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Internet Use and Social Capital: The Strength of Virtual Ties

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Abstract

This paper aims at analyzing the impact of Internet use on the formation and maintenance of social capital. Internet is a convenient and efficient means to maintain existing social ties (strong-tie investments) and/or to create new ties (weak-tie investments). Who invest in these new forms of social activities? To compare the determinants of weak-tie and strong-tie investments on the Internet, we estimate several probit models (discrete choice models) using a Luxembourg household survey. The results show complementarities between online investments in strong ties and membership in voluntary organizations. We also get evidence of substitution effects between online investments and face-to-face contacts with friends. Finally, people who experienced a geographic or professional mobility in the past are more likely to make online investments in social capital (both strong tie and weak tie investments).

Keywords: Social capital, investment, Internet use, strong ties, weak ties

JEL: L86, Z13, D12

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1. Introduction

Sending and receiving e-mails is the most frequent usage of Internet. It enables Internet users not only to communicate with their family, friends or colleagues, but also with anonymous people met in chat-rooms (Parks and Floyd, 1996). Thus, Internet is a new means of communication and socialization that can supplement face-to-face or telephone contacts. Attewell *et al.* (2003) showed however that adolescents with a home computer spend less time practicing sports or playing outside. The Internet may isolate individuals and reduce the time spent participating in social activities, especially if Internet users are mainly engaged in solitary usage (web-surfing, news reading, etc.). Moreover, virtual sociability is not really equivalent to traditional sociability: face-to-face interactions are typically richer than virtual interactions by e-mail, chat or instant message.

The objective of this article is to understand the interplay between Internet use and the building and maintenance of social capital. Social capital refers to the individual's collection of social ties that provides access to assistance, aid, information, or services. Internet usage like e-mail or chat is a social activity that may help maintaining and extending social ties. Following Granovetter (1973), we distinguish two forms of online social activities – strong-tie investments and weak-tie investments. Firstly, Internet may serve to maintain or intensify existing social ties with friends and kin (strong-tie investments). Secondly, Internet can be useful to create virtual ties and to encounter new acquaintances (weak-tie investments). In other terms, Internet enables to strengthen strong ties or to expand weak ones. Our objective is to examine and compare the determinants of these two patterns of online investments. In particular, we want to understand whether such investments are substitute or complement to traditional investments in social capital (face-to-face contacts and participation in political and organizational activities).

This issue is critical because if online and traditional investments are complementary (*substitute*), then the Internet users could accumulate more (*less*) social capital. As Internet users tend to have higher social capital than non users, the digital divide may increase or reduce the inequalities in social capital, depending on the relation between offline and online investments in social capital (Quan-Haase and Wellman, 2004). Moreover, Internet use may also modify the nature of individual's social capital, if the Internet is more favorable to either weak-tie investments or strong-tie investments. By changing the proportion of strong and weak ties in the Internet users' social capital, it may affect their ability to obtain support and emotional aid (provided by strong ties) and to access new ideas, resources or job opportunities (provided by weak ties) (Granovetter, 1973, 1983, 2005).

Related literature

The concept of social capital was initially developed by sociologists (Bourdieu, 1980; Coleman, 1988) and has since been extended to other social sciences, especially economics³. Several studies have examined the influence of social capital and social support on Internet usage (Goldfarb, 2005; Goldfarb and Prince, DiMaggio et al., 2004). For example, Goolsbee and Zittrain (1999) find that people are more likely to shop online if much of their social network (friends and kin) is doing likewise.

This article is not intended to measure the impact of social capital on Internet usage, but rather how Internet use can affect the building and maintenance of social capital. This question has been partially addressed by Franzen (2003), who examines the effect of Internet use on people's social network, measured by the number of close friends and the amount of time spent with them. Based on a Swiss panel of 700 individuals surveyed in 1998 and 2001, he shows that Internet use does not increase or decrease the number of friends and the time spent with

them, but reduces the time spent watching television. Franzen also finds that rich social capital tends to increase the probability of using the Internet.

Following Putnam (2000), Wellman *et al.* (2001) distinguish three forms of social capital: *network capital* (informal relations among friends, neighbors and colleagues), *participatory capital* (involvement in politics and voluntary organizations), and *community commitment* (trust and engagement towards community). Using U.S. data, they find that Internet use supplements network capital⁴ and increases participatory capital, yet undermines community commitment. Kraut *et al.* (2002) show that Internet use increases social interactions with friends and kin, but only for people rich in social capital⁵. Similarly, Katz *et al.* (2001) conclude that Internet users are more heavily involved in voluntary organizations; moreover, longstanding Internet users meet more readily with friends and have larger social networks than either non-Internet users or more recent users. Rippaegen and Kanger (1997) state that e-mail users do not necessarily communicate more extensively with others than non-users of e-mail, yet Internet users are able to communicate more easily with strangers or people outside their social circle (weak ties). Zooten *et al.* (2003) report contrasting effects between Internet use and individual social capital: no correlation with participatory capital (involvement in voluntary organizations), but a limited negative correlation with community commitment (volunteer work, religious activities, charities). Zhao (2006) also emphasizes differences in Internet use between social (e-mail, chat) and asocial activities (web surfing, reading the news). He shows that social users have a larger social network than non-users.

Most of the aforementioned studies indicate the existence of interaction between Internet use and social capital, although causation is often ambiguous. In the remainder of this article, we focus on online investments in social capital and attempt to empirically understand the

³ See Sobel (2002) for a more in-depth discussion on the economic concept behind social capital.

⁴ Consistent with Franzen's findings, Internet use does not increase or decrease the frequency of face-to-face and telephone contacts.

⁵ For people poor in social capital, Internet use tends to reduce their sociability.

motivations for such social activities. For this purpose, we use data from a Luxembourg household survey and estimate several probit models (discrete choice models) to find the similarities and differences in the two forms of online investments in social capital (i.e. investments to strengthen strong ties/to expand weak ties). The econometric results reveal a significant positive impact of *participatory capital* (organizational activities) and *community commitment* (trust) on strong-tie investments, but more ambiguous relations are found between online investments and *network capital* (informal contacts). By contrast, online investments to expand weak ties are poorly related to the Internet users' social capital. Our results also show that geographic or professional mobility tends to increase online investments in social capital (both strong-tie and weak-tie investments). In other terms, The Internet is a convenient and efficient means to maintain and expand social ties for those who experienced mobility in the past.

