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SOCIAL CAPITAL, WELL-BEING, AND EARNINGS

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SOCIAL CAPITAL, WELL-BEING, AND EARNINGS

Theory and evidence from Poland

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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.

Key words: bridging social capital; bonding social capital; earnings; subjective well-being; Poland

JEL Classification Numbers: D10; J20

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 dataset covering a cross-section of the Polish society in 2005.

Our empirical approach to social capital bases upon its network operationalization, originating from, among others, Bourdieu (1986) and Bourdieu and Wacquant (1992). More precisely, we define social capital along the lines of Bourdieu and Wacquant (1992: 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: 24): ‘resources embedded in social networks and accessed and used by actors for actions’. 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: 304). When thinking of ‘resources’, ‘mutual acquaintance and recognition’, and ‘facilitated action’, however, one can immediately link these stocks and opportunities to the individual benefits accruable from them. For this reason, we shall expect social capital to be related to earnings and subjective well-being, and we shall inspect this link in detail in this paper.

The notions of *bonding* and *bridging* social capital upon which we will base have been first introduced to social sciences by Putnam (2000). They refer to forming social ties with people in a similar (in the case of bonding social capital) or different (bridging social capital) socio-economic position. These two concepts are considered to illustrate specific types of social capital: as Putnam puts it, ‘[s]ome 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: 22).

The distinction between bonding and bridging social capital is closely related to the type of individuals with whom one socializes. Bonding social capital is primarily associated with social contacts within one’s family: the main objective of this type of social ties is to support the *status quo* and satisfy the safety need (Kadushin 2002). Social ties with friends and acquaintances, on the other hand, help satisfy the efficacy need and enhance innovation (Kadushin 2002; Florida 2004).

An analogous position is presented by Putnam (2000). According to him, bonding social capital should be associated with contacts with family: it is the family which is the most exclusive group of all, the one whose boundaries are the least permeable. Since it is markedly easier to become one’s friend or acquaintance than her family member, social contacts with non-kin should then be rather understood as bridging social capital

(although exclusive groups of close friends are also not uncommon, so the distinction is not completely clear).¹

Theoretical investigations show that bridging social capital goes together with civil liberties and the support for gender and racial equality. It strengthens the functioning of democracy by reducing corruption (Putnam *et al.* 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: 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'. (Beugelsdijk and Smulders 2003: 5). Beugelsdijk and Smulders (2003) proceed to show that bridging social capital is empirically good for economic growth at the level of European regions, whereas bonding social capital is bad for growth.

Bridging social capital is also found to be *individually* beneficial for those who possess it. Granovetter's (1973) most prominent discovery is that weak ties (i.e., ties between dissimilar people) facilitate better job finding than strong ties (between similar people). Friendship ties have also been shown to be positively related to individuals' wages and upward mobility in the workplace (Podolny and Baron 1997; Słomczyński and Tomescu-Dubrow 2005). Most strongly perhaps, Burt (2005) claims that bridging social capital, as opposed to bonding social capital, is positively related to individuals' economic performance, creativity, social trust, and happiness.

The question whether sophisticated social networks indeed improve the individuals' earnings potential remains unsettled, though: recent research from Franzen and Hangartner (2006) indicates that using social networks might not necessarily increase the monetary payoff but improve the non-pecuniary characteristics of the job like better career perspectives instead. Despite Burt's (2005) clear suggestions that bridging social capital should be positively related to individuals' happiness, the issue of whether social networks influence subjective well-being has not been fully settled either. Even more worryingly, earnings and SWB are directly interrelated as well, complicating the matter even further (Helliwell 2003), e.g., people with higher relative incomes have been found to show significantly higher measures of subjective well-being (Diener *et al.* 1999). It could also be true that these ambiguous results were due to a non-linear relation between SWB and income: '[t]heory and some previous research suggest that the

1. There exists substantial literature on kin and non-kin social ties, highlighting the different functions they typically serve (e.g., Wellman and Wortley 1990; Shavit *et al.* 1994; Hurlbert *et al.* 2000).

effects of individual and national incomes may be non-linear in nature, with smaller well-being effects attached to increases in income beyond levels set by each individual's or society's expectations and habits' (Helliwell 2003: 344).

