# Social Capital, Well-Being, and Earnings: Theory and Evidence from Poland

Growiec, Jakub and Growiec, Katarzyna

Warsaw School of Economics, Poland, Polish Academy of Sciences, Graduate School for Social Research, Poland, Warsaw University, Poland

6 December 2007

# Social Capital, Well-Being, and Earnings: Theory and Evidence from Poland*

Jakub Growiec† Katarzyna Growiec‡

December 6, 2007

**Abstract.** We study the relationship between two distinct dimensions of social capital (bridging and bonding social capital) and the personal performances of individuals: their reported subjective well-being (SWB) and earnings. A theoretical model is put forward which explains the sources and dynamics of social capital formation. It predicts an inverse U-shaped relationship between any type of social capital and SWB, an inverse U-shaped relationship between bridging social capital and earnings, and an unambiguously negative impact of bonding social capital on earnings. The key predictions of the model are confirmed using cross-section survey data from the 2005 wave of the "Social Diagnosis" survey program conducted in Poland. Very low levels of bridging social capital observed in Poland imply that it is unambiguously beneficial to invest in it: both SWB of individuals and their earnings would increase in such case.

**Keywords and Phrases:** bridging social capital, bonding social capital, earnings, subjective well-being, Poland

**JEL Classification Numbers:** D10, J20

*Financial support from the Foundation for Polish Science is gratefully acknowledged. All errors are our responsibility.

†Warsaw School of Economics, Warsaw, Poland. Address: Al. Niepodległości 162, 02-554 Warszawa, Poland. E-mail: jakub.growiec@sgh.waw.pl. Part of this research was done when I was visiting CORE, Louvain-la-Neuve, Belgium.

‡Polish Academy of Sciences, Graduate School for Social Research, Warsaw, Poland; and Center for Research on Prejudice, Faculty of Psychology, Warsaw University, Poland. Address (GSSR): Nowy Świat 72, 00-330 Warszawa, Poland; E-mail: kgrowiec@sns.waw.pl

# 1 Introduction

The objective of this paper is to assess the impact of bridging and bonding social capital on two important measures of individual success: earnings and subjectively reported well-being (SWB). As our first step, we shall do this by the means of an analysis of a simplified dynamic model of social capital formation which offers empirically testable predictions. The second step consists in bringing this model to our data set which covers a cross-section of the Polish society in 2005.

Our approach to social capital bases upon its network operationalization, originating from, among others, Bourdieu (1986). More precisely, we define social capital along the lines of Bourdieu and Wacquant (1992, p. 119): "Social capital is the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition", or alternatively, Lin (2001, p. 24): "resources embedded in social networks and accessed and used by actors for actions".[1] The second definition indicates that our approach agrees also with the Coleman's postulate that social capital is inevitably related to action: "social capital is created when the relations among persons change the way that facilitate action" (Coleman, 1990, p. 304). For this reason, we expect social capital to be linked with earnings and subjective well-being.

The notions of *bridging* and *bonding* social capital have been first introduced to social sciences by Putnam (2000). They refer to forming social ties with people in a different (in the case of bridging social capital) or similar (bonding social capital) socio-economic position. These two concepts are considered to illustrate specific types of social capital. Putnam defines bridging and bonding social capital as follows: "Of all the dimensions along which forms of social capital vary, perhaps the most important is the distinction between bridging (or inclusive) and bonding (or exclusive). Some forms of social capital are, by choice or necessity, inward looking and tend to reinforce exclusive identities and homogeneous groups. Other networks are outward looking and encompass people across diverse social cleavages" (Putnam, 2000. p. 22). "To build bridging social capital requires that we transcend our social and political and professional identities to connect with people unlike ourselves" (Putnam 2000, p. 411).

There are substantial differences between forming social ties with family members (bonding social capital), and with friends and acquaintances (bridging social capital). Wellman (1990) describes these differences in the following way: "unlike the support of friends, the availability of support from immediate kin is not conditional on the strength of the relationship" (Wellman, 1990). Manuel Castelles goes much further and argues: "friends are for [expressive] pleasure; relatives are for [instrumental]

[1] In our empirical work, we shall focus on the *number of particular people* (either family members or friends) *with whom the respondent maintains frequent contacts* as our proxy variable for the above mentioned: "durable networks of (...) relationships". See Section 4.

business." On the other hand, "the combination of kith and kin supplies both stable support from ascribed ties with immediate kin and adaptive support from achieved ties with friends, neighbors and co-workers and other organizational ties." (Wellman, 1990).

A variety of theoretical investigations show that bridging social capital, contrary to bonding social capital, has multiple beneficial outcomes for social order, democracy, and wealth. It goes together with civil liberties and the tolerance for gender and racial equality. It strengthens the functioning of democracy by reducing corruption (Putnam, Leonardi and Nanetti, 1993; Putnam, 2000). On the other hand, "[b]onding social capital (as distinct from bridging social capital) is particularly likely to have illiberal effects" (Putnam, 2000, p. 358). More precisely, "[b]onding social capital has negative effects for society as a whole, but may have positive effects for the members belonging to this closed social group or network. Bridging social capital, (...) [which consists in] making contacts between different groups or networks is positive. At the micro level this is related to Burt's theory of structural holes, where the optimal position for an individual is between several groups" (Beugelsdijk and Smulders, 2003, p. 5). Beugelsdijk and Smulders (2003) proceed to show that, across European regions, bridging social capital is empirically good for economic growth, whereas bonding social capital is bad for growth. These authors also find that corruption is negatively correlated with the measures of bridging social capital (Beugelsdijk and Smulders, 2003).

Bridging social capital is also claimed to be individually beneficial for those who possess it. Hurlbert, Haines and Beggs' (2000) research on the structure and content of one's social network and its activation in the context of seeking social support in a non-routine situation (hurricane Andrew) shows that networks with more gender, race, and age diversity provide more support than networks lacking these characteristics. Granovetter's (1973) most prominent discovery is that weak ties (i.e. ties between dissimilar people) facilitate better job attainment than strong ties (between similar people).[2] Erickson's (1996, 2003, 2004) research on the diversification of acquaintances shows that "people with more diversified general networks were less depressed and were better informed about health" (Erickson, 2003). Moreover, Erickson argues that the sense of control over one's life increases with the diversity of one's acquaintances.

Given this background, we organize our thinking around the following two key expectations: (i) bridging social capital should be unambiguously beneficial for individuals' earnings and subjective well-being, (ii) the impact of bonding social capital should be much less pronounced and possibly negative.

The contribution of this paper to the literature is threefold. First, it adds to the theoretical debate on the character and economic meaning of social capital, emphasizing the importance of the distinction between bridging and bonding social capital, and offering a formal model which explains the dynamics of social capital forma-

[2]However, some works are incongruent with this statement (e.g. Bian, 1997).

tion. Second, by deriving testable relationships from an explicitly specified economic model, it provides a key for understanding the variety of regression specifications found across the empirical literature. Third, it helps draw direct conclusions about the socio-economic situation in today's Poland, marked by extremely low levels of bridging social capital and social trust, and with individual earnings of Poles rising much faster than their confidence in democracy (Domański, 2005). We find that in a society like the one in Poland, everyone could benefit from an increase in bridging social capital.

The remainder of the article is structured as follows. In Section 2, we put forward a simplified dynamic model of social capital formation where not only consumption but also subjective well-being matters for individuals' utility. In Section 3, we generalize this model and derive the main predictions about the impact of bonding and bridging social capital on earnings and SWB. In Section 4, we summarize our micro-level cross-section data. In Section 5, we present the empirical results that confirm the main predictions of our model. Section 6 concludes.

# 2 The dynamics of social capital formation

We shall now discuss a simplified model which elucidates the dynamics of social capital formation.

