Social Capital in the Presence of Market Failures

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ABSTRACT

In Mexico, social capital is used to get resources. People who do not have access to formal markets use their networks to acquire public and financing services, social insurance and social benefits. To test this, social capital indicators were built using the resources supplied by people as a proportion of their income. This measure is theoretically related to a sympathy coefficient that represents the degree to which a person joins another´s welfare in its utility function, leading him to share resources with others. Synthetic panels with population cohorts were elaborated to follow population throughout the time. To correct a spurious regression problem, the cointegration-panel method was used. As a result, variables that reflect failures in financial, health and social insurance markets are associated to bonding and bridging social capital indicators. Thus, adjustments in these markets could be explained by social capital variables additionally to market prices mechanisms.

Keywords: social capital, market failures, equilibrium, relationships, networks.

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I. Introduction

Woolcock, M. (1999), van Bastelaer, Th. (2000), Grootaert, C., and van Bastelaer Th. (2002) assert that, in developing countries, many people's access to financial and social services is restricted by failures in formal markets. However, this is just restricted to Mexican case, where people present the same behaviour (Londoño and Székely, 1997; Birdsall and Londoño, 1997b).

Markets provide goods and services for people which are prepared to pay a price that covers their production costs, however, this is not always the case since markets may fail to offer certain goods and services. Government intervention through subsidies occurs when market conditions to achieve efficiency sacrifice equity conditions. Even government could produce failures trough poverty trap (Barr, 1998). Market failures are related to imperfect markets by problems of asymmetric information, contract breach, high transportation and transaction costs, monopoly, public goods and inequality problems.

In the case of financial services, market failures are related with asymmetric information problems, contract breach, high transportation and transaction costs and inequality problems. This limits access to the poor into the banking system because of the costs and risks involved in the allocation of formal credit to the population that has no collateral or guarantee (Mansell, 1995, Stiglitz and Weiss, 1981).

Access to formal financial services[3] is difficult or inaccessible to poor people, they have no guarantees such as physical or financial collateral and the guarantee is the prerequisite for most loans in the formal sector (van Bastelaer, Th., 2000). Banks have no interest in small crops, animals, or electrical appliances. In some cases, the poor have an acceptable guarantee: the land, however, the lack of legal title prevents offering it as collateral, so does the mortgage (Mansell, 1995). Consequently, banks would be based on the credit history of the poor (inaccessible or nonexistent) or in their level of income (variable and irregular). This situation, combined with the lack of information about the credit risk of these borrowers and high interest rates,

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[3] The formal sector includes commercial banks and savings and loan associations (Woodruff, 2006). The informal sector is based on the degree of regulation of lending activities and includes governmental organizations, corporations and cooperatives, private entrepreneurs, traders and lenders. Producers of private and communal lands which provide loans also are included in the informal sector. Organizations, companies, cooperatives and associations whose financial activities are regulated and partly financed by the state, are placed in the category of formal lenders (Swaminathan, M., 1992).

exclude the poor from the formal markets (Swaminathan, M., 1992; Woodruff, 2006).

Often, transaction costs may be higher on loans to the poor than for higher income individuals because the current credit monitoring and enforcement of contracts is more difficult for the poor. The lenders could raise rates to cover costs and do, but to some extent (they raise rates until the level at which higher marginal rates increase the probability of default, which would reduce their profits). Thus, financial intermediaries, in the equilibrium, ration credit to customers that involve less research and monitoring costs, and whose contracts are cheaper to enforce. Even in the informal financial sector, interest rates do not balance the markets and credit rationing exists (Stiglitz and Weiss, 1981).

Furthermore, transaction costs faced by the poor can also be huge for their deposits. The time opportunity cost of the poor is also high. As there are few formal financial sector intermediaries in low-income areas, banking may lead to getting away a few hours of work, walking long distances, taking several transports and most likely, long lines. It can also involve filling out forms difficult to understand, time and effort to gather the required documentation. Therefore, this sector of the population relies more frequently to other financial services. This is another reason why people on low income are not only excluded from formal financial markets, but also from many informal sources of financing.

In the case of health services, market failures occur because of problems associated with asymmetric information and monopolies in the distribution and supply of services. With regard to information about health care, it can be highly imperfect because a lot of medical treatments are complex and technical knowledge is required. In addition, prices knowledge is limited by the diversity and complexity of the diseases (no one knows how much health needs and the price that it represents). Hence, the cost of producing the service is not equal to the value that consumers attach, so health services are offered in a limited way. (Barr, 1998: 85, 282-283).

Therefore, consumers are poorly informed both about the quantity of treatment they need and the quality of care they receive. Regularly checking health conditions can help, but information may be costly. If consumers are to make rational choices, they need to have the necessary information, and also the power to enforce their decisions. In this sense, lower income people may have less information relevant to choices about health; in addition, they may be less able to make use of any information they acquire.

In developing countries, poverty is highly correlated with illness and with access to health. In poverty, a disease can fill the space from a previously one already eradicated (Auerbach and Krimgold, 2001). The supply of effective health services is associated with the availability of medicines and technical equipment for the prevention and care, access to this services supply is restricted to the population living in urban areas or to people who can pay a high price for its use (Evans, et al., 1994). Additionally, in developing countries poor people rarely have health insurance, first for the high risk that this population imply and secondly for the large share of their income that should be spent on purchasing an insurance.

Social security is related to problems of uncertainty and risk that stem from two sources: first, securing is generated because employment is a binary phenomenon in developing countries –i.e. an individual can be employed or unemployed on a short-term- and the retirement is a discrete event. Second, information problems related to contingencies such as long- term unemployment, inflation and major illness risks provide a justification for the state intervention to offer this service (Barr, 1998: 124-125). People who are not attached to any social security system provided by their employer do not have social benefits at work.

Woolcock, M. (1999), van Bastelaer, Th. (2000), Grootaert, C., and van Bastelaer Th. (2002), assert that, social capital may be a mechanism by which people in developing countries can obtain needed financial, health and social services in the context of absent or imperfect markets. In Mexico, people use the social capital in the same way (Birdsall and Londoño, 1997b).

