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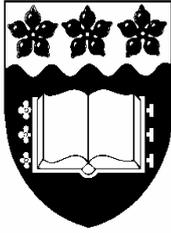
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Abstract: Sensitivity of sincere social communication to economic status disparity is incorporated into the construction of sincere social-capital index. The consideration of this index leads to the depiction of the happiness-wealth relationship as an inverted U-shaped curve that peaks at a larger than the average personal wealth. The deviation of the happiness-maximizing wealth from the community average is positively related to the ratio of the rates of return on wealth and sincere social capital and is compounded by the actual and desired community sizes and by the minimum sincere social capital associated with becoming the community's ultimate wealth holder.

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1. Introduction

With the accumulation of human and material capitals living standards have been improved over time. However, the improvements in living standards in recent decades have not been reflected in people's responses to happiness surveys (Easterlin, 1974; Diener et al., 1993; Graham and Pettinato, 2001).

One attempt to explain this anomaly is based on the notion of changing norms: absolute income levels matter when basic needs are unsatisfied, but above a certain level relative income differences matter more (Easterlin, 1974). Moreover, income may raise aspirations. From a certain level of income the possible positive direct effect of income-gains on happiness might be offset by the negative effect of the rising aspirations (Veenhoven, 1991).

A second explanation may be given by sensitivity to interpersonal economic status differences and rising inequality. This explanation is conceptually compatible with Sen's (1973) aggregate depression and Yitzhaki's (1979) aggregate relative deprivation interpretations of the Gini index[1] and empirically supported by Blau and Blau (1982), Kahn *et al.* (2000), Fiscella and Franks (2000), Muramatsu (2003) and Graham and Felton (2005).

A third explanation is suggested by Putnam's (1995, 2000) assertion of strong decline in social capital, which has diminished interpersonal communication and, in turn, happiness. This explanation is congruent with Maslow's (1954) and Schultz's (1966) argument that people have needs for inclusion and affection and with Berne's (1964) argument that interpersonal communication acts are attempts to satisfy these needs.

This paper combines the concept of social capital stressed by the second explanation with the notion of economic status sensitivity embedded in the third explanation. In agreement with Bourdieu's (1986) definition of social capital and Sobel's (2002) interpretation,[2] the paper considers the social capital of the individual member of the community and highlights a possible effect of *sincere* social capital on the relationship between happiness and wealth. The term sincere social capital is used in the paper to describe the ability of the individual to attain non-market-return-

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[1] See also Ebert and Moyes (2000) for an axiomatic characterization of Yitzhaki's index of individual deprivation.

[2] "An attribute of an individual in a social context". (Bourdieu, 1986, p. 241) An attribute describing the "circumstances in which individuals can use membership in groups and networks to secure benefits" to an extent that "depends on the person's connections, the strength of these connections, and the resources available to their connections." (Sobel, 2002, p. 139)

generating benefits—namely, inclusion and affection—through communication with members of the community. In contrast, the individual's ability to attain market-return-generating benefits through communication with members of the community is taken in this paper to be a component of the individual's human capital. The individual's human capital and material capital constitute in the proposed analysis the individual's wealth, which, in turn, determines the individual's economic status.

The analysis of the effect of sincere social capital on the relationship between happiness and wealth is based on the assumption that people have a need for inclusion and affection. This need had been formed over the period of millions of years in which human beings lived in cohesive communities of clans and tribes and hence it is inherent. The gratification of this need contributes to one's sense of happiness. It is gratified by sincere interpersonal communication.[3]

The analysis is also based on the assumption that sensitivity to differences in economic status affects interpersonal communication. In particular, it is assumed that sincere interpersonal communication is eroded by feelings of superiority, or inferiority, accompanying wealth (human capital and material capital) disparities. Hence, the accumulation of wealth by a poor person increases not only his/her market returns, but also his/her non-market aggregate returns from social communication. In contrast, while increasing market returns, the further accumulation of wealth by a rich person deepens the economic status gap between himself/herself and the majority of the members of his/her community and, in turn, diminishes his/her non-market aggregate returns from social communication. Sincere social capital is measured in the proposed analysis in a manner that facilitates the exposition of this possible indirect effect of wealth, thus the full effect of wealth, on the individual's level of happiness.