## 2.1 Setup of the model

Let us consider an individual who wants to maximize her lifelong sum of subjective well-being (SWB). Following Helliwell (2003) as well as O'Brien and Quimby (2006), we shall presuppose that SWB is composed of (i) consumption, (ii) satisfaction from family life, (iii) satisfaction from social life outside the family, and (iv) other characteristics such as the evaluation of one's health, and general conditions and circumstances of life.[3] The last component (iv) we consider exogenous to the model (though in reality, it will be correlated with earnings) and set aside hereafter. Please note that we take a markedly broader view of the maximized objective function to what is customary in economics – in the discussed framework, individuals derive utility also from other variables than just consumption. Mathematically, this means that the instantaneous flow of well-being is given by

$$SWB = Hc\ell_f^{\psi}v^{\theta}, \tag{1}$$

where $H$ is the constant exogenous constituent factor of SWB, $c$ is consumption, $\ell_f$ denotes the fraction of time spent with the family, and $v$ denotes the stock of bridging social capital. $\psi > 0$ and $\theta > 0$ are elasticity parameters of bonding and bridging

[3] By general conditions and circumstances of life, we mean housing conditions, congestion in the place of residence, frequency of problems with neighbors, etc.

social capital, respectively. In (1) we have used the Cobb-Douglas specification for analytical simplicity rather than any other reason.[4]

To keep things as simple as possible, we assume away the possibility of savings and capital accumulation. Thus, all earnings $w$ are always immediately spent on consumption, and nothing is ever stored. The production function is linear in labor (which is the only production factor here), and further augmented by a positive spillover from bridging social capital. We write:

$$w = c = A\ell_Y v^{\phi}, \tag{2}$$

with

$$\ell_Y = 1 - \ell_f - \ell_v, \tag{3}$$

and $A$ being the constant "total factor productivity", $\ell_Y$ being the fraction of the total time endowment spent effectively at work, $\ell_v$ being the fraction of time spent on socializing with people outside of the family, and the parameter $\phi > 0$ being the strength of the spillover from bridging social capital to production. This spillover is included here since it is argued (e.g. Dasgupta, 2002; Whiteley, 2000) that social capital – and in particular bridging social capital (Granovetter, 1973) – facilitates the matching of workers and firms, speeds up information transmission, and reduces transaction costs and deadweight losses in economic activity. Please note that this spillover is fully internalized by the decision-making individuals: they treat social ties with friends and acquaintances both as ends (direct increase in SWB, with an elasticity $\theta$) and (instrumentally) as means for raising the level of consumption (with an elasticity $\phi$).[5] The total time endowment at each instant in time is normalized to unity.

Bridging social capital $v$ is modeled as a stock and not as a flow as in Beugelsdijk and Smulders (2003). Intuitively, it is clear that bridging social capital might be accumulated through purposeful investments of time – i.e. time spent socializing with

[4] Alternatively, one could use a CES or a nested CES formulation of the well-being/utility function without modifying the main conclusions to be derived. See Beugelsdijk and Smulders (2003).

[5] Let us discuss the alternatives to the production function we assumed in equation (2). One may doubt whether the spillover from bridging social capital to production is fully internalized by individuals. Thus, one could replace (2) with $w = A\ell_Y \bar{v}^{\phi}$, where $\bar{v}$ is the *average* level of bridging social capital in the economy and is considered external to the individuals' decisions. Furthermore, one could doubt whether there exists a true spillover from bridging social capital to productivity: one could expect its appearance to be an artifact of the so-called "fallacy of composition" (see the discussion in Durlauf and Fafchamps, 2004): bridging social capital may improve the earnings of some individuals only at the expense of others without having an impact on aggregate productivity. In such case, we would write $w = A\ell_Y (v/\bar{v})^{\phi}$ and thus $w = A\ell_Y$ in the symmetric equilibrium. A final possibility is a generalization of our previous ideas, a function $w = A\ell_Y v^{\phi}\bar{v}^{\nu}$ that includes both internal and external effects of bridging social capital on productivity. Quantitatively, the outcomes of the model will clearly differ depending on which production function we choose. Qualitatively, however, as we shall see in Section 5, these differences do not overturn the main predictions and characteristics of the model, presented hereafter in a series of propositions.

friends and acquaintances – and that it depreciates gradually, not instantaneously, over time if not enough effort is made to maintain the social ties. Consequently, we write

$$\dot{v} = \ell_v^{\mu} - \delta_v v, \tag{4}$$

with $\mu > 0$ as the returns-to-scale parameter in bridging social capital accumulation and $\delta_v > 0$ as the depreciation rate of bridging social capital (the rate of natural decay of social ties).

Bonding social capital which is an asset deriving from ascribed ties with the family should be, in principle, modeled along the same lines as bridging social capital. We would like to tentatively suppress this fact here and identify bonding social capital $f$ with the fraction of time spent on socializing with the family, $\ell_f$. This has the strongly counterfactual implication that ties with family depreciate instantaneously, i.e. bonding social capital becomes immediately zero at the time when no investment in it is made. We make this counterfactual assumption here in order to gain a substantial degree of precision in the description of the dynamics of formation of bridging social capital: thanks to this, we can draw a phase diagram in a two-dimensional space and obtain clear-cut results on the transition. In the analysis from Section 3 onwards we shall dispose of this strong assumption and treat bonding and bridging social capital in a more symmetric manner.

We assume a constant discount rate $\rho > 0$ and a logarithmic utility function. Thus, using (1) and (2), we write the individual's maximization problem as:

$$\max_{\{\ell_f(t),\ell_v(t)\}_{t=0}^{+\infty}} \quad \int_0^{+\infty} \ln[HA(1-\ell_f-\ell_v)v^{\phi}\ell_f^{\psi}v^{\theta}]e^{-\rho t}dt \qquad \text{s.t.} \qquad \dot{v} = \ell_v^{\mu} - \delta_v v. \tag{5}$$

## 2.2 The dynamic equations

It can be easily shown that the optimal time investment in maintaining the ties with family, given by $\ell_f$, always moves against $\ell_v$:

$$\ell_f = \frac{\psi}{1+\psi}(1-\ell_v) \tag{6}$$

at all times $t$.

After necessary algebraic manipulations, we obtain the dynamic equation for $\ell_v$, i.e. the evolution of optimal time investment in bridging social capital over time. It reads:

$$\dot{\ell}_v = \ell_v \left( \frac{\rho + \delta_v - \frac{\theta+\phi}{1+\psi}\left(\frac{1-\ell_v}{v}\right)\mu\ell_v^{\mu-1}}{1-\mu+\frac{\ell_v}{1-\ell_v}} \right). \tag{7}$$

Let us now proceed to the description of the steady state of the model and its dynamics.

## 2.3 Steady state

The model meets the usual concavity requirements for an interior maximum easily, and it possesses a unique interior steady state such that $\dot{v} = 0$. From (7) it is obtained that the fractions of time spent on socializing with family and friends in the steady state, and the steady-state level of bridging social capital are equal, respectively, to:

$$\ell_f^* = \frac{\psi}{1+\psi}\left(\frac{\rho+\delta_v}{(\theta+\phi)\mu\delta_v+\rho+\delta_v}\right), \tag{8}$$

$$\ell_v^* = \frac{(\theta+\phi)\mu\delta_v}{(\theta+\phi)\mu\delta_v+\rho+\delta_v}, \tag{9}$$

$$v^* = \frac{1}{\delta_v}\left(\frac{(\theta+\phi)\mu\delta_v}{(\theta+\phi)\mu\delta_v+\rho+\delta_v}\right)^{\mu}. \tag{10}$$

## 2.4 Dynamics

The steady state described above is unique and saddle-path stable, and offers a unique transition path (stable arm) assuring convergence to it.[6] It is easily proven that the $\dot{v} = 0$ curve is upward-sloping in the $(v, \ell_v)$ space while the $\dot{\ell}_v = 0$ curve is downward-sloping. Moreover, $\dot{v} = 0$ starts at $\ell_v = 0$ for $v = 0$ and then grows to infinity, while $\dot{\ell}_v = 0$ starts at $\ell_v = 1$ for $v = 0$ and then falls down asymptotically to zero. The phase diagram is presented in Figure 1.[7]

It should be emphasized that the slope of the saddle path is unambiguously negative. An individual who starts off with a low level of social capital (has only few acquaintances) will initially invest more in social capital creation than she will do in the long run. The following proposition holds.