"Social capital is a person's or group's sympathy toward another person or group that may produce a potential benefit, advantage, and preferential treatment for another person or group of persons beyond that expected in a relationship." (Robison, Schmid, and Siles, 2002).

People who receive subsidies could perceive the benefits of the aid obtained from public institutions and could extend trust levels granting transferences towards others (Barr, 1998). Those without access to formal financial market could use alternative financial mechanisms to get these services, like loans from relatives and friends or savings in RoSCAs[4]. People involved in these informal schemes could grant resources to those who maintain a link or affinity (Mansell, 1995; van Bastelaer, Th., 2000).

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[4] Informal Rotating Saving and Credit Associations

When people do not have access to clinics or hospitals, they use alternative medicine like homemade medicine, tonic remedies, a healer or a midwife; the provision of this kind of services could settle down links with the suppliers that can be relatives or known people (Woolcock, 1999; Narayan and Pritchett (1997). When people do not have social benefits at work like medical services, nursery school, mortgage and loans, among others, they often ask relatives and friends for their supply. People who use these kind of services could grant resources to others like reciprocal consequence of others aid. (Birdsall and Londoño, 1997b; Londoño and Székely, 1997; Morduch, 1995).

This paper studies the relationship between the social capital supply and the variables that reflect market failures. The hypothesis for the study is that market failure variables explain the social capital supply of people in Mexico. In this sense, the research question asks whether the social capital supply of individuals is affected by variables that reflect market failures.

Since in developing countries poor people use their social capital to get public and financial services (Woolcock, 1999), the objective of this paper is to test if social capital is explained by market failures variables in a country like Mexico.

II. Social capital definition and assumptions

This paper is based on the assumption that households in Mexico have little or no access to formal institutions nor to the market to meet their needs, therefore they invest on their social resources to get the services they cannot obtain in a context of absent or imperfect markets. These services are related to the financial services, health and social insurance. Even these assumptions could be generalized to developing countries, this paper just study the Mexican case.

The Robison, Schmid, and Siles' social capital definition is used in this paper because:

1. It takes into account the positive aspect of the concept (Portes, A. 1998).
2. It considers interdependence among individual utility functions: a set of individual preferences that incorporates the well-being of others in the own welfare (Hochman and Rodgers, 1969).
3. It distinguishes what social capital is (sympathy) from what it makes (generates benefits, advantages or preferential treatment)

and where it resides (on the social relationship in which sympathy is expressed) (Robison, Schmid and Siles, 2002).

The following assumptions were considered in this paper:

The positive aspect of the concept is considered. This means "If social capital is positive an increase in j welfare results in an increase in the utility of i then i can increase their utility giving resources to j to increase j welfare" (Schmid and Robison, 1995: 60). In the positive aspect, the relationships through the social capital allow information flows, facilitate collective actions based on trust and create formal or informal mechanisms to protect themselves against contingency events and risks or to get advantages from opportunities.

Individuals were considered because it is difficult to think in communities in decision-taking context. Social capital of an individual depends on their personal characteristics and these can produce in or outside market returns in their interactions with others (Coleman, 1990, Glaeser, Laibson and Sacerdote, 2002). This approach contrasts with the analysis based on the group that emphasizes institutions, norms and aggregated results rather than the decisions of individual actors (Schultz 1961; Becker 1964).

From a "micro" perspective, social capital definition relates affinity relationships between people to the resources that are offered on a voluntary basis between them. This takes into account that in general, social capital and resources supply are linked because if income transfer is voluntary and agent i chooses an amount of its income to transfer it to agent j, this act maximizes both utility functions. Then transfers to agent j from agent i will increase j income with an increase in the social capital from agent j to agent i (Robinson and Siles, 1997). It is considered just social capital supply from $i's$ perspective because the only resources controlled are the granted but not the received.

The literature on social capital explains its use as an input or output, the indicator used here is regarded as a product. This is because the social capital endowment is the result of the sympathy relationships between individuals who generate useful resources for themselves and others.

The indicator of social capital considered refers to the resources invested in horizontal networks. These are the contributions, support or aid towards others or the community in which they live. Social capital supply is viewed as a bond to cover the income shocks, emergencies or to generate

opportunities, thus it could be seen as an indicator of social capital investment (Glaeser, Laibson and Sacerdote, 2002).

The social capital indicator relates theoretically with a sympathy coefficient which represents the degree to which a person incorporates the welfare of another people in his/her own utility and that leads them to share resources with others.

The objective of this paper is to find individual characteristics that affect the social capital supply; to study the factors influencing the decisions of transfers between individuals and to know how people get resources because of the problems derived of imperfect or incomplete markets.

III. Theoretical model to get the social capital indicator

Based on Robison, Hanson and Steven (1995); Andreoni (1989), Echeverría and Díaz (2002), Altonji, Hayashi and Kotlikoff (1995), Konow (2004), De la Torre, R. and L-Rodriguez, P. (2004) the following model looks for the relationship between social capital defined as sympathy and interpersonal transfers. The objective of this model is to find such social capital indicator based on the assumptions mentioned above.

In this model, social capital depends on socio economic characteristics which are exogenous to the model. Here, the utility of an individual depends on his/her own income, his/her transfers level (T) and an assessment of its personal connection to another individual given by a social capital coefficient (K) defined as a sympathy coefficient.

It considers that if agent i feels sympathy for j and i offers social capital to j, then j receives social capital. If agent i has sympathy for agent j, then any improvement in the welfare of j will also benefit the welfare of i indirectly. As a result, j can expect favours, preferential trade terms and other benefits from i that do not involve higher costs in i, only indirect benefits that can be obtained by improvements in the welfare of j.

The relations of sympathy are represented by Kij ratios that shape the extent to which the welfare of the individual i is influenced by the well-being of the person j (Robison and Hanson and Steven 1995: 3; Schmid and Robison, 1995: 43-58 and 59-66). The relationship from the person i towards j can be sympathetic ($Kij > 0$), antipathy ($Kij < 0$) or neutral ($Kij = 0$). The social capital ratio (K) is a function of the relationship between the two players and the opportunity and awareness of exercising power. Since it is considered $K > 0$,

an increase in j income generates an increase in the i's utility. So agent i could increase its own utility transferring to agent j.

