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Internet Usage and Investment in Social Capital

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Abstract

This paper aims to understand the impact of the Internet on social capital. Does Internet usage influence the investments in social networks? Firstly, we address this theoretical question with a micro-economic model of social capital. Secondly, thanks to Luxembourg data, we evaluate the determinants of the investments in social capital via the Internet. The results show a complementarity between the online investments and the offline investments (measured by the participation in associations), except for individuals who have had some kind of professional or personal mobility. The latter seem to strongly use the Internet to invest in social capital.

Keywords: Social capital, Social investment, Internet usage, digital divide

JEL : L86 ; Z13, D12

1. Introduction

The most common use of the Internet is the sending and receiving of email.

The Internet also allows the individual to communicate with their social world (family, professional, associates), but also to “meet” new people via forums, chat-rooms etc.

Numerous Internet users declare that they have developed relationships with people they have “met for the first time in forums and chat-rooms (Parks and Floyd, 1996, Velkovska, 2002, p. 196). Could it be that Internet usage necessarily has a growth effect upon the sociability of the individual?

Not necessarily, if one believes the Attewell and *al.* (2003) study which shows that adolescents who have a computer at home spend less time on sports or playing outside than those without a computer. So the Internet could isolate individuals in that they substitute leisure time for social links.

Our article has as its objective examining the link between Internet usage and the sociability of an individual, and more particularly, their social capital. The concept of social capital was initially developed by sociologists (Bourdieu, 1980, Putnam, 1993).

But after several years, economists started appropriating the idea and using it in labour economics, innovation economics and more recently in Internet economics (see Sobel, 2002 for more on the economic idea of social capital). As regards the Internet, several studies have underlined the role that social capital can play in the acquisition of information or online advice. Also, Guel, Pénard and Suire (2004) have confirmed the importance of the social world in online shopping in their survey on households in Brittany. The authors have shown that an individual is more likely to shop online if a large part of their social world also does so. The work of Goolsbee and Zittrain (1999) on US data on the social neighbourhood also produces such evidence.

In this article it is not a question of measuring the role of social capital on Internet usage, but rather the reverse, that is, the role that Internet usage plays upon the development of the social capital of the individual. Do individuals use the Internet in order to invest in social capital? And if so, what is the nature of these investments? Is it simply a question of keeping alive their existing stock of social capital or rather simply avoiding its depreciation (whilst intensifying relations with their social world)? Or is it the opposite, more a question of renewing and diversifying their social capital (by meeting new people)? These two strategies of investment in social capital recall the classic dilemma between exploitation and exploration (Bourguine, 1998). What are the factors influencing the choice between an exploitation of one's own existing social network via the Internet and an exploration of new relationships? Moreover, for people who have significant social capital, do they have investment strategies and different patterns of Internet use than others?

Certain of these questions have already been posed in relation to information usage. One can quote the works of Gollac (1996), which showed that an information tool normally used for commercial ends at work, but made available to all office workers, can influence the social capital of those office workers in several ways. The use of IT can motivate the office worker to intensify his/her relationships not only with close colleagues, but also those further afield or even with people outside of the company. More in line with our study, Franzen (2003) examines the consequences of Internet usage on the social network of an individual, measured by the number of close friends and time spent with them. Based upon a panel of 700 individuals questioned in 1998 and in 2001, he shows that Internet usage has no effect upon the social network (neither the size, nor the time spent on the network). On the other

hand, Internet usage reduced the time spent in front of the television. Moreover, Franzen shows that the existence of strong social capital positively influences Internet usage: a dense social network facilitates adoption of the Internet. Other studies of a more sociological nature conclude that there is a significant effect of Internet usage on sociability. Kraut and *al.* (2002) have shown that frequent Internet usage by adolescents can increase their social interactions with both family and friends. Similarly, Katz and *al.* (2001) found that Internet users are more involved in both political and leisure associations. They also found that Internet users of long standing met more friends and had a larger social network than either non-Internet users or more recent Internet users. For their part, Riphagen and Kanger (1997) state that email users do not communicate more with other people than non-users of email. However, they say that Internet users communicate more with people who are strangers. To conclude, most of the aforementioned studies tend to show the existence of an impact of Internet usage on the social network and the practice of sociability.

In the remainder of this paper, we will attempt to understand the relationship between investment in social capital that is not via the Internet (particularly in clubs and societies) contrasted with those investments that are via the Internet. To this end we will use Luxembourgish data which will also help us to identify the determinants of investments in social capital. It appears that economic capital and a higher level of education, as well as having both strong social stability and geographical stability, increase traditional investments in social capital as measured by the degree of commitment to clubs and societies. Moreover, Internet users are more committed to those associations, clubs and societies (and so have more social capital) than non Internet users. To conclude, the fact of having previously undergone a sudden move of home or experienced some other geographical mobility, increases the probability of resorting to the Internet to invest in social capital. In other words, investments in social capital via the Internet do not become substitutes for traditional investments for those individuals who are more geographically mobile. These more mobile people are thus able to gain more benefits from Internet usage whilst they maintain or renew their social capital.

In the following section, we will define the idea of social capital, and then propose a microeconomic model of the formation of social capital which will provide a theoretical framework for analysing the potential effects of Internet usage on the social capital of an individual. In section 3 we will present a database and the estimation model. In section 4, we will comment upon the results of those estimates of the determinants of investment in social capital, both excluding the Internet and those solely via the Internet. We will establish (for the Internet case) a distinction between those who use the Internet to maintain their existing social capital, and those whose usage is to renew or enlarge their social capital.

2. A model of formation of social capital

2.1. The notion of social capital

The notion of social capital is complex, and can be applied equally to both the individual level as well as to an aggregate level (Durlauf, 2002). Social capital at the individual level recalls the idea of a collection of confiding, trusting relationships with influence upon the individual, relationships upon which they can rely when making decisions or undertaking tasks¹. This capital is translated into a larger capacity to gain benefit by interacting with others². This aptitude is often linked to belonging to social networks or to communities, but cannot simply be reduced to this as we shall see later.

Social capital also has a collective dimension. Several definitions of social capital make reference to this collective character ("social capital as a community-level attribute"): each group or community is characterised by a level of social capital which could be linked to the degree of trust between the members of that community (Bowles and Gintis 2002). So, according to Fukuyama (1999), "*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.*"(p. 16). Similarly, for Putnam (2000), "*social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them ... A society of many virtuous but isolated individuals is not necessarily rich in social capital.*"(p. 19).

This multiplicity of definitions is often the source of ambiguity and confusion (Manski, 2000). That is why in the rest of this article, we will limit ourselves to the concept of individual social capital, and we will rely upon the approach of Glaeser, Laibson and Sacerdote (2002). For these two, social capital at the group level or at the community level results firstly in individual decisions on investments in social capital. It therefore important to model this type of decision in order to understand the nature and the collective properties of social capital.

2.2. The model of investment

Glaeser and *al.* (2002) define social capital as characteristics or social attributes of the individual, which allows him/her to benefit from advantages both marketable, and non-marketable, in their interactions with others. Social capital depends at the same time upon the intrinsic aptitudes of the individual (charisma, stature, extroversion), and investments undertaken to both maintain and develop this social capital. These investments are costly (in terms of time, effort and money), but allow the individual to enrich their social capital and to increase the resultant benefits (better job, access to goods and services)³.

The model of the formation of social capital proposed by Glaeser and *al.* (2002) offers an interesting theoretical framework in which to study the impact of Internet usage on the investment strategies in social capital and also upon the evolution of inequalities in social capital between individuals. This model is quite similar to models of investment in human capital. We will reuse the general formula; however we will adapt certain of the hypotheses.

¹ This is reminiscent of the definition of Laumann and Sandefur (1998) for whom capital social "consists of the collection and pattern of relationships in which she is involved and to which she has access".

² Coleman (1988) considers social capital as an individual resource which influences the capacity to innovate or at least to adapt to new behaviour.

³ Note that these individual investments in social capital can generate positive external events (such as when an individual joins a club), but also can have negative consequences (if they are appointed to a position envied by others).

Let S be the stock of social capital held by the individual and $\hat{S}$ the aggregate average stock of social capital held by the individuals with whom the individual interacts (members of the different communities to which he/she belongs). Our individual having a stock of social capital S thus gains utility $S.R(\hat{S})$ where $R(\hat{S})$ is a growth function of $\hat{S}$. This utility represents the yield (in both the market and non-market sense) to the individual of his/her social capital (better salary, better employment conditions, possible career path, better quality of life, chance of development). As can be seen, this utility depends positively upon the social capital of those persons with whom they interact: if one is alone in having a higher social capital, one would derive a lower yield than would be the case if one interacted with persons who also had a higher level of social capital.