In the next section, we clarify the concept of social capital and then propose a theoretical framework for analyzing the potential effects of Internet use on individual social capital. Section 3 will present the database and the econometric models used to test our hypotheses. Section 4 will display and comment the estimations. Section 5 concludes.

2. The conceptual framework

2.1 Social capital as an individual attribute

Social capital is a multiform concept that does not build consensus among social scientists (Durlauf, 2002; Manski, 2000). First, social capital can be defined as a community-level feature. Each group or community is characterized by a level of social capital that tends to be correlated with the degree of trust among community members (Bowles and Gintis, 2002). According to Fukuyama (1999) therefore, "*social capital can be defined simply as an instantiated set of informal values or norms shared among members of a group that permits*

*them to co-operate with one another. If members of the group come to expect that others will behave reliably and honestly, then they will come to trust one another. Trust acts like a lubricant that makes any group or organization run more efficiently."*⁶

By contrast, an individual level approach of social capital considers that each individual is characterized by the amount of trusting relationships and social ties "in which he is involved and where he has access" (Laumann and Sandefur, 1998). Social capital is an individual attribute that enables people to obtain greater benefits from social interactions with others, like better working and living conditions, happiness or self-esteem (Glaeser et al., 2002). The individual will accumulate social capital thanks to his intrinsic aptitudes (individuals can be more or less charismatic, extroverted, leadership abilities) and by investing to maintain and expand his social network. Such investments are costly in terms of time, effort and monetary resources; they can consist of joining an association, a club, a political party, or simply meeting friends, organizing a dinner party⁷. But these investments contribute to create social ties with helpful or influential persons. They can increase both the quantity and quality of individual social capital.

Here we keep this individual level approach of social capital and develop a micro-economic framework to examine online investments in social capital and build our research hypotheses.

2.2 Research hypotheses

From a micro-economic perspective, the decision to invest in social capital is a trade-off between the expected benefits and costs, like in physical capital (Becker, 1964). The

6 Similarly, for Putnam (2000): "Social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them."

individual will continue to allocate resources to such social activities as long as the benefits exceed the cost. The cost of investing in social capital largely depends on the individual's skills and intrinsic abilities. Social skills enhance the efficiency of social capital investments: with the same amount of resources, the individual can obtain a better outcome (i.e. can create and/or maintain more social ties). Social abilities tend to increase with both the level of education and the amount of social capital. High educated people have better skills to communicate, manage groups and take advantage of their interpersonal relationships. Similarly, when people accumulate social capital, they become more experienced (learning-by-doing).

The second dimension playing a role in social capital investments is the expected benefits. These benefits are positively linked to the amount of capital owned by the individual - not only social capital, but also economic capital (income) and human capital (education and professional skills). Obviously if an individual has a lot of friends and acquaintances or belongs to many organizations, he will have to spend a lot of time and resources to preserve his existing social ties. But the incentives to invest in social capital are also higher when the individual is rich in economic and human capital, because more social ties may provide assistance, information, or advice about how to enhance the return of one's education or property (access to better jobs or business opportunities for example).

Then, how does Internet use affect the investment decisions in social capital? First the Internet is a technology that reduces the cost of investing in social capital, even if the quality and the expected return of such investments is probably lower than with face-to-face investments. The Internet increases the productivity of many social activities: with the same amount of resources and time, people can be involved in more organizations and maintain more social

⁷ Note that these individual investments in social capital can generate positive externalities (such as when an individual joins a club), but can also have negative externalities (e.g. when a person appoints to a position envied

ties. E-mails can efficiently replace time-consuming meetings (the same e-mail can be sent to many friends or to all the members of an organization). People who need to invest a lot in social capital will have higher incentives to adopt this efficiency-enhancing form of investments.

Hypothesis 1 (H1): People rich in social, human and economic capital are more likely to invest online in social capital.

An Internet user has a higher propensity to exert social activities on the Internet if he/she is well educated and has a high income and a rich collection of social ties. Hypothesis 1 underlines that the Internet is becoming a convenient and efficient means to maintain and expand individual social capital that supplement face-to-face investments.

A second impact of Internet use deals with individual mobility. Like physical capital, social capital tends to depreciate over time if the individual decides to reduce or stop his investments in social capital, even if the depreciation rate is much lower than for physical capital (Sobel, 2002). But the main source of depreciation is when people move to another city or quit an organization. In particular, geographic mobility tends to loose or weaken many social ties with friends, neighbors or colleagues one had in his previous location. However, the Internet can lower this depreciation by facilitating contacts with geographically dispersed friends or acquaintances. Thanks to the Internet, it is possible to maintain strong ties despite the distance. But the Internet can also be a convenient means to meet new acquaintances and recreate (virtual) sociability for people who have moved in a place where they have no friends or kin. From this point of view, Internet should modify the nature of social capital for those

by others).

who experienced mobility in the past. Their social capital should be more virtual, with a lot of computer-based social interactions with their relatives and with new “virtual” friends.

Hypothesis 2 (H2): People who experienced mobility in the past are more likely to invest online social capital, either to maintain strong ties or to create new weak ties.

For such people, online investments tend to be a substitute to offline investments; especially in the case of geographic mobility because the time spent on the Internet can reduce face-to-face sociability and the involvement in local voluntary organizations.

In the next sections, we will test these two hypotheses, by examining the determinants of online investments for a representative sample of Internet users living in Luxembourg. We start by presenting data, the methodology and the variables used in the econometric models.

3. Method and data

3.1 Data collection

The data come from a survey conducted in Luxembourg and contain 1,554 individuals aged between 16 and 74 (see Box 1 for details).

The survey provides the demographic characteristics of respondents, their IT usage, in particular Internet usage, their leisure occupations, but also their values and social activities. Tables 3 and 4 (in the Appendix) present the list of the variables used in the econometric models and provide some statistics for all the respondents and the sample of Internet users. 51% of respondents declared to have used the Internet within the three previous months. 46% of the Internet users were connected online daily.

Box 1. Description of “ICT Usage by Household” survey and “European Social Survey”

The “ICT Usage by Household” survey is part of the “e-Europe 2005” program and is intended to collect data relating to IT usage by households across the European Union. Consequently, each Member State of the European Union implemented this survey in accordance with a common methodology and a set of common questions. The questionnaire is composed of two parts: the first focuses on IT use by individual Luxembourg residents, and the second part, entitled “European Social Survey”, deals with the opinions of individuals on various topics, such as politics, values, etc.