It is assumed that agents i and j have equal Cobb-Douglas utility functions. The individual's utility functions depend on his/her final income, on transfers that one individual gives to another (Tt) and on a coefficient which measures the appreciation of a person to another, which also depends on a parameter (α) that incorporates the socio-economic characteristics of individuals such as gender, household size, region, age, education, tenancy, and so on. Each individual will have their own α, so if an individual j is analysed α_i is used, if an individual i is analysed α_i is used. This parameter α is attached just to the individual so it cannot be transferred to other individual or interchanged. These characteristics affect the sympathy level felt by an agent towards the other because depending on social distance from i to j, agent i might have a sense of sympathy or affinity with j. For example, if i and j share the same region, age and gender, then i would have a higher affinity or sympathy to j. The following are the utility functions of individuals i and j.

$$U_i = LnIf_i + K_{ij}(\alpha)Ln\ Tt_{ij} \tag{1}$$

$$U_j = LnIf_j + K_{ji}(\alpha)Ln\ Tt_{ji} \tag{2}$$

The sympathy described in the utility functions shows that an individual increases its welfare by increasing the income transferred to another and not by the level of welfare that reaches the other. Andreoni (1989 and 1990) calls this kind of sympathy "warm glow" and represents the idea that giving, by itself, generates satisfaction. Andreoni (1990) considered a model where the utility of an agent depends on the other, and their utility functions reflect two motivations to donate, the first relates to contributions and the second to the psychological satisfaction derived from the donation. Thus, the agents derive utility from donating, regardless of their current consumption. Its selfishness or altruism not only influences to determine the amount of transfers, but also to generate the experience of the donation "warm glow." Here transfers supply can be interpreted as a gift to the donor because the donor transfers something valuable for the other person.

The final income of individuals i and j is given by the sum of the initial income (Io) and net transfers (Tn). These net transfers, in turn, are composed of received transfers (Tr) less given transfers (Tt).

$$If_i = Io_i + Tn_i \tag{3}$$

$$If_j = Io_j + Tn_j \tag{4}$$

$$Tn_i = Tr_i - Tt_i \tag{5}$$

$$Tn_j = Tr_j - Tt_j \tag{6}$$

Considering transaction costs equal to zero, it is assumed that the transfers made by agent i are equal to those received by agent j, and vice versa.

$$Tr_j = Tt_i \tag{7}$$

$$Tr_i = Tt_j \tag{8}$$

The transfers granted (Tt) are the only variables that an agent can control. The Initial income (Io) and received transfers (Tr) are exogenous variables. Then, the estimated variable in the model will be Tt. The maximization problem is given by:

$$\underset{Tt_{ij}}{Max}\ U_i = Ln\ (Io_i + Tr_i - Tt_i) + K_{ij}(\alpha) Ln\ Tt_{ij} \tag{9a}$$

$$\underset{Tt_{ji}}{Max}\ U_j = Ln\ (Io_j + Tr_j - Tt_j) + K_{ji}(\alpha) Ln\ Tt_{ji} \tag{9b}$$

The first order conditions of the maximization problem are the following:

$$\frac{\partial U_i}{\partial Tt_i} = -\frac{1}{Io_i + Tt_j - Tt_i} + \frac{K_{ij}(\alpha)}{Tt_{ij}} = 0 \tag{10a}$$

$$\frac{\partial U_j}{\partial Tt_j} = -\frac{1}{Io_j + Tt_i - Tt_j} + \frac{K_{ji}(\alpha)}{Tt_{ji}} = 0 \tag{10b}$$

The first order conditions mean that the optimal transfers that individual gives are equal to its income and its final sympathy level that depends on a vector of socioeconomic characteristics named α and is represented by age, gender, education, household size, tenancy, region, residence, occupation, and so on. These individuals' characteristics influence the level of sympathy felt by one individual to another. For example a woman may feel more sympathy with someone who is of the same gender than with someone different.

$$Tt_i = K_{ij}(\alpha)If_i \tag{11a}$$

$$Tt_j = K_{ji}(\alpha)If_j \tag{11b}$$

Since the income of each individual depends on the transfers it receives from the other, and in turn transfers to give depend on the income itself, it appears that the transfers to give depend on transfers to receive. This interaction leads to a Nash equilibrium after the replacement of the functions reaction. From the equations (11a) and (11b) it is obtained that social capital depends on a vector of socioeconomic characteristics and it is equal to a proportion of income that one individual transfers to another:

$$K_{ij}(\alpha) = \frac{Tt_{ie}}{If_i} \tag{12a}$$

$$K_{ij}(\alpha) = \frac{Tt_{ie}}{If_i} \tag{12b}$$

The equations above show that the social capital supplied by each individual can be approached by the given transfers as a proportion of final income. Applying logarithms to (11a) and (11b) equations, (13a) and (13b) equations are obtained as following:

$$LnTt_i = LnK_{ij}(\alpha) + \ln If_i \tag{13a}$$

$$LnTt_j = LnK_{ji}(\alpha) + \ln If_j \quad \text{(13b)}$$

Since it was assumed that agent i and j have equal Cobb-Douglas utility functions, the results are the same for the individual i and j, the following expression represent same transfers behaviour for individual i and j:

$$LnTt = LnK(\alpha) + \lambda LnIf \quad \text{(14)}$$

The social capital indicator is obtained from the equation (14) which is the ratio of given transfers as a proportion of final income. The coefficient λ represents the elasticity of transfers made with respect to income. It is assumed that $\lambda=1$, which means that transfers increase by the same proportion that income does, which means that when there are sympathy feelings towards other person, the income increase leads to an increase in transfers in the same proportion. From equation (12) it is obtained the following model where the parentheses terms represent the sympathy coefficient expressed in the term $LnK(\alpha)$.