Given this rather complex background, we would like to organize our thinking around the following two key expectations: (i) bridging social capital is supposed to be unambiguously beneficial both for individuals' earnings and their subjective well-being (despite the caveats quoted above); (ii) the impact of bonding social capital is supposed to be much less pronounced, and it could not be unambiguously signed. The contribution of this paper to the literature is three-fold. 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 formation. 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. We find that in a society like the one in Poland, everyone would 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.² The last component (iv) we consider exogenous to the model and set aside hereafter (though in reality, it will be correlated with earnings). We are thus taking 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

$$SWB = Hc\ell_f^\psi v^\theta \quad (1)$$

where H is the constant exogenous constituent factor of SWB, c is consumption, ℓ_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 social capital, respectively.

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:

$$w = c = A\ell_Y v^\phi \quad (2)$$

with

$$\ell_Y = 1 - \ell_f - \ell_v, \quad (3)$$

and A being the constant 'total factor productivity', ℓ_Y denoting the fraction of the total time endowment spent effectively at work, ℓ_v denoting 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. The spillover ϕ is included here since it is argued (cf. Dasgupta 2002) that social capital – and in particular bridging social capital (Burt 2005) – 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 increases in SWB, with an elasticity θ) and (instrumentally) as means for raising the level of

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

consumption (with an elasticity ϕ).³ The individual's total time endowment at each instant of 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 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 should be, in principle, modeled along the same lines as bridging social capital. However, we would like to suppress this fact in the current section and tentatively identify bonding social capital f with the fraction of time spent on socializing with the family, ℓ_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, but it also provides us with a substantial degree of extra precision in the description of the dynamics of bridging social capital formation. Thanks to this step, 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 fully 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:

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

$$\dot{v} = \ell_v^\mu - \delta_v v. \tag{5}$$

3. Alternatives to the production function assumed in (2) have been discussed in Durlauf and Fafchamps (2004) as well as in a working paper version of this article.

2.2. The dynamic equations

It can be easily shown that the optimal time investment in maintaining the ties with family, given by ℓ_f , always moves against ℓ_v :

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

at all times t .

Furthermore, the dynamic equation for ℓ_v , i.e., the evolution of optimal time investment in bridging social capital over time, is derived as:

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

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 equation (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:

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

$$\ell_v^* = \frac{(\theta + \phi)\mu\delta_v}{(\theta + \phi)\mu\delta_v + (\rho + \delta_v)(1 + \psi)}, \quad (9)$$

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

We can now pass to the dynamics.

2.4. Dynamics

It can be shown that the steady state described above is unique, saddle-path stable, and that it offers a unique transition path assuring convergence.⁴ Furthermore, the $\dot{v} = 0$ curve is unambiguously upward-sloping in the (v, ℓ_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 1.⁵

The crucial result here is that the slope of the saddle path is unambiguously negative. Hence, 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 ℓ_v decreases over time if $v(0) < v^*$ and increases over time if $v(0) > v^*$.*