Technical details of these surveys

The sample was extracted from the registration file of the Inspector General of Social Security (IGSS) that covers 91% of the population living in Luxembourg. The sample selection method was implemented in two phases. First, a random stratified sample of fiscal households was selected based on three criteria: the number of household members, (1, 2, 3 or more), the professional status of the head of household and the health insurance agency where the head of household is registered. Our sample was composed of 5,033 fiscal households. The unit of observation is the fiscal household, yet individual-level data were also collected. In the second phase, the Kish method was employed to select an individual between 16 and 74 years old within the surveyed household to be the household respondent (the individual whose birthday was closest to the first of January). 1,554 respondents (representative of the Luxembourg population) were selected and surveyed face-to-face between mid-April 2002 and mid-August 2002.

Balancing the sample

The sample balancing step was performed to reduce the bias arising from a lack of homogeneity between the population and the responses, in addition to improving representativeness of the 1,554 respondents. The weights of each individual were determined according to the CALMAR procedure (calibration" method at the margins). This method consists of balancing the sample using additional information or “calibration” variables (gender, age or professional status).

3.2 The econometric model

The econometric model is a probit or discrete choice model that perfectly fits binary decisions like investing in social capital or not. This model considers that for each individual $i=1, \dots, n$, the binary dependent variable y_i {either 0 or 1} is the result of a decision making process influenced by some independent variables x_i . Here, $y_i=1$ when the individual decides to invest in social capital by the means of the Internet and $y_i=0$ otherwise. Formally, $y_i = 1$ if $y_i^* > 0$ and $y_i = 0$ if $y_i^* \leq 0$, with $y_i^* = x_i\beta + \varepsilon_i$ where ε_i is the random error term (normally distributed), x_i the set of independent variables that explain the decisions of investments and β the vector of coefficients associated to each independent variable. Thus the probability or likelihood that an Internet user i invests online is given by $P(y_i = 1) = P(x_i\beta + \varepsilon_i > 0) = F(x_i\beta)$ where F is the cumulative function of the normal law.

And the likelihood function is given by $L = \prod_{i=1}^n [F(x_i\beta)]^{y_i} [1-F(x_i\beta)]^{1-y_i}$. The coefficients β

are estimated by maximizing the log of the likelihood function

$$\text{Log}L = \sum_{i=1}^n [y_i F(x_i\beta)] [(1-y_i)(1-F(x_i\beta))]$$

Now we will describe the dependent and independent variables introduced in the probit model.

3.3 Variables used

The objective of our study is to understand what influences online investments in social capital. What do these investments consist of? Are they substitute or complement to more traditional forms of investment?

Dependent variables

Our survey provides detailed information on Internet usage. In particular, Internet users were asked whether Internet has enabled them to increase or intensify ties with relatives (INTENSIFY), to take up with persons again (RE-TIE), to get to know new persons (KNOW) and/or to meet physically persons known by means of the Internet (MEET)⁸.

Among the 1,554 respondents, 31% acknowledged that they experienced at least one of these 4 situations. In other terms, 61% of Internet users had online social activities, whereas 39% considered that Internet had no impact on their social ties. Each situation can be analyzed as a form of online investment in social capital. The first form of investment (INTENSIFY) aims at strengthening strong ties, whereas the two latter forms (KNOW and MEET) are devoted to expand weak ties. The second form (RE-TIE) can be assimilated to a strong-tie investment:

the Internet is used to renew ties with relatives out of touch. Thus our data enables us to distinguish between the two main motivations when investing in social capital: maintaining existing ties (strong ties) and creating new ties (weak ties). Strong tie investments were mentioned by 51% of Internet users (i.e. 41.1% for INTENSIFY and 31.3% for RE-TIE), while weak ties investments were only performed by 34% of Internet users (32.6% for KNOW and 19.8% for MEET).

To analyze the determinants of online investments, we estimate a probit model for each of these four online investment patterns. The dependent variables (INTENSIFY, RE-TIE, KNOW, MEET) are binary. For example, INTENSIFY is equal to 1 if the Internet user declares to have intensified his ties with his relatives by means of the Internet (and 0 otherwise). We also estimate a probit model where the dependent variable (SOCIALUSE) equals 1 if the individual has yet used the Internet to invest in social capital (whatever the form of investments). SOCIALUSE is equal to 0 for those who have only solitary usage on the Internet (39% of the Internet users in our survey).

We will now describe the independent variables and their expected effects on the decision to invest online in social capital.

Independent variables

In the empirical literature on social capital, there are several methods to measure social capital. First, social capital can be measured by the number or density of social ties with close friends (Granovetter, 1973; Kraut *et al.*, 2002; Franzen, 2002). It can also be measured by the number of associations or organizations in which the individual is involved (Putnam, 2000; Glaeser *et al.*, 2002). Another measurement instrument is the trust in others or in institutions

⁸ The latter is a sub sample of the respondents who declared to have made new acquaintances thanks to the Internet, and have decided to meet physically their virtual friends.

(Putnam, 2000; Fukuyama, 1999). These different measurements correspond to the three dimensions of social capital identified by Wellman et al. (2001): social network, participatory capital and community commitment.

Our data provide information on these three dimensions. First, we are aware of the frequency with which individuals spontaneously encounter friends. Three binary variables have been built: the individual spontaneously meets friends several times a day (DAY), several times a week (WEEK) and less than once a week (MONTH). We would expect that those who interact more frequently with friends will have a higher amount of social capital and will invest more online to maintain their existing social ties (INTENSIFY) than to create new ties (KNOW and MEET).

Concerning *participatory capital*, we know the number of associations, but also the type of associations in which the individual is involved⁹. We make a distinction between "leisure" associations (where membership usually implies face-to-face relationships and a minimum of participation) and civic associations (where membership often takes the form of a financial support without any physical contacts or meetings). Leisure type associations include sporting clubs, organizations for promoting cultural and leisure activities, social and youth clubs, retirees' associations, religious and fellowship organizations. Civic associations comprise trade unions, professional societies, consumer rights groups, human rights associations and NGO, environmental protection organizations, peace activist groups, animal rights groups, political party and school associations. Amongst the 796 Internet users surveyed, 71% belong to a leisure association, 57% to a civic association and 15% do not belong to any type of association. Membership however does not indicate the degree of involvement i.e. the intensity of investment in social capital (Glaeser *et al.*, 2002). For this purpose, we distinguish the number of association membership and the number of associations in which the individual

is actively engaged (i.e. work for the association). 14% of Internet users declared to be active in a leisure association and 6% in a civic association.