**Proposition 1** *Over the transition, the fraction of time spent on socializing with friends outside of the family $\ell_v$ decreases over time $t > 0$ if $v(0) < v^*$ and increases over time if $v(0) > v^*$.*

Proposition 1 has one strong implication for the empirical analysis of cross-section data. Namely, while the long-run relationship between social capital investment $\ell_v$ and the social capital stock $v$ is clearly positive (since in the steady state, $\delta_v v = \ell_v^{\mu}$), the short-run relationship outside of the steady state is *negative*: individuals with low levels of social capital $v$ will tend to invest *more* in its accumulation than individuals who have it in abundance. Thus, when regressing $v$ on $\ell_v$ one ought to control for the age of an individual to capture the long-run relationship and not just the transition.

[6] The path converging to the steady state and satisfying the first-order condition (7) is automatically chosen since it is the only one that does not have utility diverging to minus infinity (as $v \to 0$) and satisfies the transversality condition $\lambda v \to 0$, with $\lambda = e^{-\rho t}/(\ell_Y \mu \ell_v^{\mu-1})$ being the shadow price of bridging social capital.

[7] The parameter values used to produce Figure 1: $\psi = 1, \theta = 2, \rho = .05, \phi = .2, \delta_v = .04, \mu = .3$.

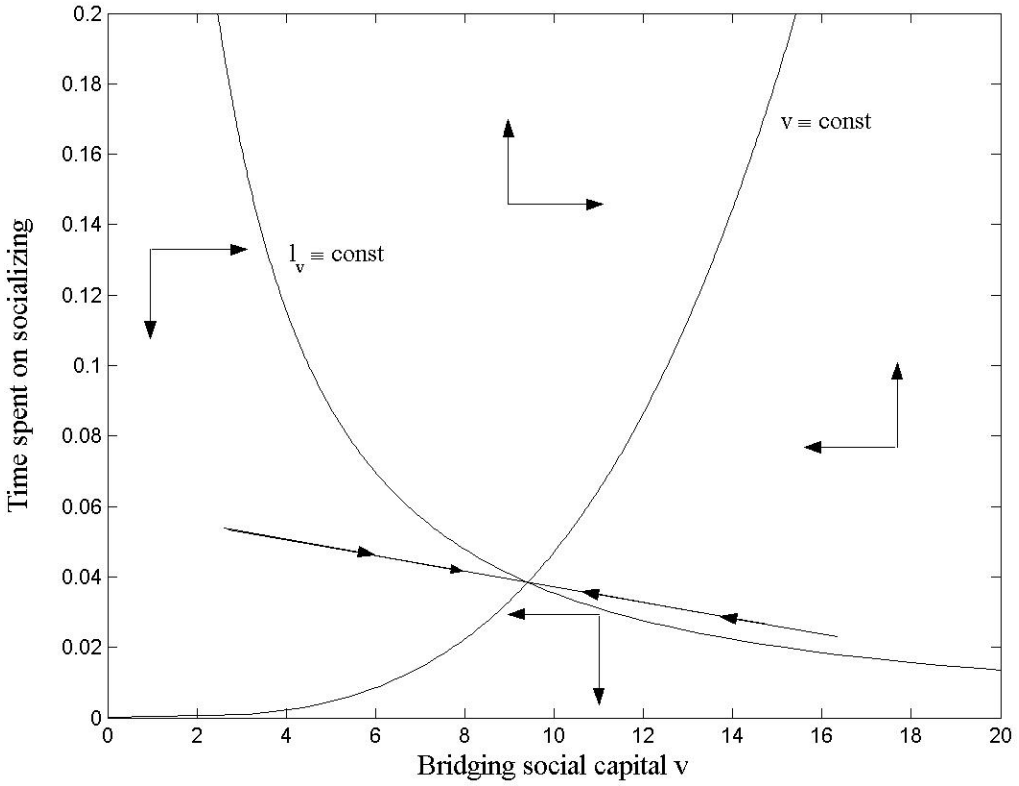


Figure 1: Phase diagram in the $(v, \ell_v)$ space.

# 3 Bridging vs bonding social capital: model predictions

## 3.1 Generalized model

Let us now add more realism to the simple model from Section 2. The differences are that now (i) we shall model bonding social capital along the lines of bridging social capital, like a state variable, (ii) we shall slightly generalize the accumulation functions for both kinds of social capital.

Similarily to (4) we assume now that bonding social capital is increased by purposeful investments of time – i.e. time spent on socializing with family. This type of social capital is now also subject to gradual depreciation. We assume that it decays at a constant rate $\delta_f > 0$.[8]

[8]Intuitively, one could expect ties with family to decay slower than the "weak" ties with strangers (cf. Granovetter, 1973), i.e. $\delta_f < \delta_v$. The relative magnitude of the two decay rates is not important for our analysis.

The modified bridging social capital equation (4) and its counterpart for bonding social capital read:

$$\dot{v} = \ell_v^{\mu} v^{\tau} - \delta_v v, \tag{11}$$
$$\dot{f} = \ell_f^{\alpha} f^{\beta} - \delta_f f, \tag{12}$$

with $\mu, \tau, \alpha, \beta \in (0,1)$.

The indivual's objective is now to maximize the discounted sum of utilities, accrued from the instantaneous levels of subjective well-being, i.e.

$$SWB = Hcf^{\psi} v^{\theta}, \tag{13}$$

subject to (11)–(12). The first order conditions of optimality for this problem boil down to two dynamic equations in $\ell_f$ and $\ell_v$. Thus, we obtain a four-dimensional dynamical system in the $(\ell_f, \ell_v, f, v)$ space. We cannot draw a phase diagram any more, but it can still be shown that the system possesses a unique interior steady state which is saddle-path stable. Furthermore, the time investments in the two types of social capital, $\ell_f$ and $\ell_v$ respectively, both decline over time along the transition path if the initial levels of social capital are below their respective steady-state levels.[9] Let us now focus on the properties of the steady state itself.

## 3.2 Steady state

The steady state is found by finding values of $\ell_f^*, \ell_v^*, f^*, v^*$ which ensure $\dot{\ell}_f = \dot{\ell}_v = \dot{f} = \dot{v} = 0$. From (11)–(12), it is easily obtained that the steady state must satisfy

$$f^* = \left[\frac{(\ell_f^*)^{\alpha}}{\delta_f}\right]^{\frac{1}{1-\beta}}, \tag{14}$$
$$v^* = \left[\frac{(\ell_v^*)^{\mu}}{\delta_v}\right]^{\frac{1}{1-\tau}}. \tag{15}$$

The implication for cross-section regressions is that the steady-state relationship between levels of social capital and investments in it is unambiguously positive.

Using the auxilliary notation:

$$\Phi = \frac{\rho + (1-\beta)\delta_f}{\psi\alpha\delta_f}, \tag{16}$$
$$\Xi = \left(\frac{\rho + (1-\beta)\delta_f}{\rho + (1-\tau)\delta_v}\right)\left(\frac{(\theta+\phi)\mu\delta_v}{\psi\alpha\delta_f}\right), \tag{17}$$

[9] These results are available from the authors upon request.

we find that in the steady state, $\ell_Y/\ell_f = \Phi$ and $\ell_v/\ell_f = \Xi$, or equivalently,

$$\ell_f^* = \frac{1}{1+\Phi+\Xi}, \tag{18}$$

$$\ell_v^* = \frac{\Xi}{1+\Phi+\Xi}, \tag{19}$$

$$\ell_Y^* = \frac{\Phi}{1+\Phi+\Xi}. \tag{20}$$

The comparative statics for these three time allocations have been computed analytically and are summarized in Table 1 below ("+" denotes positive influence, "–" denotes negative influence, "?" denotes ambiguous sign).

| Variable | $\rho$ | $\psi$ | $\theta$ | $\phi$ | $\alpha$ | $\beta$ | $\mu$ | $\tau$ | $\delta_f$ | $\delta_v$ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\ell_f^*$ | $?^a$ | + | – | – | + | + | – | – | + | – |
| $\ell_v^*$ | $?^a$ | – | + | + | – | – | + | + | – | + |
| $\ell_Y^*$ | $?^b$ | – | – | – | – | – | – | – | – | – |

Table 1: Comparative statics of the steady state.