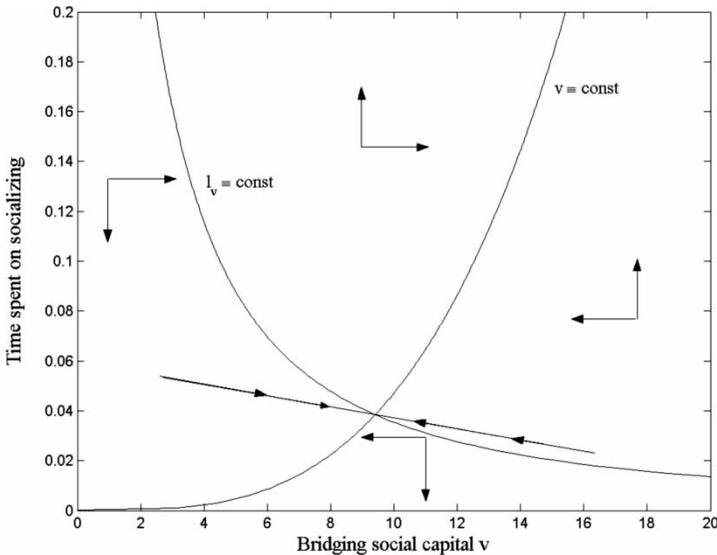


Figure 1. Phase diagram in the (v, ℓ_v) space.

4. Mathematical details are available from the authors upon request.
 5. Parameter values used to produce Figure 1: $\psi = 1$, $\theta = 2$, $\rho = .05$, $\phi = .2$, $\delta_v = .04$, $\mu = .3$.

Proposition 1 has one strong implication for the empirical analysis of cross-section data. Namely, while the long-run relationship between social capital investment ℓ_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 ℓ_v one ought to control for the age of an individual (or time elapsed since her last migration) to capture the long-run relationship and not just the transition.

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 two differences are that (i) we will now model bonding social capital along the lines of bridging social capital, i.e., like a state variable, and (ii) we shall slightly generalize the accumulation functions for both kinds of social capital.

We will now assume that bonding social capital is increased by purposeful investments of time – i.e., time spent on socializing with family. This type of social capital will therefore also be subject to gradual depreciation. We will assume that it decays at a constant rate $\delta_f > 0$.⁶ Hence, the modified bridging social capital equation (4) and its counterpart for bonding social capital read:

$$\dot{v} = \ell_v^\mu v^\tau - \delta_v v, \quad (11)$$

$$\dot{f} = \ell_f^\alpha f^\beta - \delta_f f, \quad (12)$$

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

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

$$SWB = Hcf^\psi v^\theta, \quad (13)$$

subject to (11)–(12). The first order conditions of optimality for this problem boil down to two dynamic equations in ℓ_f and ℓ_v which, together with equations (11)–(12), constitute a four-dimensional dynamical system in the (ℓ_f, ℓ_v, f, v) space. Obviously, we cannot draw a phase diagram any

6. Intuitively, one could expect ties with family to decay slower than the ‘weak’ ties with strangers (cf. Granovetter 1973), i.e., $\delta_f < \delta_v$.

TABLE 1. Comparative statics of the steady state

Variable	ρ	ψ	θ	ϕ	α	β	μ	τ	δ_f	δ_v
ℓ_f^*	?a	+	-	-	+	+	-	-	+	-
ℓ_v^*	?a	-	+	+	-	-	+	+	-	+
ℓ_Y^*	?b	-	-	-	-	-	-	-	-	-

^aThe derivative is a sum of two expressions, one of them unambiguously negative and the second – ambiguously signed. An increase in ρ implies an increase in ℓ_v^*/ℓ_f^* if and only if $(1 - \tau)\delta_v > (1 - \beta)\delta_f$, i.e., if the effective depreciation rate is higher for bridging social capital.

^bThe 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.

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, ℓ_f and ℓ_v , respectively, both decline over time along the transition path if the initial levels of social capital are below their respective steady-state levels.

The steady-state time allocation (ℓ_f, ℓ_v) can be easily computed analytically but the resulting formulas, akin to equations (8)–(10), are fairly complex so we omit them here for simplicity.⁷ Most importantly, however, they offer unambiguous comparative statics for the long-run optimal time allocation. These marginal effects have been summarized in Table 1 (‘+’ denotes positive influence, ‘-’ denotes negative influence, ‘?’ denotes ambiguous sign).

The interpretation of these comparative statics is straightforward. The parameter ψ captures the share of family life in individuals’ SWB – its increase will thus raise the individual’s time investment in family life at the expense of all other activities. The parameters θ and ϕ capture the share of social life outside of the family in the individuals’ SWB (θ is the direct share while ϕ 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. α , β and δ_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 α or β rises), or (ii) more replacement investment is necessary to maintain the current level of bonding social capital (if δ_f rises).