The analysis is structured as follows. The effect of wealth on its owner's sincere social capital is outlined in a greater detail in section 2. An index relating the individual's level of sincere social capital to the individual's wealth and also, as necessitated, to community size is constructed in section 3. The index of sincere social capital is then included in section 4 alongside wealth in the individual's portfolio of happiness-generating assets. If sincere interpersonal communication is

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[3] The relatively recent processes of commercialization, urbanization and industrialization have increased the average wealth, but possibly lowered the intensity and quality of sincere interpersonal communication. Indeed, mental depression is not confined to the lower band of the wealth distribution. Its prevalence in the upper band may reflect deprivation from sincere social communication.

sensitive to economic status disparities, the inclusion of sincere social capital in people's portfolios of happiness-generating assets theoretically leads not only to diminishing marginal happiness in wealth, but also to an inverted U-shaped relationship between happiness and wealth. The possible contribution of the inverted U-shaped happiness-wealth hypothesis to the explanation of phenomena such as wealthy-people's depression, segregation by wealth, publicized philanthropy, and non-optimality of wealth-equality is highlighted in the concluding section.

2. Economic status sensitivity, community size and sincere social capital

The formulation of the relationship between wealth and sincere social capital is based on the assumption that the quality and intensity of one's sincere interpersonal communication is adversely affected by economic status differences between one and one's community members. This assumption of *economic status sensitivity* is more broadly articulated as having the following components:

i.   wealth is visible and its distribution within the community is known;

ii.   the distribution of wealth within the community determines each member's economic status;

iii.   each community member feels inferior (superior) in the company of a community member with a higher (lower) economic status—the larger the economic status gap, the stronger these feelings;

iv.   the level (quality and intensity) of sincere communication between any two community members is adversely affected by each one's feelings of inferiority, or superiority, toward the other; and

v.   community members with similar economic status are likely to have mutual respect, similar lifestyle and common social circle that facilitate the development of a mutually sincere communication.

Consider a community of $i = 1,2,3,...,N$ members where, for computational simplicity, the distribution of the share of (human and material) wealth is normal. In this case, economic status sensitivity implies that the greater the difference between a member's wealth-share and the average wealth-share, the weaker the member's overall level of sincere social communication with the rest of the members of the community. In other words, an index of the *i*-th member's aggregate level of sincere social communication with the rest of the members of the community is negatively

related to the absolute, or quadratic, difference between his/her actual wealth-share (w_i) and the hypothetical equal wealth-share (*1/N*).

Along the positive spectrum of the economic status disparity ($w_i - 1/N > 0$) people are subjected to envy, strategic manipulation, deceitful behaviour and media intrusion. They are also subjected to resentment as their high-income-driven demand inflates the prices of normal goods disproportionably to their population share and makes these goods less affordable for lower income earners. The greater the individual's wealth-share deviation from the equal share, the more he/she encounters these adverse reactions and, in turn, the lower his/her aggregate non-market-return-generating benefits from sincere social communication.

Along the negative spectrum of the economic status disparity ($w_i - 1/N < 0$) people suffer from shame (cf. Kawachi and Kennedy, 1999; Murmatsu, 2003) and are subjected to stigma and marginalization. The greater the individual's relative poverty, the greater his/her shame, stigmatization and marginalization.

An individual sincere social capital index should encompass the entire hypothetical range of individual wealth-share, (0,1). The following arguments are made about the boundaries. Ultimate poverty ($w = 0$) might be experienced by more than one member of the community. In which case, an ultimate poor can enjoy the company of people in a similar condition. He/she may also receive sympathy from compassionate members of the community. In contrast, ultimate affluence ($w = 1$) is a condition experienced by a single member of the community. This ultimate rich receives utmost expression of hostility from the property-rights deprived *N-1* members of the community. Therefore, an individual sincere social capital index should reflect that the level of sincere social capital of an ultimate poor is greater than that of an ultimate rich.

An indirect effect of the community size is already introduced through the equal wealth-share term (*1/N*). To represent the full effect of the community size on the individual's sincere social communication it is necessary to take into account a possible direct effect. It is assumed that, in addition to being adversely affected by wealth disparity, the individual's ability to communicate sincerely is influenced by the number of people with whom he/she is bound to interact actively or passively. Up to an individually critical number, $\widetilde{N}_i$, a positive social agglomeration effect is

dominant. Beyond $\widetilde{N}_i$, crowding and congestion take over, and impersonalization (i.e., diminishing overall intimacy and trust) depreciates the individual's ability to communicate sincerely. This individually optimal (and desired) community size $\widetilde{N}_i$ may be larger (e.g., in small rural communities), or smaller (e.g., in large towns and cities), than the actual community size N.

