective in producing bridging social capital than service credit banks. The latter result in homophilous networks since the vast majority of the participants in these programs is elderly. Local currencies, on the other hand, comprise more diverse services and people. While both service credit banks and institution-based

time banks have larger proportions of (and many times exclusively) elderly participants, these programs are more likely to produce the more exclusive, bonding social capital. Exchanges between different generations are minimized or nonexistent in such programs. Given the active involvement of the elderly studied here, it appears that time banking has greater potential to ameliorate some of the social problems faced in an aging society.

The research reported here is limited with its focus on trading activity within a single time bank. Multiple community currency systems should be investigated, and future research should also consider outcome measures. Linking the attitudes and perceptions of elderly local currency participants with their trading activity would provide a much better test of the effectiveness of these programs. For now, the evidence presented here suggests that the participation of the elderly in community currencies is mutually beneficial.

NOTES

1. This time bank's directory of services looks quite similar to that of Ithaca Hours. There is a wide range of services being offered, and alternative health care services (e.g., massage and acupuncture) are very popular. Also, like Ithaca, the city in which this time bank is based is politically progressive (Greens are active and represented in local politics) and tolerant (gay and lesbian rights issues are salient).

2. Ten of the 837 individual participants are younger than 18. These youth are children of adult members in the system and engage in supervised exchanges.

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