7. All omitted mathematical results and derivations are available from the authors upon request.

Symmetrically, the same arguments apply to μ , τ and δ_v that build the case of bridging social capital.

3.2. Implications for earnings and SWB

Let us now concentrate on the steady-state values of earnings and SWB. The crucial predictions of the model will be summarized in a series of propositions.

Proposition 2 *The relationship between the amount of time invested in the formation of bonding social capital (ℓ_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 (ℓ_f) and SWB is inverse U-shaped. In the steady state, individuals allocate less time to it than is required to maximize instantaneous SWB.*

The inverse U-shaped relationship between ℓ_f and SWB derives from the two opposing forces: (i) the direct positive impact of family life on SWB, (ii) the indirect negative effect through lowered earnings. The auxiliary ‘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 (ℓ_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*

$$\theta < \frac{\phi\rho}{(1 - \tau)\delta_v} \quad (14)$$

(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 (14) is reversed (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. There are two opposing effects at work here: (i) individuals maximize SWB not earnings. Thus, they attach an elasticity of $\theta + \phi$ to bridging social capital, not just ϕ ; (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, and hence what matters for the final outcome is the balance between them. If θ is high enough, then the first effect is stronger and thus the net effect is positive; if θ 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 effects exactly level off and in the steady state, earnings are maximized.

It is important to note that if inequality (14) 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.⁸

Proposition 5 *The relationship between the amount of time invested in the formation of bridging social capital (ℓ_v) and SWB is inverse U-shaped. In the*

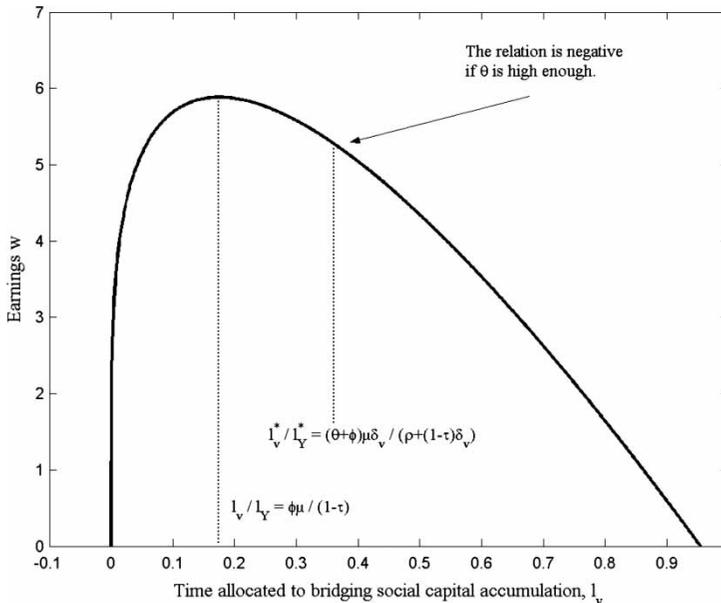


Figure 2. The inverse U-shaped relationship between bridging social capital and earnings.

⁸ Parameter values used to produce Figure 2: $\phi = .6$, $\delta_v = .04$, $\mu = .3$, $\tau = .2$, $A = 1$.

steady state, individuals allocate less time to it than is required to maximize instantaneous SWB.

Just like in Proposition 3, the inverse U-shaped relationship between ℓ_v and SWB derives from two opposing forces: (i) the direct positive impact of social life outside of the family on SWB, (ii) the indirect negative effect through lowered earnings. The reasoning behind the auxiliary ‘under-investment’ finding follows Proposition 3 as well.

3.3. Possible scenarios

Our theoretical model is able to produce a variety of qualitatively distinct outcomes, depending on the values we assign to its exogenous parameters. We have thus carried out a numerical exercise with the objective to illustrate the possible scenarios. The results are the following.