The stock of social capital at a date t (S_t) can be increased by the investments in social capital (I_t) made at that same date. These investments can be joining an association or club, a political party, a network with influence, but also something as simple as organising a dinner. These investments allow the creation of trusting relationships and of cooperation with people who could subsequently prove useful to one's professional or personal plans. Also these investments allow one to reduce the social distance with these people. Other forms of investments in social capital can consist of developing social qualities (stature, charisma, verbal skills, leadership qualities, ...) which allow the individual to gain more from their relationships with others (to gain an advantage). It could be remarked that in the preceding formula, one of the specifications of social capital (as opposed to physical capital) is the absence of depreciation over time. The investments in social capital result in a growth of the stock of social capital, which does not depreciate with usage⁴. Certain authors have even advanced the idea that social capital appreciates over time usage (the more one uses one's social network, the more one tends to reinforce or intensify these links that are at the heart of this network) (Sobel, 2002).

However, social capital can depreciate when the individual is obliged to move or has a life break (unemployment, divorce, migration to another location). In the case of moving home, for whatever reason, we suppose that the value of the social capital of the individual depreciates in proportion $(1-\lambda)$: that is to say, in the person only keeps a proportion λ of their social capital when they break with a part of their social network (whether voluntarily or not). From this hypothesis, arises the idea that a part of social capital is specific and cannot be redeployed or reused in the case of a loss of a community (family or career break, moving home) : this idea is similar to the notion of human capital specific to a business, where capital is lost when one leaves the firm (Becker, 1964). We note that $\theta < 1$ is the probability that an individual will undergo a house move or a significant family event. When one takes into account this risk of mobility, the change in the stock of capital is defined as follows :

$$S_t = \phi S_{t-1} + I_t \text{ where } \phi = (1 - \theta) + \theta\lambda$$

The cost of investment in social capital is given $C(I_t)$ where $C(.)$ is a convex growth function: it is a question of opportunity cost in terms of time and resources allocated to these investments. This cost depends positively upon the hourly wage rate of the individual . In other words, the more a person earns, the higher the cost in investing in social capital as they are not spending this time working. So the value of this time (for such a person) is higher and costs more. However, the cost of investment depends also upon the skills and intrinsic capacities of the individual (the notion of *social skills*) : the productivity of the

⁴ This is one of the differences between our model and that of Glaeser and *al.* (2002). They suggested that social capital does depreciate over time regardless of physical capital.

individual in their investments in social capital should therefore increase with the level of education, and also with the stock of social capital already accumulated (the learning effect)⁵.

We suppose that the individuals have a life expectancy of T periods and that future gains are realised by the realisation factor β .

The decision to invest in social capital shows the following optimisation:

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

with the constraint $S_t = \phi S_{t-1} + I_t$

For a stock of given aggregated social capital $\hat{S}$, the first order condition is given by:

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

This condition allows us to derive several testable propositions:

- First of all, the investments in social capital of the individual tend to increase with the level of that person's *social* productivity (in other words with the degree of efficiency in mobilising and maintaining their social capital). A high degree of productivity allows for a decrease in the marginal cost of investment. Thus investment in social capital should increase with the level of education and the existing stock of social capital of the individual (two factors that raise productivity).
- Investment in social capital should be a decreasing function of the degree of the mobility of the individual (θ) and of the degree of specificity of their social capital ($1 - \lambda$). These two elements do indeed reduce the expected yield from social capital. In other words, an individual exposed to a high risk of mobility will be less motivated to invest in social capital, all the more so if their social capital is highly specific (that is, the risk of depreciation of their capital in case of mobility or of life change is high)⁶.
- Furthermore, age has two contradictory effects upon investment in social capital. Firstly, as social capital accumulates with age, this reinforces the efficiency of investments (lower marginal costs of investment) and tends to increase the volume of investments. But, the more the individual advances in age, the less they benefit from these investments (loss of marginal benefit over future periods). It is highly probable that the first effect dominates earlier on in life (the marginal costs reduce quicker than the marginal benefits), whereas beyond a certain age the second effect becomes dominant. The profile of investments should therefore increase with age and should decrease in later life (even reaching zero at an advanced age). One should therefore see an investment curve in the form of an inverted U. From the point of view of stock of social capital, this curve should (in the absence of mobility), increase continually before stabilising eventually (if individual decides to cease to invest in social capital).
- Finally, the investment in social capital tends to increase with the realisation factor β (that is to say tends to grow as individuals have a stronger preference for the future). In other words, an individual invests more when the expected returns on their social capital are higher.

⁵ Formally, we see $\frac{\partial C'(\cdot)}{\partial S_t} < 0$

⁶ The probability of mobility is doubtless endogenous and depends upon the level of specificity of social capital accumulated by the individual.

From this theoretical model, it is possible to examine in detail the potential effects of the Internet upon the choices of investment in social capital. One can in particular ask if the Internet is a complementary mode of investment or a substitute to direct investments in social capital. Also, can the Internet contribute to the reduction in inequalities in social capital? To this end it is useful to separate the social capital of an individual into two parts: local social capital (based upon social relations of a local geographic nature) and distant social capital (based upon social relations with people further away). Each individual is characterised not only by their stock of social capital, but also by the composition of their social capital (proportion of local capital and distant capital). That part of distant social capital will be a priori more significant if the individual has been mobile in the past. So two principal effects of Internet usage can be expected on the formation of social capital :

- For the first effect, Internet usage allows the reduction in the cost of investment in social capital (local and distant), in facilitating joining and active participation in numerous networks. This *productivity gain* effect can go in the direction of reinforcing inequalities if the persons enjoying the benefits of a high level of social capital have a larger probability of having access to the Internet. So there would be a complementarity between the offline investments and the online investments in social capital. Online investments would allow an increased efficiency in those offline investments (the multiplier effect)⁷.
- In the second effect, Internet usage can reduce the depreciation of social capital, notably for those individuals having a largely distant social capital (reduction of λ). Indeed, the Internet can facilitate remaining in contact with one's original community and maintaining certain links, despite the distance. In other words, the *online* investments could become a means of supporting distant social capital and could be a substitute for *offline* investments more oriented towards the formation of local social capital. This *at a distance investment* effect seems to go in the direction of a reduction of the inequalities of social capital, since the persons subject to this mobility who hitherto lost a large part of their social capital in the case of mobility, could, through the Internet, find a way of preserving their previous investments.

In order to see if these two effects are present, we will proceed to econometric estimations of data coming from two surveys undertaken simultaneously in the Grand Duchy of Luxembourg, which we will present in the following section.

3. The data

The data that will be used were collected by CEPS/INSTEAD, as part of the "ICT Usage by Household", project co-financed by Eurostat, and also the "European Social Survey", financed by the "the Fonds National de la Recherche" (cf. table n°1). These two surveys were undertaken, in face-to-face, in the Grand Duchy of Luxembourg in 2003 involving 1,554 individuals aged from 16 to 74 years. Having been undertaken simultaneously with the same individuals, they supply an important quantity of information. For each individual, we know their socio-demographic characteristics, their usage of technologies of information and of communication and in particular the Internet. But we also have access to (via the ESS survey), information on their use of media (TV, newspapers, radio), their confidence in society, their interest in politics, their social commitments (political, cultural, sporting), their family and friendship links.

⁷ Glaeser and al. (2002) advance the idea that individual investments in social capital have multiplier effects on other people's investments in the same community (the notion of a « social multiplier »). When making investments an individual increases the collective stock of social capital and so the utility of those persons with whom they interact. This makes the investments in social capital of those persons within the community more profitable and so on. So these persons enjoying significant social capital are typically characterised by a social world which uses the Internet a lot, so the Internet could have a multiplier effect which reduces the inequalities in social capital.

Table 1 in the annex offers a description of data used for the econometric estimations: average and interval type for the whole respondent sample and for the Internet users only. At the survey date, 51% of respondents declared having used the Internet in the three preceding months. These Internet users have an average age of 32 years and their daily Internet usage is the most frequent (for 46% of Internet users)⁸.

Table n°1 : description of “ICT Usage by Household ” and “European Social Survey ” surveys

The survey “ICT Usage by Household ” is part of the “e-Europe 2005 ” programme. The aim of this survey is to collect data relating to Information Technologies and Communication Technologies within households which are comparable across the European Union. As a consequence, each member state of the European Union implemented this survey following a common methodology and a predefined set of common questions. The questionnaire is composed of two parts. The first part deals with IT usage by individuals resident in Luxembourg.

For reasons of time, cost and scientific interest, the “ICT Usage by Household ” survey was undertaken simultaneously with another survey entitled “European Social Survey ”. This study deals with the opinions of individuals on different subjects such as political life, immigration, asylum, social exclusion, etc.

Technical details of the surveys

The sample was taken from the registration file of the Inspector General of Social Security (IGSS) and dated from the 1st January 2001. This file covered 91% of the population resident in Luxembourg (EU civil servants, workers in international organisations and foreign banks were excluded as they are not within the Luxembourgish social security system). The file is constructed from Household Reference Persons who fill in a form to register for income tax. So the file does not correspond to a list of households but rather of tax units (fiscal households). (NB: a married couple have a single tax card, where as a cohabiting couple have two such cards).