3. Individual sincere social capital index

A sincere social capital index ($SSCI$) that reflects the aforementioned assumed effects of economic status sensitivity and community size on person i's sincere social communication is one that satisfies the following conditions:

i. $\dfrac{dSSCI_i}{d(w_i - 1/N)^2} < 0$ (i.e., $SSCI_i$ monotonically decreases with i's wealth-share deviation from the equal share),

ii. $\dfrac{dSSCI_i}{d(N - \widetilde{N}_i)^2} < 0$ (i.e., $SSCI_i$ monotonically decreases with the distance between i's actual and desired community sizes),

iii. $SSCI_i(w_i = 0) > SSCI_i(w_i = 1) \equiv SSCI_N^1$ for every $N > 1$ (i.e., the sincere social capital of i had he/she been an ultimate poor is greater than that had he/she been an ultimate rich),

iv. $0 \leq SSCI_i \leq 1$,

v. $SSCI_i(w_i = 1/N, N = \widetilde{N}_i) = 1$ (i.e., the sincere social capital level of i had he/she possessed the average wealth and lived in a community of his/her desired size is maximal),

vi. $SSCI_i(N = 1) = 0$ (i.e., interpersonal communication cannot exists in isolation),

vii. $SSCI_i(w_i = 1, N > 1) = SSCI_N^1 > 0$ (i.e., even an ultimate rich has some sincere social capital), and

viii. $\widetilde{N}_i > 1$ (i.e., solitude is not desired by i).

PROPOSITION 1: *An individual sincere social capital index satisfying conditions i-viii is:*

$$SSCI_i = 1 - \left[1 - SSCI_N^1 - \left(\frac{N - \tilde{N}_i}{1 - \tilde{N}_i} \right)^2 \right] \left[\frac{w_i - 1/N}{1 - 1/N} \right]^2 - \left(\frac{N - \tilde{N}_i}{1 - \tilde{N}_i} \right)^2 .$$

(The proof is by construction and is provided in Appendix A.)

Let W_i denote the absolute level of the individual's wealth and $\overline{W}$ the average (per capita) wealth in the community, then $\dfrac{w_i - 1/N}{1 - 1/N} = [(N-1)\overline{W}]^{-1}(W_i - \overline{W})$ and $SSCI_i$ can be equivalently expressed as:

$$SSCI_i = 1 - \frac{\left[1 - SSCI_N^1 - \left(\dfrac{N - \tilde{N}_i}{1 - \tilde{N}_i} \right)^2 \right]}{[(N-1)\overline{W}]^2}(W_i - \overline{W})^2 - \left(\frac{N - \tilde{N}_i}{1 - \tilde{N}_i} \right)^2 . \tag{1}$$

4. Inverted U-shaped relationship between happiness and wealth

While utility indicates satisfaction from the consumption of goods, happiness further reflects the satisfaction from the non-pecuniary returns on sincere social capital. That is, it is postulated that the individual's happiness is derived from the return on his/her portfolio of wealth and sincere social capital. The return on wealth indicates the individual's consumption and saving possibilities. The return on the individual's sincere social capital is equal to the individual's monetary appreciation of the non-market-return-generating benefits from the aggregate messages and acts of inclusion and affection received from his/her community.

Let the positive scalars r_w and r_{s_i} denote the rates of return on material wealth and sincere social capital, respectively. Since the ability of the individual to attain social benefits is restricted by construction to be within the unit interval ($0 \le SSCI_i \le 1$), r_{s_i} can be further interpreted as the maximal non-market-return-generating benefits from interacting with the rest of the members of his/her community. Correspondingly, $SSCI_i$ is the realized portion of these maximal benefits.

While r_w is determined by market forces, r_{s_i} is individualistic and reflects the effects of personal and community characteristics.