1. *The scenario of a ‘sociable’ individual (high θ).* A ‘sociable’ individual would spend 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 could be closed only by *lowering* the time investment in 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. *The scenarios of a ‘materialistic’ (low θ and ψ) and a ‘family-oriented’ (high ψ) individual.* Both these individuals would spend less time socializing with friends than is necessary to maximize instantaneous earnings. This means that in their cases, the spillover effects from bridging social capital to productivity would not be fully utilized. The individual could increase her earnings by increasing the fraction of time spent on accumulating bridging social capital, even though her working time would then shrink by the respective quantity. In such case, one would expect a *positive* relationship between bridging social capital (whose stock is relatively low) and earnings. This case is particularly relevant for the current article since, as we will see shortly, our empirical data indicate that the majority of the Polish society is actually composed of such ‘materialistic’ and ‘family-oriented’ (low θ) individuals.
3. *Under all scenarios,* earnings obtained in the steady state are greater than the earnings one would get 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 dataset covers a cross-section of individual respondents, a representative sample of the Polish society surveyed in 2005 within the ‘Social Diagnosis’ (‘Diagnoza społeczna’) program.⁹ The entirety of the dataset offers information on a wide variety of social dimensions; we select only those variables which are relevant to our hypotheses.

The objective of the current empirical analysis is to test the predictions of the theoretical model regarding the dependence of individuals’ earnings as well as their SWB on measures of bridging and bonding social capital, controlling 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, and therefore our analysis has to rely on imprecise proxy variables. We will proxy bonding social capital by the number of family members whom the respondent often socially meets, and bridging social capital – by the number of friends whom the respondent often socially meets.

The reason for relying on this operationalization is that, as we already argued in the Introduction, the distinction between bonding and bridging social capital is closely related to the type of individuals with whom one socializes. It is thus clear that contacts with family members are a reasonable proxy for bonding social capital. It remains debateable however if bridging social capital should be proxied by contacts with *friends*, *acquaintances*, or both. Let us discuss why we have chosen the first option.

The respondents of the ‘Social Diagnosis’ survey have been asked to name the number of both friends and acquaintances whom they often socially meet. The latter variable, however, turned out to be related neither to earnings nor SWB, and only weakly related to the two other measures of social capital. There are at least three reasons for this finding, and hence for the fact that social contacts with friends are actually a better proxy for bridging social capital than contacts with acquaintances in the specific Polish context.

9. ‘Social Diagnosis’ is a panel project. Four consecutive waves of surveys have been carried out to date: 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.

These three reasons are the following. First, Poland is very homogenous culturally, ethnically, and religiously, and its society is also relatively closed. It can thus be argued that in Poland – probably unlike several Western European countries – the number of friends whom one frequently meets is a variable which captures enough dissimilarity, or ‘diversity’ to operationalize bridging social capital. Furthermore, social ties with family in Poland are among the strongest in the world (Alesina and Giuliano 2007), and general trust is very low here. Relative to this, forming stable and trustworthy social ties with people outside of the family is already a major breakthrough for the Poles, requiring them to transgress a few more social cleavages than contacts with family would. Second, the family is typically more homogenous than a group of friends, and in generally homogenous countries like Poland, acquaintances cannot offer much extra heterogeneity. The fact that the boundaries of a circle of friends are permeable is then crucial for contacts with friends to proxy bridging, as opposed to bonding, social capital. Third, the distinction between friends, acquaintances, and non-acquaintances may be blurred for some respondents, which may introduce additional error, lowering the significance of the ‘acquaintances’ variable in the reported regressions.