The method of sample selection was done in two phases. In the first phase, a random stratified sample of fiscal households was selected on three criteria: the number of household members, (1, 2, 3 persons or more), the professional status of the head of household (economically active, retired, economically inactive) and the health insurance agency where the head of household is registered. So, our sample was composed of 5033 fiscal households (of which 1635 were kept on a waiting list). The unit of observation is the fiscal household but individual level data was also collected. In the second phase the Kish method was used to select an individual aged between 16 and 74 years old within a sampled household to be the household respondent. This individual corresponded to that person whose birthday was closest to 1st January 2001.

For each stratum, the number of interviews that must be completed was specified in order to be representative of Luxembourgish households. The objective was to reach at least 1500 respondents. This face to face survey was begun in mid-April 2002 and was finished mid-August 2002.

Balancing the sample

Balancing the sample has as its objective reducing the bias arising from the lack of homogeneity between the population and the responses but also improving the representativeness of the 1554 respondents. The weights of each individual are determined by the CALMAR procedure which applies the method of «calibration» at the margins. This method consists of balancing the sample using supplementary information commonly called “calibration” variables.

Finally, two systems of weighting were defined by the calibration method. The first assures that the representativeness of the sample for all questions relevant to all the households. For this first system of weighting, the calibration variables used are household level variables as well as the nationality and the sex of the reference person. The second assures representativeness of the sample of respondents at an individual level. These calibration variables in this second system are : sex, age and professional status.

⁸ For an analysis of the determinants of taking up the Internet in the Grand Duchy of Luxembourg, the reader can consult the works of Guel, Pénard (2004).

4. Empirical analysis of investment in social capital

The point of the study is to compare the determinants of investment in social capital both excluding Internet and those via the Internet. The intention is to identify the eventual effects of substitution or of complementarity between these two modes of investment and to measure in particular the impact of mobility on each of these modes. Firstly, we present a model of *offline* investment in social capital (variables used, theoretical effects and econometric results). Secondly, we will look at the model of *online* investments.

4.1. The determinants of investments in social capital excluding the Internet

4.1.1 Variables used and theoretical effects

The level of investment in social capital

In the empirical literature on social capital, the investments and the stock of social capital are measured in different ways. Firstly, one can measure social capital by the number and quality of social relations outside of the family (Granovetter, 1973 ; Kraut and al , 2002 ; Franzen, 2002). One can also measure social capital by the number of associations (clubs and societies) to which the individual actively belongs (Putnam, 2000, Glaeser and al. 2002). Lastly, one useful measure is trust in other people or in the institutions of one's country. (Putnam, 2000 ; Fukuyama, 1999). However in this case, Glaeser *et al.* (2000) questions the interpretation that one can give to this measure. Most of the time, trust is measured qualitatively from the following question : "Do you think you can trust the majority of people or rather should you be wary of them ? ". The respondents have to reply using a scale of 0 to 10. Yet Glaeser and al. (2000) show that responses are often imperfectly correlated with the results when they conducted experiments to quantitatively assess trust as a behaviour⁹.

In our database, we have information available on the participation in associations (clubs and societies), on trust in others, and on the frequency with which individuals meet friends spontaneously each week. For our model of "direct investment" in social capital, we have decided to use commitment to these associations as a variable which seems to us the most relevant as a measure of intensity of investments in social capital, even if this is the only indicator that we use. It can be assumed that there is a positive correlation between these "institutional" investments and informal investments. The two other variables (trust, spontaneously meeting friends) measure the level of previous investments rather than the current investments in their stock of social capital). So they both go under the heading of explanatory factors in the level of current investments in social capital.

Our study allows us to know not only the exact number of associations, but also the type of associations/clubs/societies to which the individual belongs (sports club, cultural or leisure organisation, religious organisation, youth social club, retirement, friendship league, trade union, professional organisation, consumers organisation, humanitarian organisation, human rights, environmental protection, peace club, animals, political party, teachers or parents association). So, it is a question of establishing a base measure of the number of

⁹ Their experiments relied upon a game of trust where two individuals are present. The first receives a sum of money, which he can in whole or in any part send to the other person. This second person then receives double the amount of money which was sent by the first person. This second person then has to decide how much money to send back to the first person. Theoretically the optimum strategy for the second person is to send nothing back. So for the first person the optimum strategy is to send nothing in the first place. But in these trust experiments it was always observed that a large proportion of first subjects did send money to the second subject and those second subjects did indeed return a part of the money they received. This suggests a degree of trust in the other person. See Willinger and al. (2001) for a discussion on the possible motivations behind this trust.

associations since we cannot know if the individual belongs to one or more of these associations¹⁰.

As regards the determinants of associative (clubs, societies as listed above) investments, we have organised the explanatory factors into five categories: the socio-economic variables, the variables of individual mobility, those variables linked to the stock of social capital, the variables linked to Internet usage and the variables linked to the usage of media other than the Internet.

The socio-economic variables

The socio-economic profile of the individual is considered to be his/her sex, age, as well as age squared (to take into account any eventual non-linear effects of age), the family situation (size of the household, living as a couple or not) and locality (in an urban zone – in Luxembourg city, in a peripheral area of Luxembourg city, in another town – in a rural area).

Age should theoretically have a positive effect at first on investments in social capital, then later have a negative effect. But as the productivity of individuals in investments in social capital increase with age, the effect could be globally positive even for people of advanced age. As regards the effect of gender, of family situation and of locality, the effects are determined *a priori*.

We also take into account the level of education of respondents (lower secondary level, higher secondary level, post secondary level)¹¹ in order to measure their human/educational capital. This latter factor should positively influence productivity and efficiency of investments in social capital and so increase the level of investment.

Economic capital is not measured directly by household income, but rather by the opinion that the individual has of their standard of living. We use a question in the ESS study indicating if the individual considers that the level of current income of their households allows them to live comfortably, or to make ends meet, or to struggle financially. The effect of economic capital is ambiguous: a higher income can mean a higher opportunity cost (negative effect on investments), but also a higher realisation factor (positive effect on investments).

Variables linked to the stock of social capital

The stock of social capital is measured indirectly from the individual's degree of trust towards others. It is a continuous variable with values from 0 to 10 inclusively (level 0 means that the Internet user thinks that most people abuse their goodwill, whereas level 10 means that the individual considers that the majority of people try to behave correctly). A higher level of trust towards others can mean that the individual has more social capital, allowing him/her to enjoy numerous advantages in their relations with other people (Glaeser and *al.* 2002). Social capital is also measured by the frequency of unplanned meetings with

¹⁰ We have tried to take more into account the intensity of associative (clubs and societies) investments, by doubling the weight attached to being a volunteer of an « association » rather than simply a member or subscriber. For example, suppose that an individual is simply a member of a sports club, but a volunteer in a trade union. For that individual, the number of association types to which he/she belongs equals two, but the weighted number of associations value is three. This variable, even if somewhat arbitrarily constructed, allows us to better capture the intensity of investments. Nevertheless, the estimations made on the weighted number of associations have provided broadly the same results as with the simple unweighted number of associations. For this reason, we have decided not to present the weighted number of associations.

¹¹ These variables were constructed from the international nomenclature CITE or ISCED (International Qualification of Type of Education).

friends or family. There again, the more an individual has extended social capital, the more they tend to meet other people every week. We have introduced four levels of frequency: spontaneously meeting family or friends several times a day, or several times a week, or once a week or less than once a week.

We expect that those people with a higher level of trust towards other people and who have more frequent interactions with family and/or friends have a higher stock of social capital, and this fact would have a positive impact on the number of associations (on the investments in social capital), because of lower marginal costs of investment (as productivity rises).

Variables of individual mobility,

The degree of current mobility and of future mobility of the individual is measured, based upon their past mobility (implicitly, we suppose that an individual who was mobile in the past, will have a higher chance of being mobile in the future). We measure three forms of past mobility: geographic mobility, professional mobility and effective mobility¹². For the first type of mobility, we have firstly introduced a binary variable indicating whether the individual has been resident in Grand Duchy of Luxembourg for five years or more. Moreover, we have three dichotomous variables which permit us to know if the mother and/or the father of the individual were born in Luxembourg. For the second type of mobility, we have a variable indicating if the individual has had a period of unemployment in the last five years of three months or longer. Lastly, effective mobility is measured by having been divorced (or not) in the past.

Those individuals who have had experience of one of these forms of mobility or have had a break from one of the communities to which they belong, should, according to the theoretical model invest less in social capital than the less mobile individuals. All the more so since mobility has had the effect of reducing their stock of social capital and so of diminishing their productivity.

Internet usage variables

Internet usage is measured by frequency of use, so we distinguish between at least once a day, once a week, once a month or never.