[a]the derivative is a sum of two expressions, one of them unambiguously negative and the second – ambiguously signed. An increase in $\rho$ implies an increase in $\Xi = \ell_v^*/\ell_f^*$ iff $(1-\tau)\delta_v > (1-\beta)\delta_f$, i.e. the effective depreciation rate is higher for bridging social capital.
[b]the case with $\partial\ell_Y^*/\partial\rho < 0$ is very special and can only be obtained if bridging social capital is *exceptionally* productive. Then we also have unambiguously $\partial\ell_v^*/\partial\rho > 0$. Under all plausible parameter assumptions, though, the discount rate is positively related to hours worked since all production is immediately consumed and social capital creation requires time.

The interpretation of these comparative statics is straightforward. The parameter $\psi$ captures the share of family life in individuals' SWB. Thus, its increase will raise the individual's time investment in family life at the expense of all other activities. The parameters $\theta$ and $\phi$ capture the share of social life outside of the family in the individuals' SWB ($\theta$ is the direct share while $\phi$ captures the indirect effect through increased earnings). Thus, their increases will make one spend more time on her social life, again at the expense of all other activities. $\alpha, \beta$ and $\delta_f$ relate to the efficiency of accumulation of bonding social capital. Their increase will raise the time share of family life at the expense of other activities because either (i) a greater return on investment in bonding social capital is expected (if $\alpha$ or $\beta$ rises), or (ii) more replacement investment is necessary to maintain the current level of bonding social capital (if $\delta_f$ rises). Symetrically, the same arguments apply to $\mu, \tau$ and $\delta_v$ that build the case of bridging social capital.

### 3.3 Implications for earnings and SWB

Let us now concentrate on the steady-state values of earnings and SWB. They satisfy the following relationships:

$$w^* = A\ell_Y^*(v^*)^\phi = A\ell_Y^*\left[\frac{(\ell_v^*)^\mu}{\delta_v}\right]^{\frac{\phi}{1-\tau}}, \tag{21}$$

$$SWB^* = HA\ell_Y^*(f^*)^\psi(v^*)^{\theta+\phi} = HA\ell_Y^*\left[\frac{(\ell_f^*)^\alpha}{\delta_f}\right]^{\frac{\psi}{1-\beta}}\left[\frac{(\ell_v^*)^\mu}{\delta_v}\right]^{\frac{\theta+\phi}{1-\tau}}, \tag{22}$$

where the optimal steady-state time allocations $\ell_f^*, \ell_v^*$ and $\ell_Y^*$ should be taken from (18), (19) and (20), respectively.

**Proposition 2** *The relationship between the amount of time invested in the formation of bonding social capital ($\ell_f$) and earnings is unambiguously negative.*

This is by no means a surprising result: by assumption, bonding social capital has no direct effect on productivity while accumulating it diverts the otherwise productive time towards socializing with the family.

**Proposition 3** *The relationship between the amount of time invested in the formation of bonding social capital ($\ell_f$) and SWB is inverse U-shaped. In the steady state, individuals allocate less time than is required to maximize instantaneous SWB.*

The inverse U-shaped relationship between $\ell_f$ and SWB derives from the two offseting forces: (i) the direct positive impact of family life on SWB, (ii) the indirect negative effect through lowered earnings. There exists a unique maximum of instantaneous SWB, for it to be obtained it must hold that

$$\frac{\ell_f}{\ell_Y} = \frac{\psi\alpha}{1-\beta}. \tag{23}$$

However, in the steady state we have

$$\frac{\ell_f^*}{\ell_Y^*} = \frac{\psi\alpha\delta_f}{\rho+(1-\beta)\delta_f} < \frac{\psi\alpha}{1-\beta}. \tag{24}$$

The difference between the two formulas – the "underinvestment in bonding social capital" result – stems from the fact that in the dynamic setup, one has to counteract social capital decay by replacement investment. Furthermore, work effort gives instantaneous payoffs while social capital needs to be accumulated in the first place. This works like a delay which is naturally disliked by the impatient individuals.

**Proposition 4** *The relationship between the amount of time invested in the formation of bridging social capital ($\ell_v$) and earnings is inverse U-shaped. In the steady state, individuals allocate less time to bridging social capital formation than is required to maximize instantaneous earnings if and only if*

$$\theta < \frac{\phi\rho}{(1-\tau)\delta_v} \tag{25}$$

*(the share of bridging social capital in SWB is low enough). They allocate more time than is required to maximize instantaneous earnings if the inequality in (25) is reversed (i.e. when bridging social capital is a sizeable part of SWB).*

Since bridging social capital is assumed to have a positive spillover effect on productivity, while still diverting working time towards socializing with others, its relation to earnings is also inverse U-shaped. Maximum earnings are obtained when

$$\frac{\ell_v}{\ell_Y} = \frac{\phi\mu}{1-\tau}, \tag{26}$$

while in the steady state we have

$$\frac{\ell_v^*}{\ell_Y^*} = \frac{(\theta+\phi)\mu\delta_v}{\rho+(1-\tau)\delta_v}. \tag{27}$$

There are two effects at work here: (i) individuals maximize SWB not earnings. Thus, they attach an elasticity of $\theta+\phi$ to bridging social capital, not just $\phi$; (ii) in the dynamic setup, one has to counteract social capital decay by replacement investment. The first effect increases the investment in bridging social capital while the second one decreases it. What matters for the final outcome is the balance between these two effects. If $\theta$ is high enough, then the first effect is stronger and thus the net effect is positive; if $\theta$ is low, then the second effect prevails and we have "underinvestment" in bridging social capital. If $\theta(1-\tau)\delta_v = \phi\rho$ then the two effect exactly level off and in the steady state, earnings are maximized.

It is important to note that if (25) holds, one should expect a positive cross-section relation between earnings and bridging social capital. If it is violated, the expected cross-section relation is negative. This is depicted in Figure 2 below.[10]

**Proposition 5** *The relationship between the amount of time invested in the formation of bridging social capital ($\ell_v$) and SWB is inverse U-shaped. In the steady state, individuals allocate less time than is required to maximize instantaneous SWB.*

Just like in Proposition 3, the inverse U-shaped relationship between $\ell_v$ and SWB derives from the two offseting forces: (i) the direct positive impact of social life outside of the family on SWB, (ii) the indirect negative effect through lowered earnings. The further reasoning follows the one in Proposition 3 directly, so we need not reproduce it here.

[10]The parameter values used to produce Figure 2: $\phi = .6, \delta_v = .04, \mu = .3, \tau = .2, A = 1$.