Being involved in political or organizational activities is most of the time a traditional form of investment in social capital (implying face-to-face contacts). An intense participation in many associations can reduce the time available to invest online in social capital. But the Internet becomes increasingly diffused in the associations and plays a key role in their functioning. It enables members to communicate together, to coordinate actions at distance, to share information, etc. Active membership should affect positively the decision to invest online to intensify social ties, especially to strengthen ties with active members of associations in which one is involved. By contrast, it should reduce the probability to use the Internet to get to know and meet new persons (less time available for meeting new acquaintances).¹⁰

The last measurement of social capital is trust in others. Trust is a continuous variable with values ranging from 0 to 10 (with 0 when respondents declare that they cannot trust others and 10 if you think that a majority of people behave honestly)¹¹. A high level of trust towards others is presumed to be a prerequisite for investing online, especially for meeting new persons. Indeed, compared to face-to-face interactions that facilitate the transmission of feelings and intention, a computer-mediated interaction can be source of misunderstanding and mistrust (Bonnet and Frey, 1999).

⁹ However, we are unable to calculate the exact number of association memberships. Because the individual only declares whether he belongs at least to one association (for each type of associations). So we cannot discriminate between an individual who is engaged in one sport club and the one who attends several clubs.

¹⁰ Except if the individual is engaged in online associations, through which he can meet new acquaintances. Unfortunately our data does not make distinction between online and offline associations.

¹¹ However, Glaeser *et al.* (2000) questioned the reliability of trust inferred from such declarative answers. Glaeser *et al.* (2000) found that responses were often imperfectly correlated with trust derived from an experimental trust game. A trust game is a two-person game, where the first has to choose the proportion of his endowment he will send to the other player (he can send nothing, all his money or only a portion. The second person receives three times the amount of money sent by the first and has to decide how much money to send back to the first player. Theoretically, the optimal strategy for the second player is to send nothing back, which means that the first person's optimal strategy is to send nothing initially. However, experimental trust games are always characterized by a large proportion of players who send money or return money. The amount of money sent is a measure of the trust between both players.

Table 1 compares Internet and non-Internet users with respect to the three measurements of social capital. We observe that Internet users are, on average, involved in more (civic and leisure) organizations (2.08) than non-users (1.71)¹² and declare a greater level of trust. They also demonstrate higher sociability¹³: 25% of Internet users spontaneously meet friends every day, whereas only 16% of non-users have this intensity of sociability. However, the difference of social capital between social Internet users and solitary Internet users is not significant.

Table 1 Social capital of Internet users and nonusers

	Non-Internet users	Internet users	Social Internet users
Membership	1.71	2.08	2.06
Trust	5.06	5.35	5.52
Spontaneous contacts with friends everyday	16%	25%	26 %

To test H2, we consider two forms of mobility: geographic mobility and professional mobility. The former is measured by a binary variable that equals 1 when the individual has resided in the Grand Duchy of Luxembourg for less than five years (MOBILITY) and by a binary variable that equals 1 when the individual's mother and father were both born in Luxembourg (PARENTS). For the second form of mobility, a binary variable indicates whether the individual has experienced a period of unemployment of three months or longer over the past five years (UNEMPLOYMENT). Internet users having experienced one of these forms of mobility are likely to invest more to maintain ties with their original community and/or to renew social ties in their new place.

Online social activities will also depend on the time spent on the Internet. Light users are less likely to know and meet new acquaintances or to intensify their link with their friends and kin

¹² The two means are statistically different from zero at 1%.

¹³ The means are also statistically different at 5%.

than heavy users. The intensity of Internet use (ONLINE) is measured by the average weekly time spent on the Internet (whatever the place – at home, at the office ...).

We also introduce demographic variables as controls: gender, age, age squared (to take into account non-linear age effects), marital status (living with a partner), household size and location (living in an urban area or not). We presume that age could exert a negative impact on online social investments. Young generations are more familiar with Internet and have massively adopted this technology to communicate and interact with their friends. By contrast, older generations are less at ease with the Internet and can find a limited interest to maintain social ties by the means of the Internet if most of their relatives are not connected. Being single can increase the incentives of using Internet to make new acquaintances and meet potential partners. Many people think that the Internet is a worldwide dating club and the success of websites like Match.com proves the increased role of the Internet to seek partners.

The respondents' level of education is also taken into account through three dummy variables (LOW EDUCATED, MEDIUM EDUCATED, HIGH EDUCATED)¹⁴ in order to measure their human capital. As human capital enhances efficiency of social capital investments, higher education should increase the probability to invest online in social capital.

Economic capital is not directly measured by the household income, but rather by the opinion the individual holds on his/her standard of living. A question in the ESS survey indicates whether individuals consider that their current household income allows them to live comfortably (HIGH INCOME), to make ends meet (MEDIUM INCOME), or to struggle financially (LOW INCOME). A higher economic capital increases the expected benefits of social investments and may encourage using Internet to maintain or expand social ties.

¹⁴ Low education corresponds to a pre-high school level, medium education to a high school level and high education to the university level.

Table 5 (in the Appendix) presents the correlation matrix of the independent variables introduced in our econometric models. Except for Age and Partner (negatively correlated), we do not find any significant correlation¹⁵.

3.3 Correction for selection bias

The probit models on the different forms of online social investments are estimated on the sample of Internet users. But if the population of Internet users is different from the general population, estimations can be biased (selection bias). Indeed, the decision to maintain social ties and/or to meet new person by means of the Internet is conditional to the choice of using Internet. And this decision of adopting Internet is largely influenced by the amount of individual capital (economic, human and social capital) that also plays a key role in the online investment choices.

This bias can be corrected by applying the Heckman method (1979), which consists of first estimating the probability of Internet use and then calculating for each Internet user the inverse Mill ratio (this corresponds to the normal density function divided by the normal cumulative function). In the second step, this ratio is introduced into the Probit models of social capital investment as an explanatory variable. The estimated coefficient *RHO*, associated with the inverse Mill ratio, thus measures the correlation in the errors of the Internet use model and the model of online social capital investment (Maddala, 1983; Breen, 1996). When this coefficient is significantly different from zero, the presence of selection bias is proved.

For the first step Probit model, the dependent variable is the decision to use Internet over the previous three months.¹⁶ The independent variables are partly the same as in the second step.