The impact of Internet usage is not clearly determined. One intensive Internet session can reduce the time available for associative investments. Moreover, Internet, whilst facilitating investments in distant social capital, can reduce the motive to invest in local social capital. In other words, local associations are replaced by more distant associations (the effect of substitution). At the same time, if the Internet is a source of gains in productivity, then its usage can reduce the investments *offline* in social capital.

Variables of usage of media other than the Internet

Investments in social capital correspond to time spent on associations, and come to be substitutes for other pastimes such as watching TV or reading. When deciding between associative ("social") leisure versus individual leisure (TV etc.), the time dedicated to watching TV and reading should have a negative impact on the number of associations to which the individual belongs. These activities are measured by the following indicator

¹² The degree of mobility of the individual can also be measured by their occupational status and their housing status. The fact of being an owner/occupier is often associated with a lesser mobility (Glaeser & Sacerdote 1999, DiPasquale & Glaeser 1999).

variables: watching TV for at least one hour a day, between one and two hours a day, between two and three hours a day, more than three hours; reading a newspaper on a daily basis, less than thirty minutes, between thirty minutes and one hour, or for more than one hour.

4.1.2 The econometric results

The results of estimations of investments using the *offline* model (by the MCO) are presented in table 2.

[insérer table 2]

The first column in table 2 concerns only socio-economic determinants, without taking into account Internet usage and the stock of social capital. It emerges that age positively influences investments in social capital, with a decreasing marginal effect over time. One can interpret this as a *productivity* effect: the older the individual is, the higher his/her level of stock of social capital (the more friends/contacts he/she has, the more associations she/he belongs to). Also the older one is, the higher the level of social capital, and the more experience they have in making such investments in social capital (reinforced efficiency).

Men tend to invest more in social capital than women. On the other hand, the sizes of the household and its locality have no effect on the investments.

Educational capital and economic capital appear to be complements to social capital (a classic result in the literature): the more that an individual is educated and/or has a high level of income, the more he/she invests in social capital by participating in associations.

To summarise, the degree of mobility of individuals has contrasting effects. An individual, who has been more geographically mobile in the past, tends to get involved less in associations, as predicted¹³. On the other hand, a life break/domestic upheaval (such as a divorce) motivates the individual to invest more in associations. Finally, the effect of having had a period of unemployment in the preceding five years has no effect.

Column 2 of table 2 presents the impact of the Internet on traditional investments in social capital. This impact is positive and significant: the more an individual uses the Internet, the more likely he/she is to belong to associations. There is a *gain of productivity* effect which seems to outweigh the *substitution* effect. This result should doubtless be considered cautiously, as the effects of causality are surely more complex. It could be that Internet usage is both a cause and a consequence of a strong commitment to belong to associations. If one participates actively in numerous associations, one is more likely to have Internet access at home, so as to be informed of decisions, of club meetings etc. So we can speak of a “club effect” or a “network effect” which is translated into a wider spread of Internet usage amongst those club/network members.

Column 3 allows us to evaluate the impact of the stock of social capital. One can see that the two variables which measure this really do have the effect predicted. A higher level of trust towards other people is translated into more commitment being made to associations. Equally, an individual who frequently meets friends/family during the week does have a tendency to invest more in social capital.

¹³ It is interesting to note that the geographical mobility effect is all the stronger on the weighted number of associations. One could interpret this result in the following manner: the weighted number of associations tends to put more weight on local investments in social capital, as it is more difficult to be actively involved in an association faraway. Under these conditions, a tendency to be geographically mobile particularly reduces investments in local social capital (participation in local associations).

In a second phase we will study the new forms of investment in social capital via the Internet. What do these investments consist of? Do they become substitutes for more traditional forms of investment (in particular associative investments), or rather are they complements? We will firstly, describe the estimated variables and the theoretical effects expected, before presenting the econometric results.

4.2. The determinants of investments in social capital via the Internet

The Luxembourgish survey that we used for this article allows us to know if an individual was able, by means of the Internet, to increase or intensify the number of his/her contacts with their close friends or family, renew links with people they had lost contact with, get to know new people and/or personally meet people encountered through the World Wide Web. Amongst the 1554 persons who replied to the survey, 490 (31%) declared that their Internet usage had had one of these four effects. We consider that these different effects can be interpreted as investments in social capital via the Internet. We have however decided to regroup these different effects in two categories: firstly, the investments *online* which permit one to maintain one's existing social capital existing (intensifying the number of contacts with close friends or family, or renew links with people they had lost contact with) and secondly, the investments which allow one to diversify or renew their social capital (getting to know new people, or personally meet people encountered through the World Wide Web). The first form of investment was mentioned by 51% of Internet users, being 26% of surveyed persons, whilst the second form was mentioned by 34% of Internet users (being 18% of surveyed persons). What were the factors that could influence these new forms of investments in social capital ?

4.2.1 The explanatory variables and their theoretical effects

Socio-economic variables

As with the investments in social capital excluding the Internet, we have introduced gender, age and age squared, the family situation, locality, level of education and of income. If the *online* investments reveal the same logic as the investments *offline*, there could be a positive effect of age, on both economic capital and educational capital. If there are such effects that are either negative or neutral, it could be that investments in social capital on the Internet differ from those other non-Internet investments, notably in terms of motivation.

Variables linked to non-Internet investment in social capital

The non-Internet investments are measured by participation in associations (clubs, societies etc.). Two specifications are proposed. First of all, we have distinguished the "leisure" type associations and those associations better classified as "campaigning"¹⁴. Amongst the 796 Internet users surveyed, 71% belong to a "leisure type" association and 57% belong to a "campaigning type" association and 15% do not belong to any type of association. However, belonging to an organisation does not allow us to assess either quantitatively or qualitatively the investment of the individual (Glaeser and *al.*, 2002). We have therefore distinguished the fact of being a member from being active in the two categories of association (leisure or campaigning). 55% of Internet users declared themselves to be members of at least one

¹⁴ In the leisure type associations, we have regrouped the sporting clubs, the organisations for the cultural and leisure activities, social and youth clubs, the social clubs for the young, the retired, friendship and religious organisations. In the campaigning type associations, we have the trade unions, professional organisations, consumer organisations, humanitarian organisations, human rights, protection of the environment, peace groups, animals groups, political parties, teaching associations, parents.

“leisure” type association and 14% active members, whilst 44% are members of a “campaigning” type association and 6% are active members. The investments in social capital are finally measured by 4 variables corresponding to the number of “campaigning” type associations to which the individual is both a member and active and the number of “leisure” type associations to which the individual is both a member and active¹⁵.

Another way of measuring traditional investments in social capital consists of using one of the questions from the ESS survey, which concerns the feelings of an individual with regard to their participation in social activities: in relation to persons of the same age, the individual can judge that he/she participates much less in social activities, less, as much as, or that he/she participates more in social activities. The expected effects of non-Internet investments are ambiguous. If one considers that the *online* investments and the *offline* investments are substitutes in terms of accumulating social capital, we would expect a negative effect. Alternatively if *online* investments and *offline* investments are in fact complements, the effect would be positive. In the case of a neutral effect (no effect) then the Internet appears to be a new form of investment in social capital which is not a substitute for traditional investments in social capital.

Variables linked to the stock and the composition of social capital

The stock of social capital is measured as before, by the degree of trust towards other people and by the frequency of spontaneous meetings of friends and family. It could be thought that a higher level of trust in other people facilitates investments in social capital via the Internet, particularly those aimed at diversifying or renewing social capital.

As for the composition of the stock of social capital, we have reused those variables measuring the degree of mobility of individuals (having lived in the Grand Duchy of Luxembourg for 5 years or more, mother and/or father born in Luxembourg, having had an unemployment episode during the previous five years, or having divorced). The effects on investments in social capital should a priori be different according to the type of mobility. It could be that geographical mobility, whilst increasing the distant part of social capital, could motivate the individual to invest via the Internet. Indeed, for this type of individual, the Internet can be an efficient way of maintaining their existing social capital. By contrast, the effect of professional mobility or effective mobility is a priori undetermined, even if one suggests that mobility could positively influence investments on the Internet with the aim of renewing or diversifying his/her social capital (especially in the cases of effective mobility).

Variables of Internet usage

We have introduced the idea of average weekly time spent using the Internet. The expected impact is positive: the more an Internet user dedicates time to Internet usage, the more he/she has a higher probability of investing in social capital whatever the motivation (maintaining their social capital or renewing it).

Finally, we have checked the use of media other than the Internet, such as newspapers, television, as these leisure pursuits reduce the time available for the Internet (Attewell and *al.* 2003, Gershuny, 2003).

¹⁵ On average, the Internet user are members of 0.83 associations of type « leisure » and of 0.72 association type « campaigning », they are active in 0.18 associations of type « leisure » and in 0.07 associations of type « campaigning ».