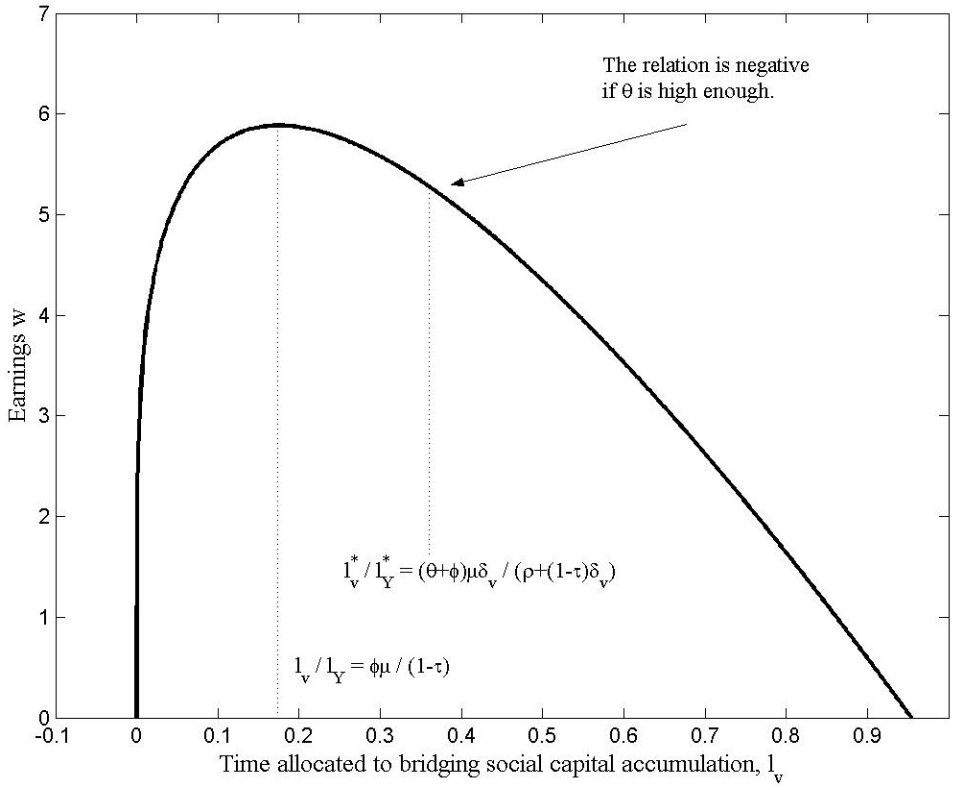


Figure 2: The inverse U-shaped relationship between bridging social capital and earnings.

## 3.4 Numerical example

For the sake of a numerical example, let us now assign specific values to the key parameters of the model to understand its workings better. We shall propose three baseline "scenarios" here: (i) one of a sociable individual who cares about her social capital (both bridging and bonding) a lot, (ii) one of a family-oriented individual whose share of family life satisfaction (bonding social capital) is especially high, and (iii) one of a materialistic individual who cares primarily about her consumption. We shall assume that the decay rate of social ties is higher for bridging social capital than for bonding social capital ($\delta_v > \delta_f$). Furthermore, we normalize the exogenous factor of SWB $H$ and total factor productivity $A$ to unity for all individuals.

The baseline parameter values are summarized in Table 2.

In the summary Table 3 we report the following steady-state results: the share of time spent socializing with family ($\ell_f^*$), with friends and acquaintances ($\ell_v^*$), and the share of time spent at work ($\ell_Y^*$). We compare them with the time shares that maximize instantaneous SWB or instantaneous earnings. We also report the steady-

| Scenario | $\rho$ | $\psi$ | $\theta$ | $\phi$ | $\alpha$ | $\beta$ | $\mu$ | $\tau$ | $\delta_f$ | $\delta_v$ |
|---|---|---|---|---|---|---|---|---|---|---|
| sociable | 0.05 | **2** | **2** | 0.6 | 0.3 | 0.2 | 0.3 | 0.2 | 0.02 | 0.04 |
| family | 0.05 | **4** | **0.3** | 0.6 | 0.3 | 0.2 | 0.3 | 0.2 | 0.02 | 0.04 |
| materialistic | 0.05 | **0.5** | **0.3** | 0.6 | 0.3 | 0.2 | 0.3 | 0.2 | 0.02 | 0.04 |

Table 2: Parameter values: three scenarios.

state values of bonding and bridging social capital ($f^*$ and $v^*$, respectively) together with the resultant levels of earnings. We do not report levels of SWB because they are not comparable across individuals with different elasticity parameters $\psi$ and $\theta$.

| Scenario | $\ell_f^*$ | $\ell_v^*$ | $\ell_Y^*$ | $\ell_f^{SWB}$ | $\ell_v^{SWB}$ | $\ell_Y^{SWB}$ | $\ell_f^w$ | $\ell_v^w$ | $\ell_Y^w$ |
|---|---|---|---|---|---|---|---|---|---|
| sociable | .116 | .244 | .640 | .275 | .358 | .367 | 0 | .184 | .816 |
| family | .243 | .088 | .669 | .529 | .119 | .352 | 0 | .184 | .816 |
| materialistic | .039 | .112 | .845 | .123 | .221 | .656 | 0 | .184 | .816 |

| Scenario | $f^*$ | $v^*$ | $w^*$ | $w_{\max\{w\}}$ | $w_{\max\{SWB\}}$ |
|---|---|---|---|---|---|
| sociable | 59.35 | 32.92 | 5.21 | 6.23 | 3.26 |
| family | 78.24 | 22.48 | 4.33 | 6.23 | 2.44 |
| materialistic | 39.24 | 24.59 | 5.80 | 6.23 | 5.22 |

Table 3: The steady state under three scenarios.

Please note the following interesting findings deriving from this numerical example:

1. In the "sociable" scenario the individual spends more time socializing with friends and acquaintances than is necessary to maximize instantaneous earnings. The gap between the maximum attainable wage and the one which is chosen in the steady state is 1.02 and the individual could close it only by *lowering* her bridging social capital. In such case, one would expect a *negative* relationship between bridging social capital (which is present in relative abundance) and earnings.

2. In two other scenarios the individual spends less time socializing with friends outside of the family than is necessary to maximize instantaneous earnings. This means that the spillover effects from bridging social capital to productivity are not fully utilized. The individuals could increase their earnings by increasing the fraction of time spent on accumulating bridging social capital, even if their working time would shrink by the respective quantity. In such case, one would expect a *positive* relationship between bridging social capital (whose stock is insufficient) and earnings.

3. Under all scenarios, the earnings obtained in the steady state are greater than the earnings one gets when maximizing instantaneous SWB. This is due to the

impatience of the individuals ($\rho > 0$) and the fact that social capital needs to be accumulated first before it could count as a steady fraction of SWB. In our model, all production is immediately consumed, while social capital accumulation requires time.

# 4 Survey data

Our data set is a cross section of individual respondents, a representative sample of the Polish society surveyed in 2005 within the "Social Diagnosis" ("Diagnoza społeczna") program.[11] The entirety of the data set offers information on a wide variety of social dimensions; we select only those variables which are relevant to our hypotheses.

As far as the empirical analysis is concerned, our objective is to use the data to test the predictions of our theoretical model regarding the dependence of individuals' earnings as well as their SWB on measures of bridging and bonding social capital. We also have to control for a number of variables that have been shown in the literature to influence earnings and SWB but which have been neglected in the theoretical model for simplicity.

Unfortunately, there are no direct measures of bridging and bonding social capital in the data. We have to rely on imprecise proxy variables here. Given these limitations, we proxy bridging social capital by the number of friends with whom the respondent maintains frequent contacts; and bonding social capital – by the number of family members with whom the respondent maintains frequent contacts.[12]

One characteristic feature of our data set is that in Poland, the level of bridging social capital is, in principle, extremely low. Indeed, international comparative research (Kääriäinen and Lehtonen, 2006) shows that in post-communist countries such as Poland, bridging social capital is lower than in any other welfare state regime. It is the highest in the "Nordic" welfare state regime (represented by Denmark, Finland, and Norway), followed by the "liberal" regime (with Australia, Canada, Great Britain, New Zealand, and United States), and the "conservative" regime (with Austria, France, former West Germany, and Switzerland). Then comes the "Mediterranean" welfare state regime with Cyprus, Italy, and Spain, and the very last regime is the "post-communist" one, with Czech Republic, former East Germany, Hungary, Latvia, Poland, Russia, and Slovenia.[13] Even more precisely, Kääriäinen and Lehto-

[11] "Social Diagnosis" is a panel project. Four consecutive waves of surveys have been carried out until today: in 2000, 2003, 2005, and 2007. In our analysis we use data from the 2005 wave because it is the only wave which includes good enough proxy variables for bridging and bonding social capital.