Each of the parameters α represent an individual's socio-economic characteristic for example gender, household size, region, age, education, tenancy, and so on. Each characteristic is linked to the sympathy level of each individual. The C constant indicates a degree of sympathy that does not depend on any of the above features. It is expected that the C antilogarithm was the base level of the individuals sympathy coefficient and this could increase or decrease depending on the behaviour of socio demographic variables. The sympathy level for a person could be determined by the constant C, if each of the socio economic variables that affect the social capital of an individual was zero. Each of the β coefficients represents an increase or decrease in the social capital of the individuals in terms of their socio-economic characteristics. The following model –from (14) equation- is the empirical model proposed for the estimation of the social capital determinants.

$$LnTt = (c + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n) + \lambda LnIf \quad \text{(15)}$$

Since the product obtained from the sympathy relations is the indicator of social capital investment (KS). The indicator KS may be representing the following differential LnTt-λLnIf. Thus the empirical model to estimate

would assume the following form which is expressed in terms of the dynamic method of cointegration to be used.

$$KS_t = c_t + \beta_{t1}X_{t1} + \beta_{t2}X_{t2} + ... + \beta_{tn}X_{tn} \tag{16}$$

As far as the empirical evidence regarding the kind of sympathy predominant, Altonji, Hayashi and Kotlikoff (1995) show that experimental findings suggest that pure altruism models do not correspond to the behaviour of individuals, but closer to a sympathy "warm glow ". However, Konow (2004) finds that the utility functions inferred are a combination of pure altruism and "warm glow." The implication of this is that the transfers as a proportion of income tend to underestimate the social capital to some extent.

Through this model it is possible to obtain an indicator of social capital. This refers to the resources supplied by people as a proportion of their income, this indicator is associated with a sympathy coefficient which represents the degree to which a person incorporates the welfare of other in its utility function and that leads to share resources with others. In this model, the social capital of an individual depends on their personal characteristics and these can generate market or out market returns in interactions with others.

From the model it is inferred the following: the utility maximization of each individual implies that the optimal transfers that an individual gives to another are equal to their final income and their level of sympathy, that is the social capital coefficient *Kij* which depends on a socioeconomic characteristics vector α, such as age, gender, education, household size, tenancy, religion, residence, occupation and market failures proxys, etc.

$$Tt_i = K_{ij}(\alpha)If_i \tag{17}$$

Social capital offered by each individual can be approximated from their transfers as a proportion of their final income. Social capital indicator depends on a vector of socioeconomic characteristics.

$$K_{ij}(\alpha) = \frac{Tt_{ie}}{If_i} \tag{18}$$

The indicator of social capital is the ratio of transfers granted with respect to income. The indicator KS would be represented by the following differential LnTt-λLnIf. The coefficient λ represents the elasticity of transfers over income. It is assumed that λ=1 which means that the transfers increase in the same proportion as the income.

$$LnTt = LnK(\alpha) + \lambda LnIf \qquad (19)$$

The following empirical model is expressed in dynamic terms because the objective is to follow the individual along the time. This model is going to be estimated.

$$LnKS_t = c_t + \beta_{t1}X_{t1} + \beta_{t2}X_{t2} + ... + \beta_{tn}X_{tn} \qquad (20)$$

Semieslaticities were suggested to avoid capture seasonal changes of income. In developing countries like Mexico they are frequent, since the income is more vulnerable to shocks that affect it.

IV. Social capital indicators

There were considered two types of social capital indicators (SK) based on what the literature calls "Bonding" and "Bridging" (Putnam, 2000). The first type directly contributes to the welfare of its members; the second opens opportunities and economic benefits for groups and communities as a whole (Narayan, 1999). This approach focuses on the way in which social capital is given, directly or as part of a process through groups or communities.

Indicators of social capital (SK)		
Types of social capital by the way it is given	Types of social capital by the form it is developed	Indicator description
Bonding	Networks	Support and aid to relatives and persons not members of the household.
Bridging 1	Participation in organizations	Contributions to charities, churches, Red Cross, and voluntary organizations.
Bridging 2	Collective action	Contributions for local religious festivities.
Bridging 3	Collective action	Contributions for local public works.

There were considered different indicators for the measurement of social capital because the objective is to observe the different effects of the independent variables on social capital. That is because the effects of an independent variable on social capital might be different depending on the type.

V. Market failures variables

There were built some indicators to approach market failure problems related to financial services, health services, social security and subsidies. The indicators that capture market failures are not measuring them as such, but are proxies of them, for example, the variable financial services is not measuring directly asymmetric information but represents an approach to this market failure in the sense that certain population sector has limited access to the banking system. This is because of the costs and risks involved in the allocation of formal credit to the population that has no collateral or guarantee (Mansell, 1995).

In the case of health services, market failure occurs because of information problems and monopolies. With regard to information about health care, the prices knowledge is limited by the diversity and complexity of the diseases, thus the cost of producing the service is not equal to the value that consumers attach so health services are offered in a limited way. (Barr, 1998). Social security is related to problems of uncertainty and risk (Barr, 1998). People who are not attached to any social security system provided by their employer do not have social benefits at work. In this sense, market failures proxies built were the following:

- *Financial services*: this is a market failure proxy that reflects asymmetric information problems in the credit market that limit access to some population to the banking system. This was built with people with limited or no access to formal financial services like banks. This is a dummy variable that takes values of 1 if people use credit and savings informal services such as deposits in batches, ROSCAs, community cooperatives and make loans to household members and friends and 0 otherwise.

- *Health services:* this is a market failure proxy that reflects problems of asymmetric information and monopolies in their distribution and supplies of health services. This was built with people with no access to the private or official health services. This is a dummy variable that takes values of 1 if people use alternative health services such as herbs, amulets, remedies,

syrups, tonics and potions, healer, bonesetter, witch or midwife and 0 otherwise.

- *Social security:* this is a proxy variable that reflects market failure problems linked with public goods. Social security is related to uncertainty and risk. Benefits from social security are medical services, nursery school, mortgage and loans, among others. This was built with people without social benefits at work. This is a dummy variable that takes values of 1 if people do not have social benefits from work like medical services, food aid or pantry, day care, training (courses, scholarships), mortgage, cash loans, transport expenses, discount or exemption on the payment of services (electricity, telephone, etc.), or don't make use of alternative private social services, and 0 otherwise.