4.2.2 The econometric results

Correction for selection bias

In order to understand the determinants of investment in social capital via the Internet, we run models of discrete choice (Probit). However, these models are not estimated solely on Internet users, which could introduce bias in the estimations. Indeed, the choice of using or not using the Internet can be linked to the level of social capital which the individual has (and to the intensity of his/her associative commitments). If this is the case, there is the risk of having a selection bias in eliminating from the sample the non-Internet users. In order to correct this selection bias, we have used a procedure known as Heckman (1979). This consists, in a first stage, of estimating the probability of using the Internet, then calculating for each of those Internet users the inverse ratio of Mill which corresponds to the function of normal density divided by the function of normal distribution. In a second phase, this ratio is introduced into the Probit model of investment in social capital as an explanatory variable. The estimated coefficient ρ , associated with the inverse ratio of Mill, then measures the correlation of errors between the model of Internet usage and the model of investment in social capital via the Internet (Maddala, 1983, Breen, 1996). When this coefficient is significantly different from zero, the existence of a selection bias can be concluded¹⁶.

We have therefore estimated in advance, a probit of Internet usage in the last three months¹⁷. In terms of explanatory variables, one finds the same socio-economic variables as in the second stage (choice of investing in social capital via the Internet) : gender, age, age squared, family situation, locality, level of education and of income, time spent watching TV and reading. We have however introduced several supplementary variables relating to ICT (information and communications technology) equipment (having a mobile telephone with or without WAP, having a DVD player, a video games console or satellite navigation in the car). These variables allow us to know if the individual is a technophile or not: one essential characteristic is to record their Internet usage. So, Internet usage is also explained by the stock of social capital (frequency of spontaneous meetings), the investments in social capital (belonging to an association whether of type "leisure" or of type "campaigning") and the degree of mobility of the individual (having lived in Luxembourg for 5 years or more, mother and/or father born in Luxembourg, having had an unemployment episode during the previous five years, or having divorced).

The results (see table 3 in annexe) shows that the probability for an individual of using the Internet is negatively influenced by his/her age and the fact of living together as a couple, but positively by his/her educational capital and his/her economic capital. Moreover, the technophile nature of the individual has a positive outcome on Internet usage. This statement reflects the work of Lenhart and *al.* (2001) and of Guel and Pénard (2005) according to whom, Internet usage is combined with usage of other ICT equipment. As for social capital, belonging to an "leisure" type association has a positive effect on the probability of using the Internet. Belonging to an "campaigning" type association also has a positive impact, but not significant. So, it appears that the network effect plays more of a role in the "leisure" type associations. In this case, the Internet has tended to become an essential tool in their "normal" functioning: participating in this type of association therefore implies using the Internet so as to have access to information and intervening in the taking of decisions. This shows that the Internet is really a complement to investing in social capital

¹⁶ the correction of selection bias can however lead to problems of heteroscedasticity. To correct the problem, the software STATA uses the procedure de Huber/White procedure.

¹⁷ We have preferred actual usage of the Internet rather than simply the existence Internet access at home, as individuals can use the Internet elsewhere, other than the home (at work, at school, in public places). Amongst those individuals having replied to this survey, 80% of the individuals were connected to the Internet at home, 37% at work, 25% at their place of study, and 15% somewhere else (public library, post office, place of administration, association/club, cybercafé).

and the *gain of productivity* effect of the Internet seems to dominate (the Internet allows a reduction in traditional investments in social capital).

We now come to the determinants of investments in social capital via the Internet. We will begin describing the results of the probit on maintaining existing social capital as detailed in table 4, before considering the results of the probit on the renewing of social capital in table 5.

The Internet as a way of maintaining existing social capital

[Insérer table 4]

Column 1 presents the socio-economic determinants of investments *online* aimed at maintaining social capital. None of the socio-economic characteristics of the Internet user appear. Neither age, nor the family situation, nor income, nor the level of education, nor the fact of having been divorced, nor having had an unemployment spell, have an effect on this new form of investment. Only having parents born outside of Luxembourg (mobility in the past) leads (quite logically) to using the Internet as a way of maintaining existing relationships. The Internet appears under these conditions as an alternative method of investment in social capital, permitting those who have mobility to preserve their original social capital (in other words, to reduce the depreciation of this distant social capital).

Column 2 presents the impact of the stock of social capital on investments online. Trust in other people increases the probability of maintaining one's social capital via the Internet. Such trust therefore has the expected sign (+/-) of influence and has the same influence on investments whether offline or online.

Columns 3 and 4 allow us to determine the nature of the links between investments whether offline or online. It can be stated that only the investments in "leisure" type associations positively influence investments online. Precisely, the more an individual is committed to "leisure" type associations, the more he/she uses the Internet for his/her social capital. There appears then to be a complementarity between investments online and offline when the latter has a local character (those investments in "leisure" type associations being by their very nature more oriented towards activities closer to home/work). On the other hand, investments in "campaigning" type associations have no effect, just like the frequency of spontaneous meetings of friends.

The Internet as a way of renewing and diversifying one's social capital

[Insérer table 5]

Investments via the Internet to renew or diversify one's social capital are very closely linked to age and the family situation (column 1). This seems to be more frequent for younger people (negative effect of age)¹⁸ and those persons living alone (negative effect of living in a couple). On the other hand, the levels of education and of income, locality or gender have no influence.

Moreover, the fact of having a professional break (unemployment) increases the probability of using the Internet to renew one's social capital. Equally, the fact of having both parents

¹⁸ This is fairly consistent with the conclusions of Parks & 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 persons of the opposite sex.

born in Luxembourg reduces the probability of using the Internet to renew one's social capital. In other words, those who have been geographically mobile and hence have some distant social capital have a stronger tendency to invest in social capital via the Internet whether this is for maintaining their social capital (as we have seen previously) or for renewing their social capital.

In a more general way, the Internet seems therefore, for the individuals having experienced mobility or a life "break" of whatever nature, to be an alternative mode of investment in social capital or a substitute for traditional investments (as shown in tables 4 and 5). This result can be linked to the theoretical model explained earlier. It can be concluded that the Internet really is a way of limiting the depreciation of social capital for individuals who are very mobile. From this point of view, the Internet would be a vector of reduction of inequalities in terms of social capital between those immobile persons (who can thus maintain their social capital by way of direct contact) and those who are more mobile (and who henceforth will maintain or recreate their social capital via the Internet).

Column 2 of table 5 shows again that the degree of trust in others has a positive effect on the probability of establishing new relationships via the Internet. But this effect is less than before. This result shows the difficulty of placing trust in people one has "met" via the Internet (Markey and Wells, 2002)¹⁹.

Moreover, there is no link between the offline investments (membership of/participation in associations) and this form of investment. For the Internet user, it is a question of a new form of investment which would not necessarily become a substitute for traditional investments. Behind these forms of investments, appear new practices of sociability and of meeting people (chat-rooms, forums) which have been the subject of detailed studies in the last few years (Velkovska, 2002 ; Smoreda and Thomas, 2001 ; Lenhart and *al.*, 2000, Parks and Floyd, 1996).

One final last result is that a more intense Internet usage significantly increases the probability of investing in social capital via the Internet (whatever from this investment takes). This effect is however more significant for the probability of establishing new relationships with persons hitherto unknown. This result is consistent with the finding of Leung (2001) who, in his analysis of people using the ICQ chat-room (students in Hong-Kong), shows that a more intense usage corresponds to a search for sociability (meeting new people)

5. Conclusion

Given that the Internet is the most frequently used method of communication, it is logical to suppose that this technology has an impact on the formation of social capital of individuals. This paper sets out to empirically confirm or to challenge this hypothesis.

The theoretical framework that we have relied upon, is that developed by Glaeser and *al.* (2002). According to these researchers, the social capital of an individual depends upon both the intrinsic aptitudes of the individual, but also upon the investments made to maintain and increase this social capital. These investments are costly (in terms of time, of effort, in money), but allow the individual to enrich their social capital and to increase their benefits as a result. The model of Glaeser and *al.* (2002) has allowed us to expound several theoretical propositions concerning the expected impact of the Internet upon investments in social capital:

¹⁹ The Internet permits the individual to mask their real identity, of appearing under pseudonyms that are easily changed when required (Lenhart and *al.*, 2001).

- First of all, Internet usage should reduce the depreciation of social capital, notably in the case of individual mobility as the Internet permits one to stay in contact with one's community of origin and to maintain certain links, however faraway. This effect seems to be one of a reduction in inequalities in social capital thanks to the Internet. The persons subject to that mobility, who previously lost a large part of their social capital when moving, found (through the Internet) a way of preserving their past investments.
- Secondly, Internet usage allows a reduction in the cost of investment in social capital; it facilitates both joining and active participation in numerous networks. This effect can be in the direction of a reinforcement of inequalities since those persons enjoying significant social capital find the Internet to be a way of improving the efficiency of their investments.

In order to verify the validity of these propositions, we used the data collected by CEPS/INSTEAD, for the "ICT Usage by Household" project, co-financed by Eurostat, and the "European Social Survey" project, financed by the "Fonds National de Recherche". These surveys collected data from approximately 1,550 individuals, of whom 796 were Internet users, aged from 16 to 74 years old.