As expressed by the following second-order polynomial, the total return on the i-th individual's portfolio of wealth and sincere social capital (the latter is given by (1)) can be concentrated on wealth:

$$R_i = r_w W_i + r_{s_i} SSCI_i = r_{s_i}(1 - \phi_i \overline{W}^2) + (r_w + 2r_{s_i}\phi_i\overline{W})W_i - r_{s_i}\phi_i W_i^2 - r_{s_i}\left(\frac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2 \quad (2)$$

where,

$$\phi_i = \frac{\left[1 - SSCI_N^1 - \left(\frac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2\right]}{[(N-1)\overline{W}]^2} > 0. \quad (3)$$

PROPOSITION 2: *If the individual's level of happiness increases with the return on the individual's portfolio of wealth and sincere social capital, there exists an inverted U-shaped relationship between happiness and wealth.* (Straightforward from the second order polynomial (2).)

As displayed by Figure 1, an inverted U-shaped relationship implies that wealth (material and human capitals) accumulation does not always lead to greater happiness. Up to $W_i = 1/N$, sincere social capital increases and complements wealth in generating happiness. Beyond a certain level of wealth, $W_i^* > \overline{W}$, the negative indirect marginal effect of wealth on happiness (through the erosion of sincere social capital) exceeds its positive direct marginal effect. This happiness-maximizing level of wealth is given by:[4]

$$W_i^* = \overline{W} + \frac{r_w}{2r_{s_i}}\left[\frac{(N-1)^2\overline{W}^2}{1 - SSCI_N^1 - \left(\frac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2}\right]. \quad (3)$$

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[4] $R_i'(W_i^*) = 0$.

This equation straightforwardly leads to the following proposition.

PROPOSITION 3: *The individual's happiness-maximizing wealth is larger than the average wealth in the community. The desired extra wealth is positively related to the ratio of the rates of return on wealth and sincere social capital. The effect of this ratio is compounded by:*

> *1. the average wealth in the community,*
>
> *2. the actual size of the community,*
>
> *3. the individual's desired size of community, and*
>
> *4. the level of sincere social capital associated with potentially becoming the ultimate wealth holder.*
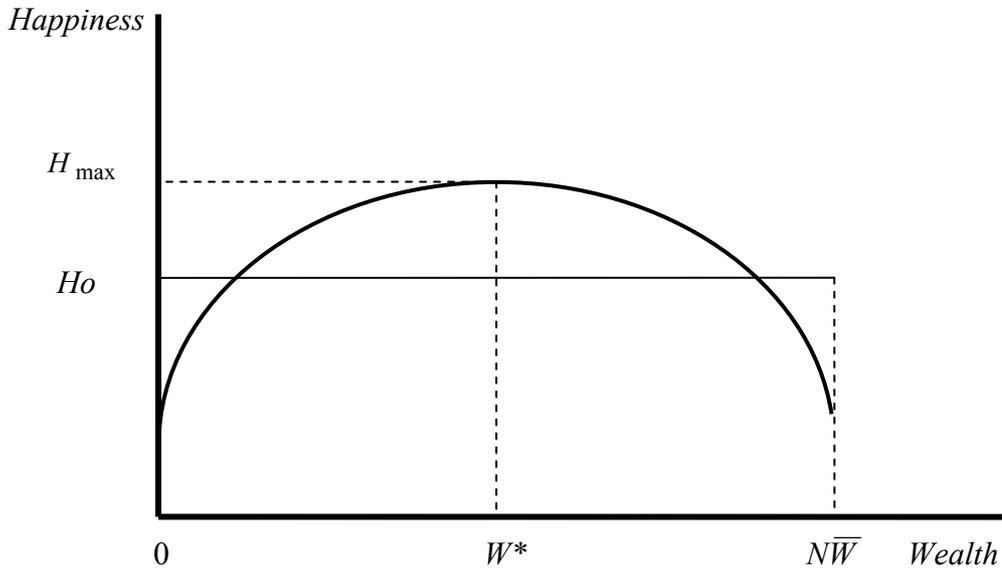

Figure 1. The inverted U-shaped happiness curve

5. Concluding remarks

By focusing on the role of wealth and assuming that sincere social communication between any two individuals is adversely affected by their economic status disparity, the paper constructs an index of individual sincere social capital. By considering the sum of the returns on wealth and individual sincere social capital, an inverted U-shaped relationship between happiness and wealth is proposed for people with economic status sensitivity. As material affluence exceeds a critical level, deprivation of an adequate level of sincere social communication, which is necessary for gratifying needs for inclusion and affection, becomes paramount and happiness is

diminished. This inverted U-shaped relationship may provide some explanation to four phenomena and may imply several testable hypotheses.