One characteristic feature of our data is that in Poland, the level of bridging social capital is, in principle, extremely low. Indeed, international comparative research by Kääriäinen and Lehtonen (2006) has shown that in post-communist countries such as Poland, bridging social capital is lower than in any other welfare state regime.¹⁰ It is the highest in the ‘Nordic’ welfare state regime (e.g., Norway), followed by the ‘liberal’ regime (e.g., United States), and the ‘conservative’ regime (e.g., France). Then comes the Mediterranean welfare state regime (e.g., Italy), and the very last is the post-communist regime including Poland. The levels of bridging social capital in Poland are actually miserable enough to locate it among the worst performing even in the post-communist group, far below e.g., Czech Republic or Slovenia. Our empirical results will be strongly influenced by the very low average level of bridging social capital in our data. The Polish society will be found to be situated in the increasing part of the inverse

10. Low levels of bridging social capital and social trust in Central and Eastern European countries (such as Poland) are partly a heritage of communism, and partly a consequence of the turbulent years of political and economic transition. After the fall of communism, these countries were pushed into ‘an era of growing insecurity, growing inequality and increasingly flexible labour markets’ (Standing 1998). The social response to such a turbulent environment was to preserve the social networks which had already been formed in the communist era, and generally not to trust strangers in the fear of being cheated. In such a situation, individual earnings of Poles began to rise much faster than their confidence in democracy (Domanski 2005).

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.¹¹ All items have been 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 2, the resultant scale is highly reliable (the standardized Cronbach's alpha coefficient equals 0.851). We have also confirmed that this level of reliability cannot be improved any further by deleting items.

In order to obtain consistent estimates of our model parameters, we shall consider a number of control variables previously neglected in the theoretical model. In the equation explaining (the logarithm of) earnings, we shall also control for education (years of schooling), work experience at current workplace, work experience squared (cf. Mincer 1974; Heckman *et al.* 2003) as well as the size of the town of residence, the individual's age, and a dummy variable for 'housewives' (i.e., people taking care of the household and not working outside of home). The sex dummy turns out to be irrelevant, probably because the dependent variable is earnings per person in the household.

TABLE 2. Reliability analysis for the scale of SWB. Basic reliability statistics

<i>Cronbach's alpha</i>	<i>Std. Cronbach's alpha</i>	<i>No. of Items</i>
0.829	0.851	24

11. The variables used in the scale are the following: (i) valuation of one's life; (ii) certainty of the source of income; (iii) financial problems; (iv) strenuous job; (v) too many duties; (vi) congestion in the place of residence; (vii) problems with neighbors; (viii) material standard of life; (ix) feeling happy; (x) feeling depressed and thinking of suicide; (xi) feeling loved; (xii) the strength of will to live; (xiii) valuation of one's physical appearance; (xiv) mobilization to work; (xv) insomnia; (xvi) ease of getting tired; (xvii) appetite; (xviii) health problems/hypochondria; (xix) desire for sex; (xx) satisfaction from relations with the closest family; (xxi) satisfaction from housing conditions; (xxii) satisfaction from sexual life; (xxiii) satisfaction from children; and (xxiv) satisfaction from marriage.

In the equation explaining SWB, we shall 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 equations of the empirical model have been derived by applying logs to the key steady-state relationships:

$$\ln w = \ln A - \frac{\phi}{1 - \tau} \ln \delta_v + \ln \ell_Y + \frac{\mu\phi}{1 - \tau} \ln \ell_v, \quad (15)$$

$$\begin{aligned} \ln SWB = \ln H + \ln A + \ln \ell_Y - \frac{\psi}{1 - \beta} \ln \delta_f + \frac{\theta + \phi}{1 - \tau} \ln \delta_v \\ + \frac{\alpha\psi}{1 - \beta} \ln \ell_f + \frac{\mu(\theta + \phi)}{1 - \tau} \ln \ell_v. \end{aligned} \quad (16)$$

It should be noted that the decay rates of social ties (δ_f and δ_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 in logs and not in levels*. Thirdly, one has to account for a number of control variables, purged into H and A in equations (15)–(16) but highly relevant for explaining earnings and SWB.