- *Subsidies:* this is a market failure proxy that reflects issues of equity in the market that generate the need for subsidies. Markets provide goods and services to a price that covers costs but markets could not offer certain goods and services. Subsidies represent a market failure indicator because when markets are looking for efficiency, they sacrifice fairness. This was built with people that receive subsidies. This is a dummy variable that takes values of 1 if at least one household member received resources from governmental antipoverty programs named "Procampo" (like its initials in Spanish) and "Oportunidades" (like its initials in Spanish) and 0 otherwise.

Indicators used as market failures were selected considering the available information in the Income and Expenditure Household Mexican Surveys (ENIGHs). This is to be consistent with the information source where proxies of social capital were obtained.

VI. Data and methodology

There is a technical restriction to test hypotheses related to the life cycle[5], mobility expected or physical distance[6]. This is because in Mexico there are no panel surveys with more than 3 reports containing social capital variables with features of the same individual over time at regular intervals. An

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[5]   Villagómez, F. Alejandro. (2000) "A dynamic analysis of household decision-making : the Mexican Case" by F. Alejandro Villagómez, Andrés Zamudio. BID, *Research Network working paper* ; R-415.

[6]   Specifically if the residence variable is been considered as a proxy for physical distance i.e. if the work was done in Mexico or abroad, by the migration effect.

alternative to obtain data following the same individual over time is through statistical techniques like the synthetic panel, using this technique it is possible to perform an analysis on the determinants of social capital in Mexico over several years. It is possible to build a synthetic panel using cohorts from cross section database. The cohorts are built based on individuals' socio-demographic characteristics that allow us to follow them over time.

Another aspect relevant about the data is that the database used in this analysis is representative in income, i.e. it allows to record almost all the sources of individual's income in order to derive the proportion that social capital transfers represents for individuals in monetary terms. Furthermore, the same database needs information available to build the indicators of market failures.

The results in this paper could be generalized to other countries if they have surveys with the kind of transfers used in this paper and those are representative in revenue. Additionally, it is important to have panel surveys or build synthetic panels to observe the behavior of individuals over time in the relationship social capital and proxies of market failures.

The following will describe the explanatory variables used in the model. To control for socioeconomic individual situation, individual characteristics were selected related to his/her socioeconomic environment. The variables related to these characteristics were age, sex, education, telephone, region, residence or migration, employment characteristics, rate of economic dependence (TDE), and household size.

Four bonding and bridging social capital indicators and combinations between them were used as dependent variables. These indicators consist in the resources supplied by people as a proportion of their income that theoretically relate to the sympathy coefficient and represent the degree to which a person joins the welfare of another in its utility function and that leads them to share resources with others. The exogenous variables were market failures and control variables related to demographic and socioeconomic aspects. Then, twelve social capital supply models where estimated to observe the variations and consistency of the results on the dependent variables.

The data -social capital and market failures indicators as well as control variables- were obtained from Income and Expenditure Household Mexican Surveys. In the empirical model only household heads were considered

because it is assumed that home transfers decisions are influenced by the head of household. Estimations with Tobit models were made since information was presented in censurated form – values were presented in continuous form and were less than 0 and behave like a normal distribution (Wooldridge, 2002).

In econometric terms, social capital presented an endogeneity problem (Haussman 1978) in the sense that people with more resources could be granted more resources to others and acquires social capital more easily. With this problem, the estimated coefficients could be biased and inconsistent if they are obtained through the OLS method. The solution to this problem is to use instrumental variables and implement a causality test in both directions. The problem with this method lies in finding the appropriate instrumental variable. This method is useful only if the instruments are plausible. However it is not possible to construct instrumental variables with the dataset used in this paper.

Other alternative to correct for endogeneity is to work with historical data because it is not possible to reverse causality when current variables are linked with past socioeconomic indicators. This method allows to test whether social capital indicators are affected over time by the variables that determine it. Synthetic panels for seven years with population cohorts were elaborated to follow population throughout the time (1992, 1994, 1996, 1998, 2000, 2002 and 2004). The cohorts were built considering the year of birth and schooling.

Endogeneity in time series is associated with spurious regression -two series could be correlated because they have a tendency over time for reasons related to unobserved factors. Some of the series constructed through the panel method presented the problem of spurious regression. Some of the variables used had a high correlation. This is the case with the observed correlation between the variable rural and variable education, or the correlation observed between the variable rural and telephone or the correlation observed between the variable white collar and education. Factors associated might be related to the lack of infrastructure or with the restrictions faced by the labour market and are not directly observed in this model. To correct spurious regression problem, the cointegration method was used for panel data (Engle and Granger, 1987; Pedroni, 2000; Granger, Hyung and Jeon 2001) from where estimated coefficients were obtained.

VII. Results

The econometric results are shown in the chart bellow. Based on the results obtained through the econometric models, it is observed in general terms that social capital is related in most of the models with market failures variables, thus market failure variables explain in some sense the social capital supply of people in Mexico. The following chart shows a summary of econometrics models results under different types of social capital.