The econometric models implemented show that the individuals committed to "leisure" type associations have a higher probability of using the Internet : so the digital divide disguises certain inequalities in social capital. Moreover, an intensive utilisation of the Internet is translated into investments in social capital (via the Internet). We have highlighted a complementarity between investments online aimed at intensifying existing relationships (maintaining one's existing social capital) and certain offline investments which contribute to the formation of local social capital (commitments to "leisure" type associations). In particular, it seems that individuals who have a social capital based upon participation in organisations of type "leisure" use the Internet much more for maintaining their capital than those who have social capital based upon participation in organisations of type "campaigning". These results underline the important role that the Internet plays in the formation of social capital, even if the links between non-Internet investments and those via the Internet are surely more complex than our first analyses led us to believe.

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Table 1 : Description of variables introduced into the econometric models

Variables (yes= 1)	All of the population		The Internet users	
	N	Average (Standard deviation)	N	Average (Standard deviation)
Having used the Internet in the last 3 months	1554	0.5122265 (0.5000114)	796	1.0000000 (0)
Number of associations of which the individual is a member	1552	1.9033505 (1.7454930)	796	2.0854271 (1.8361126)
Having intensified relationships with people considered close via the Internet	795	0.5157233 (0.5000673)	795	0.5157233 (0.5000673)
Having got to know new people via the Internet	795	0.3433962 (0.4751413)	795	0.3433962 (0.4751413)
Gender (male=1)	1554	0.4736165 (0.4994642)	796	0.5188442 (0.4999589)
Age	1554	42.1698842 (18.5480554)	796	32.1859296 (14.0206713)
Living in a couple	1524	0.5997375 (0.4901123)	778	0.5051414 (0.5002952)
Household size	1554	3.2413127 (1.4875547)	796	3.5364322 (1.4070548)
Living in an urban location	1523	0.4688116 (0.4991902)	783	0.4482759 (0.4976353)
Has a diploma level qualification (lower secondary level)	1554	0.3507079 (0.4773452)	796	0.2286432 (0.4202230)
Has a diploma level qualification (upper secondary level)	1554	0.3996139 (0.4899767)	796	0.4560302 (0.4983760)
Has a diploma level qualification (post secondary)	1554	0.1904762 (0.3928031)	796	0.2851759 (0.4517820)
Considers has an inadequate income	1524	0.0997375 (0.2997481)	773	0.0465718 (0.2108563)
Considers has a reasonable income	1524	0.3543307 (0.4784670)	773	0.2975420 (0.4574730)
Considers has a comfortable income	1524	0.5459318 (0.4980492)	773	0.6558862 (0.4753860)

Variables (yes= 1)	All of the population		The Internet users	
	N	Average (Standard deviation)	N	Average (Standard deviation)
Has a mobile phone	1554	0.7644788 (0.4244607)	796	0.8178392 (0.3862197)
Has a mobile phone with WAP	1554	0.3133848 (0.4640187)	796	0.4170854 (0.4933873)
Has a DVD	1554	0.4131274 (0.4925538)	796	0.5703518 (0.4953371)
Has a games console	1554	0.3815959 (0.4859346)	796	0.5025126 (0.5003080)
Have satellite navigation in the car	1554	0.0604891 (0.2384675)	796	0.0929648 (0.2905657)
Weekly Internet use (in minutes)	781	376.3713188 (573.9110137)	781	376.3713188 (573.9110137)
Never use the Internet	1554	0.4710425 (0.4993214)	/	/
Use Internet at least once a day	1554	0.2355212 (0.4244607)	796	0.4597990 (0.4986946)
Use Internet at least once a week	1554	0.2175032 (0.4126805)	796	0.4246231 (0.4945964)
Use Internet at least once a month	1554	0.0592021 (0.2360785)	796	0.1155779 (0.3199191)
Watches TV at least one hour a day	1554	0.2393822 (0.4268438)	796	0.2839196 (0.4511818)
Watches the TV between 1 and 2 hours daily	1554	0.2580438 (0.4376991)	796	0.3140704 (0.4644364)
Watches the TV between 2 and 3 hours daily	1554	0.2619048 (0.4398126)	796	0.2248744 (0.4177621)
Watches the TV more than 3 hours daily	1554	0.2361647 (0.4248613)	796	0.1733668 (0.3788021)
Does not read newspapers	1554	0.2078507 (0.4059000)	796	0.2223618 (0.4160944)
Reads newspapers at least 30 minutes a day	1554	0.3854569 (0.4868597)	796	0.4221106 (0.4942065)
Reads newspapers at least 1 hour a day	1554	0.2393822 (0.4268438)	796	0.2273869 (0.4194080)
Reads newspapers more than 1 hour a day	1554	0.1640927 (0.3704789)	796	0.1268844 (0.3330527)
Spontaneously meets friends once a day	1554	0.2072072 (0.4054358)	796	0.2525126 (0.4347268)
Spontaneously meets friends several times a week	1554	0.2709138 (0.4445747)	796	0.2964824 (0.4569934)
Spontaneously meets friends once a week	1554	0.1756757 (0.3806665)	796	0.1608040 (0.3675811)
Spontaneously meets friends zero or more times a month	1554	0.3397683 (0.4737829)	796	0.2851759 (0.4517820)
Is a member of an association of type “leisure”	1554	0.5611326 (0.4964085)	796	0.5716080 (0.4951568)
Is a member of an association “campaigning”	1554	0.6280566 (0.4834790)	796	0.7072864 (0.4552941)
Number of “leisure” type associations where the individual is a member	1552	0.7313144 (0.9038060)	796	0.8379397 (0.9330374)
Number of “campaigning” type associations where the individual is a member	1552	0.6552835 (0.9283057)	796	0.7223618 (1.0153798)
Number of “leisure” type associations where the individual is an active member	1552	0.1436856 (0.4375641)	796	0.1809045 (0.4913718)
Number of “campaigning” type associations where the individual is an active member	1552	0.0625000 (0.2815375)	796	0.0766332 (0.3256834)
Judges that he/she participates in social activities much less than other person of the same age	1554	0.1364221 (0.3433468)	796	0.0628141 (0.2427808)
Judges that he/she participates in social activities less than other person of the same age	1554	0.2136422 (0.4100090)	796	0.2135678 (0.4100828)

Variables (yes= 1)	All of the population		The Internet users	
	N	Average (Standard deviation)	N	Average (Standard deviation)
Judges that he/she participates in social activities as much as other person of the same age	1554	0.4034749 (0.4907524)	796	0.4610553 (0.4987944)
Judges that he/she participates in social activities more than other person of the same age	1554	0.1409266 (0.3480579)	796	0.1645729 (0.3710277)
Judges that he/she participates in social activities much more than other person of the same age	1554	0.0444015 (0.2060519)	796	0.0489950 (0.2159932)
Degree of trust in others (0 to 10 ; 0= no trust)	1533	5.2133072 (2.2987181)	787	5.3557814 (2.1919298)
Has lived in Luxembourg for at least 5 years	1545	0.9469256 (0.2242545)	790	0.9392405 (0.2390400)
Father or mother born in Luxembourg	1554	0.1415701 (0.3487209)	796	0.1281407 (0.3344566)
Father and mother born in Luxembourg	1554	0.5032175 (0.5001506)	796	0.5276382 (0.4995494)
Neither father nor mother born in Luxembourg	1554	0.3462033 (0.4759121)	796	0.3354271 (0.4724364)
Has been divorced	1554	0.0817246 (0.2740328)	796	0.0665829 (0.2494550)
Has experienced a period of unemployment of more than 3 months in the last five years.	1554	0.0534106 (0.2249231)	796	0.0590452 (0.2358575)

Table 2 : the determinants of investment in social capital excluding the Internet (MCO)