5.1. Explaining earnings

As can be seen in Table 3, the partial elasticity of earnings with respect to bridging social capital (proxied by the number of friends with whom the respondent socially meets) is positive and statistically significant at the 10 percent significance level ($P = 0.0541$): a 1 percent increase in bridging social capital increases one's earnings by approximately 0.041 percent. This means that people in Poland tend to underinvest in bridging social capital and that if the model is correct, the Polish society is located in the increasing part of the inverse U-shaped curve shown in Figure 2. In line with the predictions of the theoretical model, the estimated elasticity of bonding social capital (proxied by the number of family members with

whom the respondent socially meets) 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: (i) inhabitants of greater cities and agglomerations earn more than those living in smaller towns or in the countryside; (ii) an additional year of schooling brings about around a 6.1 percent increase in private earnings (cf. Heckman *et al.* 2003); (iii) an additional year of experience at the current workplace increases earnings by around 0.3 percent;¹² (iv) older people earn more on average (even controlling for experience); (v) 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 of earnings with respect to hours worked is very low: on average, a 1 percent increase in hours worked is supposed to increase earnings by a mere 0.091 percent. This stands in sharp contrast to our model where wages move one-to-one with hours worked; one of the reasons 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 these simple OLS estimates are unbiased and have the smallest variance among all linear estimates because a series of subsequent diagnostic tests has shown that the problems of heteroskedasticity or endogeneity are negligible in the current case.

TABLE 3. Estimating log earnings by OLS; $n = 1570$

<i>Variable</i>	<i>Coefficient</i>	<i>SE</i>	<i>t-Statistic</i>	<i>P-Value</i>
Constant	5.34859	0.144595	36.9902	0.0000
Log friends	0.0407652	0.0211520	1.9273	0.0541
Log family	-0.0034028	0.0222018	-0.1533	0.8782
Log hours worked	0.0913715	0.0242160	3.7732	0.0002
Size of town ^a	-0.0929960	0.0088872	-10.4641	0.0000
Education ^b	0.0607568	0.0051327	11.8372	0.0000
Experience ^c	0.0032976	0.0016293	2.0240	0.0431
Age (in years)	0.0059091	0.0016797	3.5179	0.0004

^aSize classes in descending order: 1 = city 500,000+; 2 = city 200,000–500,000; ...; 6 = countryside.

^bYears of schooling.

^cYears of work at the current workplace.

12. 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.

The above presented model, though significant and meaningful, leaves 80 percent of the variance of log earnings unexplained ($\bar{R}^2 = 0.2$). This disappointing finding is due to the fact that our calculations are based on survey data (which introduces additional error) and that they neglect technological and capital-related aspects of the workplace.¹³

5.2. Explaining SWB

The second step is to explain subjective well-being of the individuals using as regressors 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 (16)). This will be done using 2SLS so that endogenous log earnings will be instrumented by theoretical values from an auxiliary model explaining log earnings.¹⁴ 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 4, the effect of bridging social capital is fully congruent with our expectations. It unambiguously increases SWB, also when controlling for the impact of earnings. Even more precisely, we find that bridging social capital pulls double duty here: (i) it helps increase earnings, but it also (ii) provides *additional* increases to SWB beside those obtained via increased earnings. Since a 1 percent increase in earnings brings about a 0.128 percent increase in reported SWB, a 1 percent increase in bridging social capital brings about a 0.018 percent direct increase in SWB plus an $0.041 * 0.128 \approx 0.005$ percent indirect increase via earnings. There are thus two separate active channels through which bridging social capital increases SWB.