[12] In the survey, the respondents were also asked to name the number of *acquaintances* with whom they frequently contact, but this variable turned out to be unrelated to both earnings and SWB, and only weakly related to other measures of social capital. This could be, for example, because people tend to define acquaintances in divergent ways.

[13] The proxy for bridging social capital here was participation in a political party, club or association, trade union, religious association, sports group, hobby or leisure club, charitable organization,

nen argue that the group of post-communist welfare state regime countries is not completely homogeneous with respect to the levels of bridging social capital: the result for Poland is miserable enough to locate this country among the worst performing even in this group, far below Czech Republic or Slovenia. As we shall see shortly, our results will be influenced by the very low average level of bridging social capital in our data. The Polish society is situated in the increasing part of the inverse U-shaped curve shown in Figure 2, indicating that the relative share of social life (with friends and acquaintances) in the average Pole's SWB is very low (cf. Proposition 4).

As far as our measure of earnings is concerned, the best variable available in our data is earnings *per person in the household*. This can be easily transformed into total earnings in the household, or equivalent income, using the size of the household. Unfortunately, we do not have any data on differences in individual earnings within households.

Subjective well-being cannot be measured directly. It is constructed as a 24-item scale here, where each item is a question related to a specific dimension of individual well-being as perceived by the respondent.[14] All variables are normalized such that 0 denotes the lowest level of satisfaction of a certain need, and 1 denotes its full satisfaction (some questions have been inverted). As it is visible in Table 4, the resultant scale is highly reliable (the standardized Cronbach's alpha coefficient equals 0,851); as it further follows from Table 5, this level of reliability cannot be improved any further by deleting items.

| Cronbach's $\alpha$ | Std. Cronbach's $\alpha$ | No. of Items |
|---|---|---|
| 0,829 | 0,851 | 24 |

Table 4: Reliability analysis for the scale of SWB. Basic reliability statistics.

In order to obtain consistent estimates for our model parameters, we shall employ the following control variables neglected in the theoretical model. In the equation explaining (the logarithm of) earnings, we control for education (years of schooling), work experience at current workplace, work experience squared (cf. Mincer, 1974; Heckman, Lochner, and Todd, 2003) as well as the size of the town of residence in which the individual lives, the individual's age, and a dummy variable for "housewives" (i.e. people taking care of the household and not working outside of home).

neighborhood group, or "other".

[14]The variables used in the scale are the following. dp3: valuation of one's life; dp17: certainty of the source of income; dp18: financial problems; dp19: strenuous job; dp20: too many duties; dp22: congestion in the place of residence; dp24: problems with neighbors; dp38: material standard of life; dp39: feeling happy; dp41: feeling depressed and thinking of suicide; dp42: feeling loved; dp45: the strength of will to live; dp49n: valuation of one's physical appearance; dp49o: mobilization to work; dp49p: insomnia; dp49q: ease of getting tired; dp49r: appetite; dp49t: health problems / hypochondria; dp49u: desire for sex; dp61_1: satisfaction from relations with the closest family; dp61_9: satisfaction from housing conditions; dp61_13: satisfaction from sexual life; dp61_18: satisfaction from children; dp61_19: satisfaction from marriage.

| Variable[a] | Mean if del. | Variance if del. | Item–total corr. | Cronbach's $\alpha$ if del. |
|---|---|---|---|---|
| dp3 | 17,0640 | 5,710 | 0,478 | 0,821 |
| dp17 | 17,1854 | 5,298 | 0,415 | 0,823 |
| dp18 | 17,2977 | 5,224 | 0,501 | 0,817 |
| dp19 | 17,1816 | 5,387 | 0,373 | 0,825 |
| dp20 | 17,1414 | 5,475 | 0,344 | 0,826 |
| dp22 | 16,9363 | 5,622 | 0,270 | 0,829 |
| dp24 | 16,9740 | 5,648 | 0,258 | 0,829 |
| dp38 | 17,2014 | 5,555 | 0,513 | 0,818 |
| dp39 | 17,1447 | 5,592 | 0,546 | 0,818 |
| dp41 | 16,8198 | 5,822 | 0,347 | 0,825 |
| dp42 | 16,8419 | 5,602 | 0,351 | 0,824 |
| dp45 | 17,6341 | 5,922 | 0,406 | 0,826 |
| dp49n | 16,9486 | 5,476 | 0,397 | 0,822 |
| dp49o | 16,8691 | 5,667 | 0,464 | 0,821 |
| dp49p | 16,9517 | 5,596 | 0,381 | 0,823 |
| dp49q | 16,9990 | 5,592 | 0,481 | 0,819 |
| dp49r | 16,8595 | 5,740 | 0,359 | 0,824 |
| dp49t | 16,9377 | 5,623 | 0,366 | 0,823 |
| dp49u | 16,9598 | 5,559 | 0,386 | 0,823 |
| dp61_1 | 16,9694 | 5,751 | 0,397 | 0,823 |
| dp61_9 | 17,0697 | 5,699 | 0,345 | 0,824 |
| dp61_13 | 17,0403 | 5,664 | 0,434 | 0,821 |
| dp61_18 | 16,9117 | 5,850 | 0,296 | 0,826 |
| dp61_19 | 16,9471 | 5,697 | 0,423 | 0,822 |

[a]: for the definitions of variables, see Footnote 14.

Table 5: Reliability analysis for the scale of SWB. Item–total statistics.

The sex dummy turns out to be irrelevant (probably because the dependent variable is earnings per person in the household).

In the equation explaining SWB, we again control for the individual's age, the size of town of residence, and the dummy for "housewives". However, this time we must also take care of the sex dummy and several indices of health and life conditions or circumstances: suffering from a serious sickness, household size, and earnings (an endogenous variable, explained within the same model).

# 5 Results

Let us now proceed to the presentation of our main regression results. The key relations of the model are obtained by linearizing (21) and (22). Applying logarithms

to both sides of these equations yields

$$\ln w = \ln A - \frac{\phi}{1-\tau}\ln \delta_v + \ln(\ell_Y) + \frac{\mu\phi}{1-\tau}\ln(\ell_v), \tag{28}$$

$$\ln SWB = \ln H + \ln A + \ln(\ell_Y) - \frac{\psi}{1-\beta}\ln \delta_f - \frac{\theta+\phi}{1-\tau}\ln \delta_v + \\ + \frac{\alpha\psi}{1-\beta}\ln(\ell_f) + \frac{\mu(\theta+\phi)}{1-\tau}\ln(\ell_v). \tag{29}$$

Please note that the decay rates of social ties ($\delta_f$ and $\delta_v$) are equal for all individuals and thus their terms in the above equations simply add to the intercept term. Secondly, *the implied regression equations are formulated in logs and not in levels.* Thirdly, we have to account for a number of control variables, purged into $H$ and $A$ in (28)–(29) but highly relevant for explaining earnings and SWB.

## 5.1 Explaining earnings

As can be seen in Table 6, the steady-state elasticity of bridging social capital (proxied by the number of frequently contacted friends) in determining earnings, is positive and statistically significant at the 10% significance level (p-value = 0,0541). A 1% increase in bridging social capital ought to increase one's earnings by approximately 0,041%. This means that people in Poland tend to underinvest in bridging social capital and that the Polish society is located in the increasing part of the inverse U-shaped curve shown in Figure 2.[15] Also in line with the predictions of the theoretical model, the estimated elasticity of bonding social capital (proxied by the number of frequently contacted family members) is negative. It is not significantly different from zero, though.

All these results have been obtained controlling for a number of variables, whose regression coefficients accord with the expected values, confirming the validity of results obtained herein. Inhabitants of greater cities and agglomerations earn more than those living in smaller towns or in the countryside; an additional year of schooling brings about around a 6,1% increase in private earnings (cf. Heckman, Lochner, and Todd, 2003); an additional year of experience at the current workplace increases earnings by around 0,3%;[16] older people earn more on average (even controlling for experience).