¹⁵ However, the test of Variance Inflation Factors (VIF) has not revealed a serious problem of collinearities in our estimations. VIF measures the inflation in the variances of the parameter estimates due to collinearities that could exist among the independent variables. Even if there is no formal criteria for deciding if a VIF is large

We control for demographic characteristics: gender, age, age squared, household size, marital status, location, education and income levels. We also take into consideration the amount of social capital (frequency of spontaneous meetings, membership in leisure or civic associations and trust). Specifically for this first step probit, we also control for the use of media other than the Internet, like newspapers and television since these leisure activities reduce the time available for the Internet (Attewell *et al.*, 2003; Gershuny, 2003). Watching TV is measured by a continuous variable from 0 (no TV) to 7 (more than three hours per day).¹⁷ Similarly, a continuous variable measures the time spend reading newspapers from 0 (no reading) to 7 (more than 3 hours per day). Finally, we have introduced several additional variables to control for high-tech equipments (smart phone, DVD player, video games console, GPS).

4. Results

Table 3 presents the parameter estimates for the five specifications of online investments in social capital.¹⁸ Each column presents the second step probit estimates and the selection probit estimates. Concerning the second step probit, we indicate the log-likelihood, the error correlations (RHO) and the percentage of concordance¹⁹. We first comment the results for the selection probit (the decision to use the Internet).

enough to affect the predicted values, the VIF of the independent variables in our probit models can be considered as reasonably low (lower than 2).

¹⁶ We have chosen Internet use during the last three months (whatever the place) rather than an Internet access at home, since individuals can also use the Internet elsewhere (at work, at school, in public places). Among survey respondents, 80% were connected to the Internet at home, 37% at work, 25% at their school/university, and 15% elsewhere (public library, post office, association/club).

¹⁷ This variable is equal to 1 for watching TV less than half an hour, 2 for watching TV between half an hour and one hour, 3 for watching TV between one hour and one hour and half, etc.

¹⁸ Estimations were run in STATA 8.

¹⁹ The % of concordance is obtained by calculating the predicted values of online investments (the dependent variable) for each individual. When the predicted value is lower than 0.5, the predicted probability is equal 0, when it is higher than 0.51, the predicted probability equals 1. Then, we compare the observed and predicted probabilities to obtain the % of good prediction, called percentage of concordance.

4.1 Social capital and Internet use

The probability of using the Internet decreases with age and increases with education and income (i.e. with individuals' human and economic capital). Internet use is rather complementary with other IT equipments like smartphone, GPS or DVD player. TV and Internet seem to be substitute. The probability of using the Internet decreases with the time spent watching TV. We do not find a similar relation between Internet and newspapers.

Social capital has a positive but limited impact on Internet use. Participation in leisure or civic associations increases the probability to adopt the Internet. We can interpret it as indirect evidence that the Internet plays a central role in the functioning of associations, providing members with an efficient means of communication and coordination. Being involved in many associations create a need to access Internet. However, sociability and trust have no impact on the decision to adopt the Internet.

We now analyze the determinants to invest online in social capital (the second step). Results (column 1) show that the decision to undertake social activities on the Internet depend both on the amount of social capital and mobility. Those who invest in social capital tend to be more involved in leisure associations and have a higher degree of trust. They also are heavy Internet users and have at least one parent born abroad. Parents originated from another country mean that family is geographically dispersed and the Internet seems to be a convenient tool to maintain such distant ties or take up with relatives again.

We now consider separately the four patterns of online investments (columns 2-5).