Independent variable name	Name of the dependent variables, different types of social capital (LnSK)			
	Bonding	Bridging 1	Bridging 2	Bridging 3
	Networks	Participation in organizations	Collective action	Collective action
	Support and aid for relatives and people not household members	Contributions to charities, churches, red cross and voluntary organizations	Contributions to local and religious festivities	Contributions for local and public works
Age	-0.0087* (-0.2415)	-0.0585** (-1.9304)	-0.0449* (-0.8667)	-0.0967** (-1.5301)
Age²	0.000077 * (0.6868)	0.000599* (1.1002)	0.00038* (0.9603)	0.00127* (0.1857)
Education	0.0305 ** (0.7964)	0.0352* (1.0630)	0.0450* (0.8469)	0.1279** (1.9541)
Rate of economic dependence (TDE)	-0.4268 * (-1.2676)	-0.0399* (-0.1461)	-0.5414* (-1.2585)	-0.5836* (-1.0706)
Telephone	0.4671 (1.7985)	0.2585** (1.2022)	0.7018 (2.3685)	0.3718 (0.9979)
Women	0.6334***(2.2957)	0.4719** (1.9357)	-0.4473** (-1.4351)	0.4038* (1.0147)
Rural	1.1658*** (4.8622)	-0.4177** (-1.6625)	0.9236*** (3.5395)	0.3147* (0.9336)
White collar	0.1841 (0.7670)	-0.1547 (-0.6369)	-0.6687** (-2.1068)	-1.7166*** (-4.1478)
Extended household	-0.1657*(-0.6894)	-0.5545*** (-2.5103)	-0.2192* (-0.8126)	-0.1144* (-0.3304)
Residence or migration	-1.8269 (-12.3159)	0.0891 (0.6579)	-0.7562*** (-3.1621)	-0.9293*** (-3.4398)
Health services	0.8132**(2.3774)	0.6778** (2.1863)	0.9720 (0.9049)	0.7245*** (4.5687)
Financial services	0.6578***(3.7951)	0.7663 (0.1086)	0.6910** (2.1149)	0.5112**(2.5478)
Subsidies	0.0166 (0.0117)	0.4212***(3.3600)	0.9281 (0.5803)	0.1658** (3.1298)
Social security	0.7458***(3.9443)	0.5442***(2.1584)	0.7831***(3.8969)	0.45896***(3.6169)
R²	05277	0.5422	0.8379	0.7866
R² adjusted	-0.2061	-0.3689	-0.0071	-1.9489

Note: This table contains the results using the method of Kao and Chiang (2000) for the estimation of the panel not stationary. Social capital indicator (LnSK) is the dependent variable (LnSocial Capital = Transfers / Income). Social capital indicators are considered in the different forms defined. The estimation is for the synthetic panel and covers the period 1992-2004 every two years considering the ENIGHs of those years. The coefficients were estimated under the method DOLS (The Dynamic OLS) at ***99%, **95% o *90% significance level. The numbers in parentheses refer up to the t-ratio values. Positive signs mean increases and negative decreases.

The results derived from the estimations are the following[7]:

- If people do not have formal health services, they help relatives and friends in around 81% more than people having these services. In other words, the ratio of transfers granted to people - like relatives and friends- with respect to income is 81% greater among people who do not have formal health services than among people who do have formal health services. If people do not have formal financial services, they help relatives and friends in around 65% more than people having these services. If people do not have social security derived from job benefits, they help relatives and friends in around 74% more than people having these services, *ceteris paribus*.

- If people receive subsidies, they grant more contributions to beneficial institutions like churches, Red Cross and ecclesiastical services in around 42% more than people without subsidies. If people do not have formal health services, they grant more contributions to beneficial institutions like churches, Red Cross and ecclesiastical services in around 67% more than people having these services. If people do not have social security, they grant more contributions to beneficial institutions like churches, Red Cross and ecclesiastical services in around 42% more than people having this service, *ceteris paribus*.

- If people do not have social security, they make more communal contributions for local celebrations (like religion celebration) in around 78% more than people having this service. If people do not have formal financial services, they make more communal contributions for local celebrations (like religion celebration) in around 69% more than people having these services, *ceteris paribus*.

- If people receive subsidies, they make more contributions for local public service works in around 16% more than people without subsidies. If people do not have social security benefits, they make more contributions for local public service works in around 45% more than people having these benefits. If people do not have financial services, they make more contributions for

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[7] These refer to semielasticities.

local public service works in around 51% more than people having these services. If people do not have health services, they make more contributions for local public service works in around 72% more than people having these services, *ceteris paribus*.

Other findings using control variables were the following: it is inferred in general terms that social capital is higher between very young people (children) when compared to older people. Young people have less social capital. People with higher education, women, and people from rural areas invest more in social capital. People who live in households with more economic dependents and who live in extended households invest less in social capital. These results also coincide with the literature (authors are in parenthesis):

- *Age and age[2]*: Social capital is related to the effects of the life cycle; at the beginning, social capital is high and then decreases with age (Glaeser, Laibson and Sacerdote, 2002).

- *Education*: Individuals who invest in human capital also invest in social capital (Glaeser, Laibson and Sacerdote, 2002; Krishna and Uphoff, 1999).

- *Rate of economic dependency (TDE)*: The higher the number of dependents in a household, the lower social capital investment (Coleman, 1990).

- *Telephone*: The information mechanisms increase social connections, but individuals with a high value of time accumulate less social capital (Krishna and Uphoff, 1999)

- *Women*: being a woman affects positively the needs of social capital investment (Krishna and Uphoff, 1999; Coleman 1990)

- *Rural*: social capital is higher in rural than urban area (Krishna and Uphoff, 1999; Coleman, 1990; Narayan and Pritchett, 1997; Putnam, 2000; Knowles and Anker, 1981).

- *Whitecollar*: social capital investment is high in occupations with high returns to the social skills (Glaeser, Laibson and Sacerdote, 2002)

- *Household extension*: a larger number of members inside a household reduces social capital (Krishna and Uphoff, 1999; Coleman, 1988; Furstenberg, and F. Hughes, M., 1995; Coleman, 1990)

- *Residence or migration*: social connections between people decreased substantially with the physical distance and transportation costs (Glaeser, Laibson and Sacerdote, 2002).

VIII. Conclusions

The implications of the above results are that in the presence of market failures (lack of services), people invest in social capital. As a result, there are variables that reflect market failures associated to bonding and bridging social capital indicators when financial, health and social benefits markets fail. These market failures are associated with people using alternative health services -as homemade medicine, tonic remedies, midwife-, alternative social benefits –as children care, social guaranty, medical services and loans provided by relatives and friends- participation in schemes of microfinances and subsidies –as scholarships and food aid provided by public institutions.

If these market failures proxies explain in some sense social capital indicators when credit and saving mechanisms, health services, job social benefits and subsidies are analyzed, thus an inverse causality could be considered. In other words, the equilibrium of these markets could be explained by social capital variables –as networks, trust, membership and collective action- additionally to traditional mechanisms of market adjustments in prices.