Variable explained : Number of associations to which the individual belongs				
	Coefficient (standard deviation)			
SOCIO ÉCONOMIC CHARACTERISTICS				
Being a man	0.33789*** (0.08448)	0.29048*** (0.08394)	0.31779*** (0.08421)	0.27887*** (0.08391)
Age	0.10556*** (0.01393)	0.10800*** (0.01409)	0.10948*** (0.01395)	0.11193*** (0.01414)
Age squared	-0.00102*** (0.00014583)	-0.00099458*** (0.00014562)	-0.00104*** (0.00014560)	-0.00102*** (0.00014583)
Living in a couple	0.11219 (0.11072)	0.16847 (0.10922)	0.13084 (0.11012)	0.17738* (0.10894)
Household size	0.04297 (0.03400)	0.04036 (0.03352)	0.05203 (0.03384)	0.04969 (0.03346)
Living in an urban location	-0.00662 (0.08641)	0.00953 (0.08548)	-0.02158 (0.08635)	-0.00207 (0.08570)
EDUCATIONAL CAPITAL / HUMAN CAPITAL				
Has a diploma level qualification (lower secondary level)	Ref.	Ref.	Ref.	Ref.
Has a diploma level qualification (upper secondary level)	0.21705** (0.09697)	0.10581 (0.09771)	0.22168** (0.09656)	0.11970 (0.09773)
Has a diploma level qualification (post secondary)	0.78567*** (0.12512)	0.45338*** (0.13297)	0.77950*** (0.12595)	0.48159*** (0.13418)
ECONOMIC CAPITAL				
Considers that income means that living is difficult	Ref.	Ref.	Ref.	Ref.
	0.24292 (0.15577)	0.13201 (0.15493)	0.23895 (0.15517)	0.13114 (0.15489)
Considers that income is sufficient				
Considers that income allows a comfortable lifestyle	0.64746*** (0.15596)	0.41881*** (0.15749)	0.55401*** (0.15643)	0.35072** (0.15830)
DEGREE OF MOBILITY				
Lived at least 5 years in Grand Duchy	0.50858*** (0.20478)	0.51421*** (0.20249)	0.54219*** (0.20438)	0.54651*** (0.20284)
Neither parent born in Grand Duchy	Ref.	Ref.	Ref.	Ref.
	0.41827*** (0.13615)	0.42201*** (0.13464)	0.40542*** (0.13620)	0.40447*** (0.13508)
One parent born in Grand Duchy				
Both parents in Grand Duchy	0.59841*** (0.10060)	0.56167*** (0.09962)	0.57097*** (0.10049)	0.53784*** (0.09973)
Has been divorced	-0.34440** (0.15432)	-0.37226*** (0.15203)	-0.32462** (0.15375)	-0.35392*** (0.15200)
Has had a period of unemployment	-0.24912 (0.19541)	-0.27385 (0.19281)	-0.20680 (0.19393)	-0.23693 (0.19195)
INTERNET USAGE				
Never uses the Internet	/	Ref.	/	Ref.
Using Internet at least once a day	/	0.63171*** (0.12780)	/	0.57393*** (0.12812)
Using Internet once a week	/	0.55273*** (0.12891)	/	0.52318*** (0.12888)
Using Internet once a month	/	0.25987 (0.19150)	/	0.27842 (0.19070)
USAGES OF MEDIA OTHER THAN THE INTERNET				
Watches TV at least once one hour a day	/	Ref.	/	Ref.
Daily watches TV between one and two hours	/	-0.26883*** (0.11649)	/	-0.25904** (0.11661)
Daily watches TV between two and three hours	/	-0.23754** (0.11858)	/	-0.24344** (0.11862)
Daily watches TV more than three hours	/	-0.43559*** (0.12683)	/	-0.36669*** (0.12773)
Does not read a newspaper	/	Ref.	/	Ref.
Reads a newspaper for at least 30 minutes a day	/	0.04198 (0.11664)	/	0.06686 (0.11676)
Reads a newspaper for between 30 minutes and one hour a day	/	0.17460 (0.13073)	/	0.15836 (0.13061)

Variable explained : Number of associations to which the individual belongs				
	Coefficient (standard deviation)			
Reads a newspaper for at least one hour a day	/	0.57501*** (0.14530)	/	0.55613*** (0.14569)
STOCK OF SOCIAL CAPITAL				
Trust in others	/	/	0.04684*** (0.01863)	0.03937** (0.01850)
Spontaneously meets friends several times a day	/	/	Ref.	Ref.
Spontaneously meets friends several times a week	/	/	-0.04781 (0.12456)	-0.05329 (0.12339)
Spontaneously meets friends once a week	/	/	-0.44582*** (0.13782)	-0.39250*** (0.13683)
Spontaneously meets friends less than once a week	/	/	-0.54264*** (0.12136)	-0.49671*** (0.12025)
Constant	-2.22247*** (0.38106)	-2.31524*** (0.39767)	-2.30371*** (0.38898)	-2.39463*** (0.40585)
Sample size	1450	1465	1465	1450
R2	0.1796	0.2128	0.2011	0.2286

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

Table 3 : the determinants of Internet usage

Variable explained : Probability of having used the Internet during the last three months	
	Coefficient (standard deviation)
THE SOCIO-ÉCONOMIQUES CHARACTERISTICS	
Being a man	0.0968 (0.0868)
Age	-0.0579*** (0.0148)
Age squared	0.0001 (0.0002)
Living in a couple	-0.2167** (0.1139)
Household size	-0.0141 (0.0346)
Living in an urban location	-0.0016 (0.0881)
EDUCATIONAL CAPITAL / HUMAN CAPITAL	
Has a diploma level qualification (lower secondary level)	Ref.
Has a diploma level qualification (upper secondary level)	0.6176*** (0.0983)
Has a diploma level qualification (post secondary)	1.1137*** (0.1330)
ECONOMIC CAPITAL	
Considers that income means that living is difficult	Ref.
Considers that income is sufficient	0.4098 (0.1638)
Considers that income allows a comfortable lifestyle	0.7565*** (0.1658)
DEGREE OF MOBILITY	
Lived at least 5 years in Grand Duchy	0.1168 (0.2100)
Neither parent born in Grand Duchy	Ref.
One parent born in Grand Duchy	0.0744 (0.1410)
Both parents in Grand Duchy	0.1164 (0.1030)
Has been divorced	0.0641 (0.1486)
Has had a period of unemployment	0.1810 (0.1775)
ICT EQUIPMENT OF THE INDIVIDUAL	
Has a mobile phone with WAP	0.3337*** (0.1258)
Has a classic mobile phone	0.3879*** (0.1068)
Has a DVD player	0.4276*** (0.0930)
Has a games console	0.1151 (0.1001)
Has satellite navigation in the car	0.7031*** (0.1950)
USAGE OF MÉDIA OTHER THAN THE INTERNET	
Daily watches TV less than one hour	Ref.
Daily watches TV between one and two hours	0.1577 (0.1194)
Daily watches TV between two and three hours	-0.2162* (0.1211)
Daily watches TV more than three hours	-0.1035 (0.1367)
Does not read a newspaper	Ref.
Reads a newspaper for at least 30 minutes a day	0.1369 (0.1196)

Variable explained : Probability of having used the Internet during the last three months	
	Coefficient (standard deviation)
Reads a newspaper for between 30 minutes and one hour a day	0.1777 (0.1351)
Reads a newspaper for at least one hour a day	0.2254 (0.1532)
INVESTMENT AND STOCK OF SOCIAL CAPITAL	
Spontaneously meets friends several times a day	Ref.
Spontaneously meets friends several times a week	0.0603 (0.1281)
Spontaneously meets friends once a week	-0.1775 (0.1396)
Spontaneously meets friends less than once a week	0.0192 (0.1248)
Belongs to an “campaigning” type association	0.1399 (0.0923)
Belongs to an association of type “leisure”	0.3276*** (0.0926)
Degree of trust in others	0.0280 (0.0192)
Constant	-0.1504 (0.4186)
Number of observations	1346
Log of the probability	-577.35

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

Table 4 : the determinants of investment in social capital via the Internet (maintaining one's existing social capital)