Table 3: The determinants of different of online investments

Second step Probit - Dependant variables: Online investments in social capital					
	Coefficient (standard error)				
	SOCIALUSE	INTENSIFY	RE-TIE	KNOW	MEET
GENDER	0.087 (0.102)	-0.025 (0.100)	-0.131 (0.100)	0.166 (0.109)	0.05 (0.115)
AGE	-0.032 (0.021)	-0.017 (0.020)	-0.001 (0.021)	-0.054*** (0.025)	-0.062*** (0.025)
AGE2	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001*** (0.001)	0.001*** (0.001)
PARTNER	-0.175 (0.136)	-0.118 (0.133)	-0.169 (0.135)	-0.372*** (0.144)	-0.143 (0.155)
SIZE	-0.058 (0.039)	-0.035 (0.0394)	0.0126 (0.039)	-0.059 (0.042)	-0.050 (0.046)
URBAN	-0.005 (0.099)	-0.071 (0.100)	0.192** (0.100)	-0.070 (0.105)	0.071 (0.115)
MEDIUM EDUCATED	-0.067 (0.146)	0.062 (0.150)	0.059 (0.163)	-0.256* (0.149)	-0.400*** (0.151)
HIGH EDUCATED	0.099 (0.226)	0.296 (0.218)	0.121 (0.250)	-0.570*** (0.229)	-0.375* (0.230)
MEDIUM INCOME	0.265 (0.265)	0.3898 (0.282)	0.005 (0.274)	0.452 (0.297)	0.122 (0.306)
HIGH INCOME	0.145 (0.289)	0.408 (0.305)	-0.115 (0.298)	0.212 (0.321)	-0.078 (0.327)
MOBILITY	-0.092 (0.216)	-0.271 (0.207)	-0.342* (0.208)	-0.017 (0.219)	0.171 (0.242)
UNEMPLOYMENT	0.264 (0.213)	0.380** (0.209)	0.080 (0.210)	0.746*** (0.215)	0.261 (0.231)
PARENTS	-0.280*** (0.102)	-0.383*** (0.105)	-0.180* (0.105)	-0.121 (0.108)	-0.250** (0.118)
ONLINE	0.001*** (0.001)	0.001 (0.001)	0.0001 (0.001)	0.001*** (0.001)	0.001*** (0.001)
TRUST	0.073*** (0.024)	0.052*** (0.023)	0.060*** (0.024)	0.040* (0.026)	0.039* (0.027)
VOLUNTEER	0.028 (0.077)	0.175*** (0.078)	-0.038 (0.080)	-0.069 (0.094)	-0.001 (0.092)
LEISURE MEMBERSHIP	0.111** (0.059)	0.109** (0.059)	0.137** (0.061)	0.035 (0.065)	-0.011 (0.067)
CIVIC MEMBERSHIP	-0.052 (0.057)	-0.097* (0.057)	-0.043 (0.060)	-0.029 (0.065)	-0.010 (0.070)
DAY	0.011 (0.139)	0.118 (0.140)	-0.041 (0.140)	0.029 (0.149)	0.064 (0.156)
WEEK	0.112 (0.114)	0.272*** (0.116)	-0.141 (0.120)	-0.011 (0.126)	-0.072 (0.138)
CONSTANT	0.731 (0.515)	-0.269 (0.512)	-0.222 (0.534)	0.610 (0.532)	0.538 (0.556)
SELECTION PROBIT Dependent variable: having used the Internet during the last three months					
GENDER	0.087 (0.083)	0.088 (0.083)	0.089 (0.083)	0.092 (0.084)	0.087 (0.083)
AGE	-0.065*** (0.019)	-0.065*** (0.019)	-0.067*** (0.019)	-0.063*** (0.020)	-0.064*** (0.019)
AGE2	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
PARTNER	-0.172* (0.114)	-0.179* (0.114)	-0.164 (0.116)	-0.189* (0.115)	-0.173* (0.114)
SIZE	-0.012 (0.035)	-0.013 (0.035)	-0.008 (0.036)	-0.011 (0.035)	-0.014 (0.034)
URBAN	-0.047 (0.087)	-0.045 (0.087)	-0.038 (0.088)	-0.047 (0.087)	-0.040 (0.087)
MEDIUM EDUCATED	0.611*** (0.097)	0.599*** (0.097)	0.605*** (0.097)	0.610*** (0.097)	0.606*** (0.097)
HIGH EDUCATED	1.146*** (0.129)	1.131*** (0.128)	1.130*** (0.127)	1.170*** (0.137)	1.148** (0.131)
MEDIUM INCOME	0.414*** (0.162)	0.406*** (0.161)	0.408*** (0.162)	0.419*** (0.161)	0.411*** (0.160)
HIGH INCOME	0.769*** (0.160)	0.770*** (0.160)	0.767*** (0.160)	0.791*** (0.162)	0.778*** (0.160)
SMARTPHONE	0.269*** (0.093)	0.277*** (0.093)	0.271*** (0.092)	0.273*** (0.092)	0.276*** (0.092)
DVD	0.458*** (0.089)	0.444*** (0.090)	0.460*** (0.090)	0.424*** (0.090)	0.429*** (0.089)
CONSOLE	0.067 (0.107)	0.103 (0.099)	0.066 (0.112)	0.104 (0.097)	0.132 (0.095)
GPS	0.577*** (0.204)	0.609*** (0.197)	0.593*** (0.201)	0.581*** (0.210)	0.596*** (0.202)
TV	-0.035* (0.020)	-0.037** (0.020)	-0.037** (0.020)	-0.028 (0.024)	-0.033* (0.001)
NEWSPAPER	0.017 (0.029)	0.018 (0.029)	0.026 (0.031)	0.014 (0.029)	0.021 (0.029)
DAY	-0.011 (0.121)	-0.008 (0.121)	-0.025 (0.123)	0.009 (0.123)	0.009 (0.122)
WEEK	-0.032 (0.094)	-0.038 (0.094)	-0.0396632 (0.0940588)	-0.045 (0.094)	-0.046 (0.094)
LEISURE MEMBERSHIP	0.101** (0.052)	0.102** (0.052)	0.101** (0.052)	0.099** (0.052)	0.097** (0.052)
CIVIC MEMBERSHIP	0.098** (0.055)	0.097* (0.056)	0.099* (0.056)	0.100** (0.056)	0.100** (0.056)
LEISURE VOLUNTEER	0.032 (0.144)	0.044 (0.148)	0.025 (0.140)	0.035 (0.146)	0.048 (0.146)
CIVIC VOLUNTEER	0.175* (0.102)	0.163* (0.104)	0.164* (0.101)	0.163* (0.104)	0.165* (0.104)
TRUST	0.023 (0.018)	0.023 (0.018)	0.023 (0.018)	0.023 (0.018)	0.023 (0.018)
CONSTANT	0.950** (0.449)	0.955** (0.453)	0.970** (0.451)	0.868** (0.475)	0.900** (0.463)
Sample size	713	720	720	720	720
Log-likelihood	-1019.225	-1035.807	-1002.908	-950.8828	-892.5412
rho	-0.460	-0.244	-0.435	-0.445	-0.392
% of concordance	63.75	62.91	60.00	75.41	80.00

Remarks : * coef. significant at a threshold of 10%, ** coef. significant at a threshold of 5%, *** coef. at a threshold of 1%.

4.2 The Internet as a means for strengthening strong ties

Column 2 (Table 3) displays the determinants of *online* investments aimed at intensifying social ties with friends and kin. Socio-demographic characteristics have no influence, except the nationality of parents. When at least one parent was born in another country, the Internet is well a means to keep in touch with friends and kin still living in this country. Similarly a (involuntary) professional mobility increases strong-tie investments on the Internet.

Column 3 shows similar effects. Individuals who have experienced mobility (i.e. who lived in another country five years ago) tend to use the Internet to take up relatives again. Thus, the Internet serves to lower social capital depreciation after individuals have moved. This is consistent with hypothesis 2.

Concerning the impact of social capital, trust increases the probability of strengthening strong ties thanks to the Internet. We find also interesting relations between participatory capital and online investments. Being actively involved in many associations or just a member of several leisure associations encourages individuals to invest online in strong ties. Complementarities exist between online and offline investments in social capital as predicted in the hypothesis 1. However, people tend to invest less online when they are members of civic associations.

Finally, people who meet friends frequently (every day) or rarely (less than once a week) are less likely to interact online with their friends than those who meet friends only several days a week. This can be interpreted as weak evidence that certain Internet users tend to substitute face-to-face contacts by computer-mediated contacts in their interpersonal relationships. Using the Internet to communicate with friends reduces the time or the necessity to meet them physically. But this substitution effect can also arise from the difficulty to meet friends everyday (job constraints, transports, etc.) and in such case, the Internet is a convenient tool to keep contact with them everyday (at anytime and anyplace).

4.3 The Internet as a means for expanding weak ties

Investments via the Internet to diversify social capital (columns 4 et 5) are strongly correlated with age, education and marital status. Meeting new acquaintances through the Internet is more frequent for younger, low-educated people and those living alone²⁰. Other socio-demographic characteristics have no influence.