The more hours per day one works, the more one earns, in line with intuition and the model. Perhaps quite surprisingly, though, the estimated elasticity is very low: on average, a 1% increase in hours worked is supposed to increase earnings by a mere 0,091%. This stands in sharp contrast to our model where wages move one-to-one

[15] Kääriäinen and Lehtonen (2006) have shown that the measured levels of bridging social capital in Poland are among the very lowest in Europe.

[16] The square term in work experience, although negative (in line with our expectations), turned out to be insignificant in the regression so it was removed.

with hours worked; the reason for this counterfactual prediction of our simple model is that it ignores other production factors than labor, such as e.g. capital or technology, which are clearly important for production in the real world.

The equation explaining log earnings has been estimated using OLS. We believe that simple OLS estimates have the smallest variance among all linear estimates here because a series of subsequent diagnostic tests has shown that the problems of heteroskedasticity or endogeneity are negligible in the current case. All regressions have been run using *gretl*.

Table 6: Estimating **log earnings** by OLS; $n = 1570$.

| Variable | Coefficient | Std. error | $t$-statistic | $p$-value |
|---|---|---|---|---|
| Constant | 5,34859 | 0,144595 | 36,9902 | 0,0000 |
| Log friends | 0,0407652 | 0,0211520 | 1,9273 | 0,0541 |
| Log family | −0,00340276 | 0,0222018 | −0,1533 | 0,8782 |
| Log hours worked | 0,0913715 | 0,0242160 | 3,7732 | 0,0002 |
| Size of town[a] | −0,0929960 | 0,00888719 | −10,4641 | 0,0000 |
| Education[b] | 0,0607568 | 0,00513269 | 11,8372 | 0,0000 |
| Experience[c] | 0,00329763 | 0,00162928 | 2,0240 | 0,0431 |
| Age (in years) | 0,00590911 | 0,00167971 | 3,5179 | 0,0004 |

[a]: size classes in descending order: 1 = city 500,000 +; 2 = city 200,000–500,000; ...; 6 = countryside. [b]: years of schooling. [c]: years of work at the current workplace.

Table 7: Basic diagnostics.

| | |
|---|---|
| Dependent variable mean | 6,38530 |
| Dependent variable standard deviation | 0,642662 |
| Residual sum of squares | 516,010 |
| Residual standard error ($\hat{\sigma}$) | 0,574763 |
| Coefficient of determination $R^2$ | 0,203712 |
| Adjusted $\bar{R}^2$ | 0,200143 |
| $F(7, 1562)$ | 57,0858 |
| Akaike information criterion | 2724,52 |
| Schwarz Bayesian criterion | 2767,39 |
| Hannan-Quinn criterion | 2740,46 |

Model diagnostics summarized in Table 7 indicate that the model, though significant and meaningful, leaves 80% of the variance of log earnings unexplained ($\bar{R}^2 = 0,2$). This disappointing fact is not too surprising given that our calculations are based on survey data (which introduces additional error) and that they neglect technological and capital-related aspects of the workplace.

## 5.2 Explaining SWB

The second step is to explain subjective well-being of the individuals using their levels of bridging and bonding social capital as well as their earnings (which are endogenous to the regression model) and a number of additional control variables (lumped into $H$ in equation (29)). The estimation has been done using 2SLS so that endogenous log earnings have been instrumented by theoretical values from an auxilliary model explaining log earnings.[17] This is sufficient to handle the problem of simultaneity. One additional estimation problem prevailing here is related to heteroskedasticity. Reported standard errors and $t$-statistics have thus been adjusted for heteroskedasticity using the HC1 method.

As we see in Table 8, bridging social capital pulls double duty here: (i) it helps increase earnings, and (ii) it provides *additional* increases to SWB beside those obtained via increased earnings. An 1% increase in earnings brings about a 0,128% increase in reported SWB. A 1% increase in bridging social capital in turn brings about a 0,018% direct increase in SWB plus an $0,041 \cdot 0,128\% \approx 0,005\%$ indirect increase via earnings.

Table 8: Estimating **log SWB** by 2SLS (endogenous log earnings instrumented by theoretical values from an auxilliary model), using standard errors robust to heteroskedasticity (HC1); $n = 1306$.

| Variable | Coefficient | Std. error | $t$-statistic | $p$-value |
|---|---|---|---|---|
| Constant | 1,07451 | 0,186870 | 5,7501 | 0,0000 |
| Log friends | 0,0179255 | 0,00670589 | 2,6731 | 0,0075 |
| Log family | 0,00420792 | 0,00654698 | 0,6427 | 0,5204 |
| Size of town[a] | 0,0130551 | 0,00309540 | 4,2176 | 0,0000 |
| Age (in years) | −0,00200476 | 0,000436224 | −4,5957 | 0,0000 |
| Sex (1=Female) | −0,0326582 | 0,00847854 | −3,8519 | 0,0001 |
| Sick (1=Yes) | −0,0843580 | 0,0158093 | −5,3360 | 0,0000 |
| Housewife[b] | 0,0535437 | 0,0279824 | 1,9135 | 0,0557 |
| Log household size | 0,0755261 | 0,0222778 | 3,3902 | 0,0007 |
| Log earnings | 0,128854 | 0,0254309 | 5,0668 | 0,0000 |

[a]: size classes in descending order: 1 = city 500,000 +; 2 = city 200,000–500,000; ...; 6 = countryside. [b]: 0 = no, 1 = yes.

Bonding social capital, proxied by the number of frequently contacted members of the family, turns out to be insignificant in the regression. The interpretation of this result goes back to Proposition 3 which says that the relationship between the

[17]The auxilliary model was a slight generalization of the model described in the previous subsection. The difference is that we added a couple of insignificant exogenous variables to the regression. Thanks to this step, $\bar{R}^2$ was raised from 0,2 to 0,34.

amount of time invested in forming bonding social capital and SWB should be inverse U-shaped. In the steady state, individuals would allocate less time than is required to maximize instantaneous SWB, making us expect a positive relationship between SWB and bonding social capital to be found in the data. The null relationship which we find here means that in Poland, as opposed to the theoretical model, the level of investment in bonding social capital is in fact (approximately) optimal. This means that Poland is right on the summit of the inverse U-curve and additional investment in bonding social capital would only lower SWB instead of increasing it.[18]

It must be noted that hours worked turned out to be insignificant in the regression. This means that there is no direct impact of the amount of leisure time on SWB: all impact is realized through (i) earnings, and (ii) the measures of social capital.

All the control variables have expected signs, confirming several interesting findings of sociology (Wilson, 1967; Rose, 2000; Diener and Seligman, 2002; Helliwell, 2003):

- people living in smaller towns and villages enjoy higher levels of well-being than those living in big cities (controlling for earnings which are greater in cities),
- on average, younger people are more satisfied with their lives,
- men are more satisfied with their lives than women,
- having suffered from a serious illness provides a strong drag on SWB.

Two further results are easily interpretable but slightly more problematic:

- "housewives" (i.e. people taking care of the household) are more satisfied with their lives than other respondents,
- people are the more satisfied with their lives the greater is the household they are living in.

As can be seen in Table 9, the model explains only a small fraction (around 8,5–9%) of the total variation of reported SWB. Given our estimation technique, it is robust, however, to heteroskedasticity and endogeneity problems. The invoked Hausman test confirms that OLS estimates of this model would be inconsistent and that using 2SLS is necessary.

In sum, our empirical results confirm all the principal cross-sectional predictions of our theoretical model. They also shed some light on the current state of the Polish society. Extremely low levels of bridging social capital found here, already reported elsewhere (Kääriäinen and Lehtonen, 2006), imply that increasing it would bring unambiguously positive effects both in terms of average earnings and SWB. On the other hand, high levels of bonding social capital (cf. Cook, Rice, and Gerbasi, 2004)

[18] Cook, Rice, and Gerbasi (2004) argue that social ties with kin are dominant in the Polish society.