Variable explained : Probability of intensifying of existing relationships via the Internet				
	Coefficient (standard deviation)			
CHARACTERISTICS SOCIO ÉCONOMIQUES				
Being a man	-0.0744207 (0.0932317)	-0.0590899 (0.0960151)	-0.0630584 (0.097991)	-0.0575569 (0.097101)
Age	-0.0148078 (0.016973)	-0.0198932 (0.0180508)	-0.02209 (0.0191011)	-0.0223634 (0.0183828)
Age squared	0.0003262* (0.000194)	0.0003403* (0.000205)	0.0003163 (0.0002151)	0.0003598* (0.0002083)
Living as a couple	-0.1413302 (0.125006)	-0.1431564 (0.1282126)	-0.1062624 (0.1320702)	-0.1435024 (0.1293953)
Household size	-0.0274527 (0.0360286)	-0.0264173 (0.037066)	-0.0440345 (0.0384988)	-0.0322626 (0.0375807)
Living in an urban location	0.0075405 (0.0928733)	0.0030071 (0.0956431)	0.016403 (0.0978377)	-0.0005801 (0.0966949)
Has a diploma level qualification (lower secondary level)	Ref.	Ref.	Ref.	Ref.
Has a diploma level qualification (upper secondary level)	-0.0279871 (0.1286733)	0.0282792 (0.1355099)	0.0732763 (0.140065)	0.0485496 (0.1378943)
Has a diploma level qualification (post secondary)	-0.0279871 (0.1286733)	0.1569906 (0.1864028)	0.226476 (0.1925385)	0.1777515 (0.1902499)
Considers that income means that living is difficult	Ref.	Ref.	Ref.	Ref.
Considers that income is sufficient	0.1799518 (0.2410686)	0.2593192 (0.2529521)	0.2680242 (0.2579625)	0.2799757 (0.2564656)
Considers that income allows a comfortable lifestyle	0.1304168 (0.2516384)	0.1864116 (0.2628527)	0.2005024 (0.2677075)	0.2145661 (0.2670712)
DEGREE OF MOBILITY				
Lived at least 5 years in Grand Duchy	-0.0686917 (0.2167402)	-0.0610755 (0.2218839)	-0.0932328 (0.2254711)	-0.0646914 (0.223518)
Has had a divorce	-0.0579971 (0.182005)	-0.0259354 (0.1886342)	0.0546332 (0.1951041)	-0.0245654 (0.1907956)
Has had a period of unemployment	0.0103729 (0.1967296)	0.0511221 (0.2019095)	0.0387251 (0.2076091)	0.0540091 (0.2043815)
Neither parent born in Grand Duchy	Ref.	Ref.	Ref.	Ref.
Having one parent born in Grand Duchy	-0.3351038** (0.1554472)	-0.3047396** (0.1600566)	-0.3433533** (0.1642717)	-0.3316189** (0.1634671)
Having both parents born in Grand Duchy	-0.329468*** (0.1080365)	-0.3390903*** (0.1107417)	-0.3594115*** (0.1145239)	-0.3734205*** (0.1136065)
INTERNET USAGE				
Degree of Internet usage	0.000153** (0.0000833)	0.0001597** (0.0000859)	0.00015* (0.0000877)	0.0001766** (0.0000877)
INVESTMENT IN SOCIAL CAPITAL				
Number of “leisure” type associations where the individual is a member	/	/	0.1725873*** (0.0592158)	/
Number of “campaigning” type associations where the individual is a member	/	/	-0.0738385 (0.0544788)	/
Number of “leisure” type associations where the individual is active	/	/	0.0513514 (0.1028253)	/
Number of “campaigning” type associations where the individual is active	/	/	0.1612984 (0.1542997)	/
Judges that he/she participates in social activities much less than other person of the same age	/	/	/	-0.1335044 (0.2084073)
Judges that he/she participates in social activities less than other person of the same age	/	/	/	-0.1755886 (0.122699)
Judges that he/she participates in social activities as much as other person of the same age	/	/	/	Ref.
Judges that he/she participates in social activities more than other person of the same age	/	/	/	0.069763 (0.1306317)
Judges that he/she participates in social activities much more than other person of the same age	/	/	/	0.0282791 (0.2188088)

Variable explained : Probability of intensifying of existing relationships via the Internet				
	Coefficient (standard deviation)			
STOCK OF SOCIAL CAPITAL				
Spontaneously meets friends several times a day	/	Ref.	Ref.	Ref.
Spontaneously meets friends several times a week	/	0.0410656 (0.1303918)	0.0754664 (0.1337918)	0.0438019 (0.1319838)
Spontaneously meets friends once a week	/	-0.1364928 (0.1511241)	-0.0828658 (0.1553037)	-0.1230068 (0.1539092)
Spontaneously meets friends less than once a week	/	-0.0710208 (0.1324695)	0.0002977 (0.1374326)	-0.0492991 (0.1353003)
Degree of trust in other people	/	0.0523908*** (0.022862)	0.0503778*** (0.0231506)	0.0493878*** (0.0232504)
Constant	0.6706222 (0.432699)	0.389969 (0.4659303)	0.3427006 (0.4807641)	0.4640824 (0.473538)
Sample size	722	722	722	722
Log of the probability	-1046.413	-1042.824	-1036.783	-1041.213
ρ	-0.6421783	-0.5279379	-0.4271009	-0.4806219

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

Ref. : reference variable

Table 5 : the determinants of investment in social capital via the Internet (renewing one's social capital)

Variable explained : Probability of establishing of new relations sociales via the Internet				
Coefficient (standard deviation)				
CHARACTERISTICS SOCIO ÉCONOMIQUES				
Being a man	0.1253301 (0.1079927)	0.1391537 (0.1101001)	0.1413741 (0.1102234)	0.1353431 (0.1102398)
Age	-0.0525526*** (0.0197987)	-0.0583068*** (0.0205497)	-0.0571178*** (0.0211038)	-0.0560852*** (0.0206406)
Age squared	0.000597*** (0.0002247)	0.0005998*** (0.0002348)	0.0005831*** (0.0002385)	0.0005883*** (0.0002332)
Living as a couple	-0.3766542*** (0.1388568)	-0.3765731*** (0.1416293)	-0.3632725*** (0.1434033)	-0.3751584*** (0.1415706)
Household size	-0.0339913 (0.0410262)	-0.0345748 (0.0418887)	-0.0395675 (0.042793)	-0.0317752 (0.0421151)
Living in an urban location	-0.0050776 (0.1051322)	-0.0091065 (0.1079092)	0.0041167 (0.1086623)	-0.0010638 (0.1078388)
Has a diploma level qualification (lower secondary level)	Ref.	Ref.	Ref.	Ref.
Has a diploma level qualification (upper secondary level)	-0.2292862* (0.1420955)	-0.1629886 (0.1491883)	-0.1632275 (0.1503704)	-0.1753216 (0.1487679)
Has a diploma level qualification (post secondary)	-0.4052671** (0.1987574)	-0.3165166 (0.2080748)	-0.3230332 (0.2084539)	-0.3291765 (0.2072989)
Considers that income means that living is difficult	Ref.	Ref.	Ref.	Ref.
Considers that income is sufficient	0.4068034 (0.2758858)	0.4991264* (0.284815)	0.5074732* (0.284818)	0.5006279* (0.2842602)
Considers that income allows a comfortable lifestyle	0.2049895 (0.2855586)	0.2756091 (0.2938032)	0.274849 (0.2935106)	0.2719685 (0.2930432)
DEGREE OF MOBILITY				
Lived at least 5 years in Grand Duchy	0.1803365 (0.2374242)	0.1786409 (0.2410755)	0.1864101 (0.2422238)	0.199594 (0.2420582)
Has had a divorce	-0.0721794 (0.2212235)	-0.0535898 (0.22604)	-0.0428046 (0.2275928)	-0.0487098 (0.227022)
Has had a period of unemployment	0.5949724*** (0.2155832)	0.6508881*** (0.2204245)	0.6463677*** (0.2223275)	0.6459032*** (0.2215163)
Neither parent born in Grand Duchy	Ref.	Ref.	Ref.	Ref.
Having one parent born in Grand Duchy	-0.2868277* (0.173577)	-0.2451523 (0.1777381)	-0.2365823 (0.178888)	-0.2161829 (0.1785317)
Having both parents born in Grand Duchy	-0.2568251** (0.1214723)	-0.2521206** (0.1239095)	-0.2473433** (0.1255154)	-0.2286928** (0.1255359)
INTERNET USAGE				
Degree of Internet usage	0.0005009*** (0.0000945)	0.0005155*** (0.0000955)	0.0005109*** (0.0000957)	0.0004992*** (0.0000963)
INVESTMENT IN SOCIAL CAPITAL				
Number of "leisure" type associations where the individual is a member	/	/	0.0646386 (0.0639779)	/
Number of "campaigning" type associations where the individual is a member	/	/	-0.0213555 (0.0634342)	/
Number of "leisure" type associations where the individual is active	/	/	-0.0460059 (0.1658697)	/
Number of "campaigning" type associations where the individual is active	/	/	-0.1180108 (0.1148504)	/
Judges that he/she participates in social activities much less than other person of the same age	/	/	/	0.1616858 (0.2316049)
Judges that he/she participates in social activities less than other person of the same age	/	/	/	0.0811661 (0.1365926)
Judges that he/she participates in social activities as much as other person of the same age	/	/	/	Ref.
Judges that he/she participates in social activities more than other person of the same age	/	/	/	-0.1073405 (0.1493338)
Judges that he/she participates in social activities much more than other person of the same age	/	/	/	-0.2054148 (0.2501212)

Variable explained : Probability of establishing of new relations sociales via the Internet				
Coefficient (standard deviation)				
STOCK OF SOCIAL CAPITAL				
Spontaneously meets friends several times a day	/	Ref.	Ref.	Ref.
Spontaneously meets friends several times a week	/	0.03461 (0.1441336)	0.0294794 (0.1454817)	0.0273619 (0.1445526)
Spontaneously meets friends once a week	/	-0.2713893 (0.1726804)	-0.2836367* (0.1744827)	-0.3000612* (0.173891)
Spontaneously meets friends less than once a week	/	-0.0069094 (0.1468259)	-0.0030729 (0.14926)	-0.0351617 (0.1478704)
Degree of trust in other people	/	0.0435304* (0.0252563)	0.0433681* (0.0253089)	0.0493424** (0.0256998)
Constant	0.6317582 (0.4912341)	0.3849655 (0.5256894)	0.3445467 (0.5304942)	0.3058569 (0.5282868)
Sample size	722	722	722	722
Log of the probability	-961.0661	-957.8598	-956.8148	-956.7045
ρ	-0.3639864	-0.2034966	-0.1902026	-0.2544651

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

Ref. : reference variable