Consistent with the hypothesis 1, the amount of economic and social capital (degree of trust, sociability, and membership) has no impact on the decision to invest online in weak ties. Trust seems to matter only for strengthening strong ties with friends and kin. It is certainly more difficult to place trust in anonymous persons met on the Internet (Markey and Wells, 2002).

Heavy Internet users meet more frequently new acquaintances. The Internet is a useful means to create weak ties and accumulate a new form of social capital, called virtual social capital. But such investments require spending a lot of time connected to the Internet (Smoreda and Thomas, 2001; Lenhart *et al.*, 2000; Parks and Floyd, 1996).

Finally, the fact of experiencing a rupture in one's professional career (i.e. unemployment) or having his or her parents born abroad increases the probability of using the Internet to diversify his social network. This finding is consistent with the hypothesis 2.

5. Discussion and conclusion

Our article has examined how Internet use can affect the formation and maintenance of social capital. Our conceptual framework has underlined the importance of costs and benefits when deciding to invest in social capital. From this perspective, the Internet can decrease the cost of investing in social capital and reduce the depreciation of social capital, especially for people

leaving their community or any organization. Internet enables to abolish distance and facilitate many-to-many interactions. People who are rich in social capital or experienced mobility in the past should have higher incentives to invest online in social capital, mostly to strengthen strong ties.

To test these predictions, we have used a survey on Luxembourg households conducted in 2002. We have found complementarities between online investments to strengthen strong ties and active participation in associations (especially leisure associations in which face-to-face contacts are important).

Another finding is the difference between young and old generations. Meeting new persons thanks to the Internet is quite specific to young generations. Consequently, young people should have social capital composed of more weak ties (a more sparsely knit social network). This may attenuate social support and aid that they could obtain from strong ties, but they may access to more information and ideas according to the *strength of weak ties* theory (Granovetter, 1973).

Moreover, the massive diffusion of Internet could stimulate individual mobility by reducing one of the main obstacles –the fear to depreciate individual social capital. Thanks to the Internet, people can preserve most of their existing social ties when leaving a place or a firm. These results underline the vital role played by the Internet in the formation of social capital, even though the links between strong-tie and weak-tie investments or between online and face-to-face investments are extremely complex and require further studies.

²⁰ It is fairly consistent with the conclusions of Parks and Roberts (1997), according to whom the majority of personal relationships on the Internet, in particular via chat-rooms (Multi-User Dimension, Object Oriented: MOO) are established with members of the opposite sex.

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Table 3: List of the variables

Variable	Description
INTERNET USE	Has used the Internet for the last 3 months (binary)
SOCIALUSE	Internet use to invest in social capital whatever the form (binary)
INTENSIFY	Internet use to intensify ties with friends and kin (binary)
RE-TIE	Internet use to take up with persons again (binary)
KNOW	Internet use to know new persons (binary)
MEET	Internet use to meet physically new persons (binary)
GENDER	Male (binary)
AGE	Age (continuous)
AGE2	Age squared (continuous)
PARTNER	Living with a partner married or not (binary)
SIZE	Number of persons in the household
URBAN	Living in urban areas (binary)
LOW EDUCATED	Pre-high school level (binary) - reference
MEDIUM EDUCATED	High school level (binary)
HIGH EDUCATED	University level (binary)
LOW INCOME	Income insufficient to support comfortable lifestyle (binary) – reference
MEDIUM INCOME	Income just sufficient to support comfortable lifestyle (binary)
HIGH INCOME	Income more than sufficient to support comfortable lifestyle (binary)
SMARTPHONE	Having a smart phone with advanced functionalities (binary)
DVD	Having a DVD player (binary)
CONSOLE	Having a game console (binary)
GPS	Having GPS in his/her car (binary)
ONLINE	Weekly time spent using Internet for personal or professional usage (minutes)
TV	Time spent watching TV (continuous)
NEWSPAPER	Time spent reading newspaper per day (continuous)
DAY	Unplanned meetings with friends several times a day (binary)
WEEK	Unplanned meetings with friends several times a week (binary)
MONTH	Unplanned meetings with friends less than once a week (binary) - reference
LEISURE MEMBERSHIP	Membership in leisure associations (number)
CIVIC MEMBERSHIP	Membership in a civic associations (number)
LEISURE VOLUNTEER	Active participation in leisure associations (number)
CIVIC VOLUNTEER	Active participation in civic associations(number)
VOLUNTEER	Active participation in associations (number)
TRUST	Trust in the others (continuous)
MOBILITY	Has lived in Luxembourg for at least 5 years (binary)
PARENTS	Father and mother born in Luxembourg (binary)
UNEMPLOYMENT	Has experienced a period of unemployment of more than 3 months in the last five years (binary)

Table 4: Statistical description of the variables used in the econometric models

	All the population		Internet users			
	N	Average	N	Average	Min	Max
INTERNET USE	1554	0.512 (0.500)	796			
SOCIALUSE	/	/	795	0.616 (0.486)	0	1
INENSIFY	/	/	795	0.411 (0.492)	0	1
RE-TIE	/	/	795	0.313 (0.464)	0	1
KNOW	/	/	795	0.325 (0.468)	0	1
MEET	/	/	795	0.197 (0.398)	0	1
GENDER	1554	0.473 (0.499)	796	0.518 (0.499)	0	1
AGE	1554	42.169 (18.548)	796	32.185 (14.020)	13	101
PARTNER	1524	0.599 (0.490)	778	0.505 (0.500)	0	1
SIZE	1554	3.2413 (1.487)	796	3.536 (1.407)	1	10
URBAN	1523	0.468 (0.499)	783	0.448 (0.497)	0	1
LOW EDUCATED	1554	0.350 (0.477)	796	0.228 (0.420)	0	1
MEDIUM EDUCATED	1554	0.399 (0.489)	796	0.456 (0.498)	0	1
HIGH EDUCATED	1554	0.190 (0.392)	796	0.285 (0.451)	0	1
LOW INCOME	1524	0.099 (0.299)	773	0.046 (0.210)	0	1
MEDIUM INCOME	1524	0.354 (0.478)	773	0.297 (0.457)	0	1
HIGH INCOME	1524	0.545 (0.498)	773	0.655 (0.475)	0	1
ONLINE	/	/	781	376.371 (573.911)	3	2400
SMARTPHONE	1554	0.313 (0.464)	796	0.417 (0.493)	0	1
DVD	1554	0.413 (0.492)	796	0.570 (0.495)	0	1
CONSOLE	1554	0.381 (0.485)	796	0.502 (0.500)	0	1
GPS	1554	0.060 (0.238)	796	0.092 (0.290)	0	1
TV	1547	4.361 (2.133)	793	3.958 (2.092)	0	7
NEWSPAPER	1549	1.579 (1.525)	795	1.405 (1.343)	0	7
DAY	1554	0.207 (0.405)	796	0.252 (0.434)	0	1
WEEK	1554	0.446 (0.497)	796	0.296 (0.456)	0	1
MONTH	1554	0.339 (0.473)	796	0.160 (0.367)	0	1
VOLUNTEER	1552	0.206 (0.585)	796	0.257 (0.663)	0	5
LEISURE MEMBERSHIP	1552	0.731 (0.903)	796	0.837 (0.933)	0	4
CIVIC MEMBERSHIP	1552	0.655 (0.928)	796	0.722 (1.015)	0	5
LEISURE VOLUNTEER	1552	0.143 (0.437)	796	0.180 (0.491)	0	3
CIVIC VOLUNTEER	1552	0.062 (0.281)	796	0.076 (0.325)	0	3
TRUST	1533	5.213 (2.298)	787	5.355 (2.191)	0	10
MOBILITY	1545	0.946 (0.224)	790	0.939 (0.239)	0	1
PARENTS	1554	0.503 (0.500)	796	0.527 (0.499)	0	1
UNEMPLOYMENT	1554	0.053 (0.224)	796	0.059 (0.235)	0	1