Table 9: Model diagnostics.

| | |
|---|---|
| Dependent variable mean | 2,11239 |
| Dependent variable standard deviation | 0,146650 |
| Residual sum of squares | 27,3056 |
| Residual standard error ($\hat{\sigma}$) | 0,145152 |
| Coefficient of determination $R^2$ | 0,091643 |
| Adjusted $\bar{R}^2$ | 0,085335 |
| $F(9, 1296)$ | 14,5280 |
| Akaike information criterion | −1324,8 |
| Schwartz Bayesian criterion | −1273,1 |
| Hannan-Quinn criterion | −1305,4 |

Hausman test –
Null hypothesis: OLS estimator is consistent
Asymptotic test statistic: $\chi^2_1 = 1144{,}87$
p-value = $5{,}83288 \cdot 10^{-251}$
First-stage $F(1, 2007) = 112{,}839$

indicate that increasing it further cannot bring about any positive results, neither for earnings nor for SWB. It is possible that Poles "overinvest" in bonding social capital and it is *sure* that Poles underinvest in bridging social capital.

# 6 Conclusion

In this paper, we have analyzed the dependence between social capital – and in particular, its two dimensions: bridging and bonding social capital – and such measures of individual success as earnings and subjective well-being (SWB).

The first step was to build a theoretical model describing the dynamics of social capital formation. Individuals are assumed to invest their time in forming social ties with family and friends because this (i) provides direct increases in well-being, and (ii) can potentially help in obtaining a better job, and thus (indirectly) in increasing the level of consumption. We have shown that people who have very few friends initially, would at first invest a lot of time in finding them and in maintaining these contacts, and then will their effort gradually decrease, such that in the long run, they would spend less time on socializing than in the beginning. Conversely, for those endowed with a lot of friends at the outset, the share of time spent on socializing will start off very low and then gradually increase over time (see Figure 1).

The second step is to derive testable steady-state predictions from the model. The theory suggests that there should be an unambiguously negative impact of bonding social capital on earnings (due to the opportunity cost of working), and an inverse

U-shaped relationship between bridging social capital and earnings: on the one hand, bridging social capital increases efficiency, but on the other hand, it incurs an opportunity cost of foregone working time. Whether the steady state of the model is in the increasing or in the decreasing part of this inverse U-shaped curve, depends on the relative strength of these two counteracting effects.

As far as SWB is concerned, we find inverse U-shaped relationships both in the case of bridging and of bonding social capital. The model, featuring discounted utility-maximizing individuals, predicts the steady state to be in the increasing parts of both inverse U-shaped curves.

The third step is to confront these predictions with real-world data. Using a cross-section survey data set from the Polish "Social Diagnosis" program (2005 edition), we show that (i) bridging social capital in positively related to earnings in Poland (since the levels of bridging social capital are very low here, Poland is in the increasing part of the inverse U-shaped curve), (ii) the negative impact of bonding social capital on earnings is negligible, (iii) bridging social capital unambiguously increases SWB also when controlling for (endogenously determined) earnings, (iv) bonding social capital turns out to be unrelated to SWB (indicating that Poland is in the maximum part of this inverse U-shaped curve).

While computing these results, we have used a number of control variables and carefully selected estimation techniques in order to obtain precise and consistent estimates. One natural extension of the current paper would be to test the predictions of our theoretical model against different datasets and to compare the results across countries.

The direct implication for Poland is that the worryingly low levels of bridging social capital recorded here are a significant force which lowers not only the subjective well-being of Poles, related to their happiness and satisfaction with life, but also their individual earnings – which a directly measurable, down-to-earth characteristic. Any steps aimed at increasing bridging social capital in Poland would result in increases in private and social wealth, and indirectly also in social trust and the confidence in democracy. It really pays to invest in bridging social capital in Poland.

# References


[1] Beugelsdijk, S., S. Smulders (2003), "Bonding and Bridging Social Capital: Which Type is Good for Economic Growth?" [in:] W. Arts, L. Halman, J. Hagenaars (eds.) *The Cultural Diversity of European Unity.* Brill Leiden, 147–184.

[2] Bian, Y. (1997), "Bridging Strong Ties Back in: Indirect Ties, Network Bridges, and Job Searches in China", *American Sociological Review* 62, 366-385.

[3] Bourdieu, P., (1986), "The Forms of Capital" [w:] John C. Richardson (ed.), *Handbook of Theory and Research of Sociology of Education.* New York, Westport, Connecticut, London: Greenwood Press, 117-142.

[4] Bourdieu, P., L. Wacquant (1992), *An Invitation to Reflexive Sociology*, Chicago: University of Chicago Press.

[5] Cook, K., E.R.W. Rice, A. Gerbasi (2004), "The Emergence of Trust Networks under Uncertainty: The Case of Transitional Economies - Insights form Social Psychological Research" [in:] Kornai, J. B. Rothstein, S. Rose-Ackerman (eds.), *Creating Social Trust in Post-Socialist Transition*, Palgrave Macmillan, 193-212.

[6] Coleman, J. (1990), *Foundations of Social Theory*, Cambridge, Mass: Harvard University Press.

[7] Dasgupta, P. (2002), "Social Capital and Economic Performance: Analytics". Mimeo, University of Cambridge.

[8] Diener, E., M.E.P. Seligman (2002), "Very Happy People. Research Report", *Psychological Science* 13(1), 81-84.

[9] Domański, H. (2005), "Determinants of Legitimization in Europe: an Empirical Analysis for 21 Countries", *Empiria. Revista de Metodologia de Ciencias Sociales* 9 (I-VI), 61-88.

[10] Durlauf, S.N., M. Fafchamps (2004), "Social Capital," NBER Working Paper 10485.

[11] Erickson, B. H. (1996), "Culture, Class, Connections", *American Journal of Sociology* 102(1), 217-251.

[12] Erickson, B. H. (2003), "Social Networks: the Value of Variety", *Context* 2(1), 25-31.

[13] Erickson, B. H. (2004), *A Report on Measuring Social Capital in Weak Ties. A Report Prepared for the Policy Research Initiative*, Ottawa, Canada.

[14] Granovetter, M. S. (1973), "The Strength of Weak Ties", *American Journal of Sociology*, 78 (6), 1360–1380.

[15] Heckman, J., L.J. Lochner, P.E. Todd (2003), "Fifty Years of Mincer Earnings Regressions", NBER Working Paper 9732.

[16] Helliwell, J. (2003), "How's Life - Combining Individual and National Variables to Explain Subjective Well-Being", *Economic Modeling* 20 (2), 331-360.

[17] Hurlbert, J.S., V.A. Haines, J.J. Beggs (2000), "Core Networks and Tie Activation: What Kinds of Routine Networks Allocate Resources in Nonroutine Situations?", *American Sociological Review* 65, 598-618.

[18] Kääriäinen, J., H. Lehtonen (2006), "The Variety of Social Capital in Welfare State Regimes - a Comparative Study of 21 Countries", *European Societies* 8(1), 27-57.

[19] Lin, N. (2001) *Social Capital.* Cambridge: Cambridge University Press.

[20] Mincer, J. (1974) *Schooling, Experience, and Earnings.* New York: Columbia University Press.

[21] O'Brien, K.M., J. L. Quimby (2006), "Predictors of Well-Being Among Non-Traditional Female Students with Children", *Journal of Counseling and Development* 84, 451-460.

[22] Putnam, R. (2000), *Bowling Alone. Collapse and Revival of American Community.* New York: Simon & Schuster.

[23] Putnam, R., R. Leonardi, R. Nanetti (1993), *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton: Princeton University Press.

[24] Rose, R., (2000), "How Much Does Social Capital Add to Individual Health? A Survey Study of Russians", *Social Science and Medicine* 51, 1421-1435.

[25] Wellman, B. S. (1990), "Different Strokes from Different Folks: Community Ties and Social Support", *American Journal of Sociology* 96(3), 558-588.

[26] Whiteley, P.F. (2000), "Economic Growth and Social Capital", *Political Studies* 48, 443–466.

[27] Wilson, W. (1967), "Correlates of Avowed Happiness", *Psychological Bulletin* 67, 294-306.