If people that do not have access to formal services invest more in their networks through transfers, it might be thought that social capital is a useful mechanism to provide resources to low-income people (who generally are not participating in the formal markets). In this sense, social capital can be harnessed as a mechanism for targeting resources and public programs to support low-income population without access to formal market. That is, the communities identified with the highest concentration of positive social capital are the best candidates to receive public support. These communities with more social capital could benefit from the most efficient way to use public resources as compensatory mechanisms when no access to other goods. It could be thought that those who invest more in their networks of social capital through transfers are also those that could expand and/or potentiate the benefits of public programs to the rest of the people with whom have ties of sympathy.

For further generalization of the results it would be desirable to explore the hypothesis tested in this paper with other indicators of social capital such as

trust, membership, collective action and networking. It could be tested with other models such as pooling data using instrumental variables methodology to correct the endogeneity problem. Additionally it would be appropriate to conduct this study in a large sample of countries. However, the Mexican case is useful as a benchmark for future comparisons with other developing countries.

REFERENCES

Altonji, J., F. Hayashi and L. Kotlikoff (1992), "Is the Extended Family Altruistically Linked? Direct Test using Micro Data" *American Economic Review*, 82(5), pp. 1177-1198.

Altonji, J., F. Hayashi and L. Kotlikoff (1995), "The Effects of Income y Wealth on Time y Money Transfers between Parents and Children" *NBER Working Papers* 5522, National Bureau of Economic Research, Inc.

Andreoni J. (1989), "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence" *Journal of Political Economy* 97, 1447-58.

Andreoni, J. (1990), "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving" *Economic Journal* 100, 464-77.

Arrow, Kenneth J., (2000), "Observations on social capital", Social Capital: A Multifaceted Perspective, Washington, D.C., World Bank.

Auerbach, J.A. and Krimgold, B.K. (2001), Income, Socioeconomic Status and Health: Exploring the Connections. Washington, DC: National Policy Association.

Barr N. (1998), *The Economics of the Welfare State*, 3rd edn, Oxford University Press.

Becker, Gary S., (1964), *Human Capital*, New York: Columbia University Press for the National Bureau of Economic Research.

Birdsall, N., and J. L. Londoño (1997b), "Asset Inequality Matters", *American Economic Review*, May.

Burt, R. (2000), "The Network Structure of Social Capital." In Robert Sutton and Barry Staw, eds. Research in Organizational Behavior. Greenwich, CT: JAI Press, pp. 345-423.

Coleman J. S. (1990), *Foundations of Social Theory*. Cambridge, Mss. and London: Harvard University Press, Belknap Press, ch.12.

Coleman, J. S. (1988), "Social Capital in the Creation of Human Capital", *American Journal of Sociology*, supplement 94, pp. S95-S120.

Collier, P. (2002), "Social Capital y Poverty: A Microeconomic Perspective." In Christiaan Grootaert and Thierry van Bastelaer, eds. The Role of Social Capital in Development: An Empirical Assessment. New York: Cambridge University Press, pp. 19-41.

Cox, D. (1987), "Motives for Private Transfers" *Journal of Political Economy*, 95(3), pp. 508-46.

Cox, D. and Jimenez, E. (1990), "Achieving Social Objectives through Private Transfers: A Review" *The World Bank Research Observer*, vol. 5, no.2, July, pp.205-18.

Dasgupta, P. (2005), "The economics of social capital", 1st teaching workshop on environmental economics for the Middle East y North Africa, December 5-16, 2005 – ICTP, Trieste, Italy, University of Cambridge.

Deaton, A. (1997), The Analysis of Household Survey. *Microeconometric Analysis for Development Policy*, Washington, The Johns Hopkins University Press.

De la Torre, R., and L-Rodriguez, P. (2004), "Capital social y Desarrollo Humano en México" *Background Paper* Programa de Naciones Unidas para el Desarrollo (PNUD).

Durlauf, S. (2002), "On the Empirics of Social Capital." *Economic Journal* 112 (483): 459-479.

Durlauf, S., and Fafchamps, M. (2004), "Social capital", NBER Working Papers, CSAE WPS/2004-14, National Bureau of Economic Research, Inc.

Echevarría, C. and Diaz A. (2002), "Solidarity, Transfers, and Poverty", *Review of Development Economics*, October 2002, pp.337-350

Engle, R. F., and C. W. J. Granger (1987), "Co-integration and Error Correction: Representation, Estimation, and Testing", *Econometrica* 55, 251-276

Evans, et al. (1994) Why are some people healthy and others not?, New York: Aldine and Gruiter.

Evans P., ed. (1997), *State-Society Synergy: Government y Social Capital in Development*. University of California International and Area Studies Digital Collection, Research Series No. 94.

Fox, J. (1996), "How Does Society Thicken? The Political Construction of Social Capital in Rural Mexico", *World Development*, 24, pp. 1089-1103.

Fukuyama, F. (1995), Trust: The Social Virtues and the Creation of Prosperity. New York: Free Press.

Furstenberg, F. F. and Hughes M. E. (1995), "Social Capital and Successful Development Among At-Risk Youth." *Journal of Marriage & the Family* 57(3):580-592.

Glaeser, E., Laibson D., and Sacerdote B. (2002), "An Economic Approach to Social Capital." *Economic Journal* 112 (483): 437-458.

Granger, C.W.J., Hyung, N. and Jeon, Y. (2001), "Spurious regressions with stationary series", *Applied Economics*, Vol. 33, pp.899-904.

Grootaert, C., and van Bastelaer Th., eds. (2002), *The Role of Social Capital in Development: An Empirical Assessment*. Cambridge University Press, Cambridge, England.

Grootaert, C., and van Bastelaer Th., eds. (2002b), *Understanding and Measuring Social Capital: A Multidisciplinary Tool for Practitioners*. Washington D.C.: World Bank.

Haussman, J. (1978), "Specification Tests in Econometrics", *Econometrica*, Vol. 46, pp. 1251-71.

Hochman, H. M. and Rodgers, J.D. (1969), "Pareto optimal redistribution". *American Economic Review*, 59, pp. 542-57.

Kawachi, I., Kennedy, B.P., Lochner, K., and Prothrow-Stith, D. (1997), "Social Capital, Income Inequality y Mortality", *American Journal of Public Health*, 87, Sept. 1997, pp. 1491-1498.