Bonding social capital, proxied by the number of family members whom the respondent often socially meets, 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 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

13. Statistical details are available from the authors upon request.

14. The auxiliary 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.

TABLE 4. Estimating log SWB by 2SLS (endogenous log earnings instrumented by theoretical values from an auxiliary model), using standard errors robust to heteroskedasticity (HC1); $n = 1306$

<i>Variable</i>	<i>Coefficient</i>	<i>SE</i>	<i>t-Statistic</i>	<i>P-Value</i>
Constant	1.07451	0.186870	5.7501	0.0000
Log friends	0.0179255	0.0067059	2.6731	0.0075
Log family	0.0042079	0.0065470	0.6427	0.5204
Size of town ^a	0.0130551	0.0030954	4.2176	0.0000
Age (in years)	-0.0020048	0.0004362	-4.5957	0.0000
Sex (1 = Female)	-0.0326582	0.0084785	-3.8519	0.0001
Sick (1 = Yes)	-0.0843580	0.0158093	-5.3360	0.0000
Housewife (1 = Yes)	0.0535437	0.0279824	1.9135	0.0557
Log household size	0.0755261	0.0222778	3.3902	0.0007
Log earnings	0.1288540	0.0254309	5.0668	0.0000

^aSize classes in descending order: 1 = city 500,000 +; 2 = city 200,000–500,000; ...; 6 = countryside.

between SWB and bonding social capital to be found in the data. The null relationship which we find here means that in Poland, the level of investment in bonding social capital is in fact approximately optimal. This means that Poland is close to the summit of the inverse U-shaped curve and additional investments in bonding social capital might actually lower SWB instead of increasing it.

Turning to the control variables, we note 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 other control variables have expected signs, confirming the established findings of sociology (Wilson 1967; Rose 2000; Diener and Seligman 2002; Helliwell 2003). We omit the discussion of these results here to save space.

The current model explains only around 8.5–9 percent of the total variation of reported SWB. Given our estimation technique, it is robust, however, to heteroskedasticity and endogeneity problems. The Hausman test indicates ($P = 0.000$) that OLS estimates of the parameters of this model would be inconsistent and that using 2SLS is necessary.¹⁵

5.3. Magnitude of the effects

It is clear that our empirical results confirm all the principal cross-sectional predictions derived from the theoretical model. They also shed

¹⁵ Statistical details are available from the authors upon request.

light on the current state of the Polish society, indicating that Poles for sure underinvest in bridging social capital.¹⁶

On the other hand, one important characteristic of the results obtained herein is that the marginal effects of bridging social capital on earnings and SWB are actually quite modest. Our estimates indicate that a 1 percent increase in bridging social capital should increase earnings by as little as 0.041 percent, and SWB – by an even smaller total of 0.023 percent (direct impact plus indirect impact via earnings). This implies that even substantial increases in bridging social capital could not change the Polish economy and society too strongly. A remaining caveat is that our modest estimates – by construction – capture *private* returns to social capital only, while the additional *social* returns¹⁷ are in fact likely to be substantial, boosting the total effects.

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 in the model have been 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 in increasing earnings. 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 their effort will 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 low and then gradually increase over time (see Figure 1).

The second step was to derive testable steady-state predictions from the model. The theory suggests that there should be an unambiguously

16. In relation to our theoretical model, this result suggests that the Polish society consists primarily of ‘materialistic’ and ‘family-oriented’ individuals, indicating a generally low share θ of bridging social capital in SWB. See the alternative scenarios presented in Section 3.3.
17. By social returns to bridging social capital we mean several forms of externalities, i.e., non-anticipated or at least non-internalized additional effects affecting large fractions of the society, such as an improved sense of security, an increase in general trust, reduced transaction costs in trade, and reduced monitoring costs in trade and industry.

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 was to confront these predictions with real-world data. Using a cross-section survey data set from the Polish ‘Social Diagnosis’ program, we have shown that (i) bridging social capital is 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).

Our findings are in agreement with the earlier literature emphasizing the strength of family ties in Poland (Kääriäinen and Lehtonen 2006; Alesina and Giuliano 2007), quantifying the impact of social capital on labor market outcomes (Granovetter 1973; Lin 2001; Burt 2005), and discussing the relation between social capital and subjective well-being (Diener *et al.* 1999; Helliwell 2003). Our principal contribution to the literature is to capture the implications of a substantial underinvestment in bridging social capital, both in a theoretical model and in an empirical investigation applied to Poland. Obviously, 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 to their individual earnings. 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.

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