A notable phenomenon is a prevalent, neither accidentally nor genetically caused, depression within the group of wealthy people. It is possible that when the individual's happiness level is persistently lower than a mentally accommodating threshold (say H_o in Figure 1) the individual is depressed. In the case of wealthy people, in particular, a persistently low level of happiness is due to a strong deprivation (i.e., low quality and intensity) of sincere social communication. As indicated by the inverted U-shaped curve, people located in the lower and upper tails of the wealth-spectrum are vulnerable to depression. The closer they are to the extremities of the poverty/affluence spectrum, the greater their deprivation of sincere social communication with the majority of the community members and, in turn, the likelihood and depth of their depression. An implied testable hypothesis is that depression is not only more prevalent within the group of people in the lower tail of the wealth distribution, but also beyond a critical level of wealth in the upper tail. A related phenomenon is the formation of exclusive clubs and neighbourhoods for improving wealthy people's opportunities to develop sincere social communication and for minimizing their exposure, and increasing their resilience, to adverse reactions.

Another phenomenon is non-anonymous, rather heavily publicized, donations to public projects. (In contrast, true philanthropy is anonymous.) An inverted U-shaped relationship between happiness and wealth implies that even a non-philanthropist i with wealth $W_i > W_i^*$ can increase his/her happiness by restructuring his/her portfolio of material and sincere social assets. Recalling the individual sincere social capital index, a non-anonymous donation is a wealthy person's investment in sincere social capital, whose expected returns are greater levels of inclusion and affection. The optimal donation is the excessive, futile and harmful material wealth: $W_i - W_i^*$. In this respect, the happiness-maximizing wealth equation suggests the following testable hypotheses. The size of the donation decreases with the ratio of the rates of return on wealth and sincere social capital. The larger the average wealth and size of the community, the greater the donation-moderating effect of this ratio.

An ego complex of being above the average (but not a disliked and excluded tall-poppy) is also a notable phenomenon. Although the individual's sincere social

capital is eroded by material-wealth-disparities, the inverted U-shaped relationship reveals that wealth-equality is not desired by happiness-maximizing people. Yet, the lower the ratio of the rate of return on material wealth to the rate of return on sincere social capital, the smaller the gap between the happiness-maximizing wealth, W_i^*, and the equal, sincere social-capital-maximizing wealth, $\overline{W}$.

Appendix A: Individual sincere social capital index

The construction of the individual sincere social capital index is commenced by considering a convenient specification that satisfies conditions i, ii and v:

$$SSCI_i = 1 - \delta_i(w_i - 1/N)^2 - \mu_i(N - \widetilde{N}_i)^2 \tag{A1}$$

where δ_i and μ_i are positive scalars indicating the marginal depreciation effects of the deviation of the wealth-share of member i from the equal share and the deviation of the community-size from his/her desired size $\widetilde{N}_i$, respectively. The magnitudes of these marginal effects depend on personal virtues and circumstances. By imposing condition vi on this specification:

$$\mu_i = \frac{1}{(1 - \widetilde{N}_i)^2}. \tag{A2}$$

By imposing this result and condition vii on (A1):

$$\delta_i = \frac{1 - SSCI_N^1 - \left(\dfrac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2}{(1 - 1/N)^2}. \tag{A3}$$

To ensure that δ_i and μ_i are positive, the following condition must be fulfilled:

$$1 < \widetilde{N}_i < \frac{N}{\sqrt{1 - SSCI_N^1}} - 1. $$

That is, person i neither remains in seclusion nor stays in a community whose size is larger than $\sqrt{1 - SSCI_N^1} + \left[1 - \sqrt{1 - SSCI_N^1}\right]\widetilde{N}_i$. When this condition is obeyed, the individual social capital index is given by:

$$SSCI_i = 1 - \left[1 - SSCI_N^1 - \left(\frac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2\right]\left[\frac{w_i - 1/N}{1 - 1/N}\right]^2 - \left(\frac{N - \widetilde{N}_i}{1 - \widetilde{N}_i}\right)^2. \tag{A4}$$

This expression further satisfies conditions iii and iv.

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