Kennedy, B. P., Kawachi, I., Prothrow-Stith, D., Lochner, K., and Gupta, V. (1998), "Social Capital, Income Inequality, and Firearm Violent Crime" *Social Science & Medicine* vol. 47, Issue 1, 1 July 1998, pp. 7-17.

Knack, S. and Keefer, P. (1997), "Does Social Capital Have an Economic Payoff?", *The Quarterly Journal of Economics*, November., pp.1250-1288.

Knowles, J. C., and Anker, R. (1981), "An Analysis of Income Transfers in a Developing Country." *Journal of Development Economics* 8 (April), pp. 205-26.

Konow, J. (2004), "Mixed Feelings:Theories and Evidence of Warm Glow and Altruism" Department of Economics, Loyola Marymount University.

Krishna, A. and Uphoff, N. (1999), "*Mapping y measuring Social Capital: A Conceptual and Empirical Study of Collective Action for Conserving and Developing Watersheds in Rajasthan, India*". Social Capital Initiative Working Paper Nº 13. Washington DC: The World Bank.

La Ferrara, E. (2002), "Inequality and Group Participation: Theory and Evidence from Rural Tanzania" *Journal of Public Economics*, vol. 85, Issue 2, August 2002, pp. 235-273.

La Porta, R., F. López de Silanes, A. Shleifer and R. W. Vishny (1997), "Trust in Large Organizations." American Economic Review Papers y Proceedings, NBER Working Paper 5864.

Lin, N. (2001), *Social capital: A theory of social structure and action*, Cambridge, Cambridge University Press.

Londoño, J. L., and M. Székely (1997), "Sorpresas distributivas después de una década de reformas: América Latina en los noventas", Banco Interamericano de Desarrollo.

Mansell C. (1995), *Las Finanzas populares en México: el redescubrimiento de un sistema financiero olvidado*, CEMLA-ITAM, México.

Morduch, J. (1995), Income Smoothing and Consumption Smoothing. *Journal of Economic Perspectives* 9 (3): 103.114.

Narayan, D. (1999), *Bonds and Bridges: Social Capital and Poverty*, Washington, D.C., World Bank.

Narayan, D., and Pritchett, L. (1997), "Cents and Sociability: Household Income and Social Capital in Rural Tanzania." *Economic Development and Cultural Change* 47(4): 871-97.

Pedroni, P. (2000), "Fully Modified OLS for Heterogeneous Cointegrated Panels", *Advances in Econometrics*, vol. 15, pp. 93-130.

Portes, A. (1998), "Social Capital: Its Origins and Applications in Contemporary Sociology." Annual Review of Sociology 24: 1-24.

Putnam, R. (1993), *Making Democracy Work, Civic Traditions in Modern Italy*, Princeton, New Jersey, Princeton University Press.

Putnam, R.D. (2000), *Bowling Alone. The Collapse and Revival of American Community*. New York, Simon and Schuster.

Ravallion, M. and Dearden L. (1988), "Social Security in a 'Moral' Economy: An Empirical Analysis for Java." *Review of Economics y Statistics* 70 (February): 36-44.

Robison, L.J., and Siles, M.E. (1997), "Social Capital y Household Income Distributions in the United States: 1980, 1990, Michigan State University", Department of Agricultural Economics Report No. 595 y The Julian Samora Research Institute, Research Report 18, East Lansing, October, Michigan.

Robison, L.J., Hanson, S.D. and Steven D. (1995), "Social Capital y Economic Cooperation", *Journal of Agricultural y Applied Economics*, 27, 1, July, pp. 43-58.

Robison, L.J., Schmid, A.A. and Siles, M.E. (2002), "Is Social Capital Really Capital?", *Review of Social Economics*, 60(1), pp. 1-21, March 2002.

Robison, L.J., Schmid, A.A. and Siles, M.E. (2004), "Social Capital and Poverty Reduction: towards a mature paradigm", *Social capital y poverty reduction in Latin America y the Caribbean: towards a new paradigm* ed. ECLAC and Michigan State University, United Nations, Santiago de Chile, Ch. 3 pp.49-104.

Schmid, A. A. and L. J. Robison (1995), "Applications of Social Capital Theory", *Journal of Agricultural y Applied Economics*, 27 (1), July, pp. 59-66.

Schultz, Theodore W. (1961), "Investment in Human Capital", *The American Economic Review* 51.1 (1961): 1-17.

Sen, A. (1999), *Development as Freedom*, New York: Anchor Books.

Sobel, J. (2002), "Can We Trust Social Capital?", *Journal of Economic Literature*, vol. XL, March, pp. 139-154.

Stiglitz, J. E., and Weiss, A. (1981) "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, June 1981.

Swaminathan, M. (1992), El papel cambiante del Crédito Formal e Informal en el México Rural, *CIDE, Documento de Trabajo* 1.

Székely, M. (1997), "Household Savings and Income Distribution in a Developing Economy", Washington, Office of the Chief Economist-BID.

Uphoff, N. (2000), "Understying Social Capital", In *Social Capital, a Multifaceted Perspective*, Partha Dasguspta and Ismael Serageldin, Washington, D.C., The International Bank of Reconstruction y Development, The World Bank, Washington D.C.

van Bastelaer, Thierry. 2000. "Imperfect Information, Social Capital and the Poor's. Access to Credit." *World Bank Working Paper* No. 234.

Woodruff, Christopher (2006), "Characteristics of the unbanked and banked in the popular financial sector in Mexico: An analysis of the BANSEFI household panel Survey", *Una Mirada al Interior del Sector de Ahorro y Crédito Popular en México. Estudios sobre hogares e Instituciones*, BANSEFI, pp. 1-42.

Woolcock, M. (1999), "Managing Risk, Shocks, y Opportunity in Developing Economies: The Role of Social Capital." In Gustav Ranis, ed. *Dimensions of Development*. New Haven, CT: Yale Center for International y Area Studies, pp. 197-212.

Wooldridge, J. (2002), Econometric Analysis of Cross Section and Panel Data, MIT Press.

World Bank (2002), Empowerment and Poverty Reduction—A Sourcebook. Washington D.C.: World Bank.