Table 5: Correlation table for the variables introduced into the econometric models

Pearson Correlation Coefficients Prob > r under H0: Rho=0											
	Gender	Age	Partner	Size	Urban	Medium educated	High educated	Medium income	High income	Mobility	Unemployment
Gender	1.000										
Age	0.087 0.013	1.000									
Partner	-0.0080 0.819	0.577 <.001	1.000								
Size	0.004 0.901	-0.242 <.001	0.044 0.214	1.000							
Urban	0.061 0.084	0.028 0.425	-0.056 0.120	-0.171 <.001	1.000						
Medium educated	0.023 0.507	0.032 0.357	0.088 0.013	0.027 0.440	-0.024 0.487	1.000					
High educated	0.029 0.412	0.217 <.001	0.146 <.001	-0.211 <.001	0.082 0.020	-0.578 <.001	1.000				
Medium income	0.030 0.403	0.001 0.971	0.039 0.275	-0.047 0.184	0.045 0.206	0.089 0.013	-0.110 0.002	1.000			
High income	-0.0122 0.732	0.010 0.761	-0.017 0.621	0.047 0.191	-0.064 0.075	-0.072 0.045	0.120 0.001	-0.898 <.001	1.000		
Mobility	0.030 0.386	0.061 0.085	-0.056 0.113	0.064 0.071	-0.117 0.001	0.094 0.007	-0.169 <.001	-0.014 0.689	0.035 0.321	1.000	
Unemployment	-0.004 0.907	0.016 0.635	0.041 0.253	-0.099 0.005	0.102 0.004	0.038 0.282	0.018 0.595	0.130 0.001	-0.214 <.001	-0.072 0.041	1.000
Parents	0.045 0.197	0.004 0.907	-0.049 0.167	0.063 0.071	-0.130 0.001	0.002 0.947	-0.071 0.044	-0.104 0.001	0.165 <.001	0.269 <.001	-0.136 0.001
Online	0.161 <.001	-0.001 0.984	-0.102 0.004	-0.027 0.444	0.072 0.043	-0.039 0.273	0.102 0.004	-0.024 0.495	0.014 0.698	-0.022 0.536	0.061 0.087
Trust	-0.027 0.444	0.132 0.001	0.097 0.006	-0.017 0.625	-0.021 0.547	-0.068 0.053	0.117 0.001	-0.131 0.001	0.151 <.001	-0.010 0.767	-0.062 0.078
Volunteer	0.078 0.027	0.096 0.006	0.050 0.158	0.005 0.878	0.026 0.464	-0.009 0.790	-0.010 0.771	0.032 0.373	-0.008 0.809	0.098 0.005	-0.024 0.482
Leisure membership	0.053 0.129	0.061 0.081	0.001 0.959	0.106 0.002	-0.056 0.114	-0.073 0.038	0.073 0.036	-0.080 0.024	0.113 0.001	0.086 0.015	-0.076 0.030
Civic membership	0.056 0.113	0.363 <.001	0.323 <.001	-0.106 0.002	-0.016 0.645	-0.052 0.137	0.241 <.001	-0.047 0.186	0.076 0.032	0.049 0.166	-0.083 0.018
Day	0.021 0.545	-0.230 <.001	-0.157 <.001	0.037 0.292	0.039 0.274	0.013 0.702	-0.136 0.001	-0.031 0.377	0.029 0.407	0.012 0.723	-0.02 0.5185
Week	-0.044 0.207	0.055 0.116	0.062 0.080	-0.041 0.239	0.029 0.410	0.001 0.999	0.090 0.010	-0.056 0.117	0.057 0.110	-0.021 0.549	-0.015 0.652
Month	0.034 0.327	0.167 <.001	0.087 0.014	0.014 0.686	-0.065 0.066	-0.008 0.811	0.026 0.459	0.093 0.009	-0.093 0.009	0.009 0.794	0.042 0.231

Pearson Correlation Coefficients Prob > r under H0: Rho=0									
	Parents	Online	Trust	Volunteer	Leisure Membership	Civic membership	Day	Week	Month
Parents	1.000								
Online	-0.008 0.809	1.000							
Trust	0.082 0.021	-0.023 0.512	1.000						
Volunteer	0.033 0.345	0.014 0.679	0.060 0.090	1.000					
Leisure membership	0.100 0.004	0.053 0.137	0.105 0.003	0.2482 <.001	1.000				
Civic membership	0.110 0.001	0.005 0.887	0.092 0.009	0.167 <.001	0.297 <.001	1.000			
Day	-0.017 0.618	-0.012 0.727	0.046 0.188	0.110 0.001	0.091 0.009	-0.105 0.002	1.000		
Week	0.024 0.482	0.022 0.525	-0.021 0.541	-0.063 0.072	0.037 0.283	0.131 0.001	-0.533 <.001	1.000	
Month	-0.009 0.7806	-0.013 0.714	-0.022 0.531	-0.039 0.263	-0.134 0.001	-0.038 0.2807	-0.367 <.0017	-0.579 <.001	1.000