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Are Happier People Better Citizens?

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I INTRODUCTION

Happiness plays a key role in individual behavior (Frey and Stutzer 2002). Happiness has been found to increase personal income and health (Graham et al. 2004). Studies using both regional and country-level data, have also shown that measures of social capital and trust are strongly *correlated* with happiness (Bjrnskov 2003; Hudson 2006; Helliwell 2006). For instance, social conflicts are related to lower wellbeing (Welsch 2008). Findings from the psychology literature also suggest that happier people smile more often during social interactions; are more prepared to initiate social contacts; are more inclined to respond to requests for help; and are more likely to exhibit positive morale (Frank 1999). Dunn and Schweitzer (2005) find that emotions, and specifically happiness, are significantly and positively correlated with trust in experimental settings.

'The pursuit of happiness' is explicitly mentioned in the American Declaration of Independence. The Kingdom of Bhutan also endeavors to maximize the 'Gross National Happiness', as a macroeconomic aggregate. But, does happiness really pay for the society? For instance, do happy individuals more frequently engage in volunteer activities than unhappy ones? We know that too much unhappiness can lead to undesired outcomes. Is it possible that being 'too happy' can lead to such negative outcomes for an individual and for the society as a whole? There might as well be a desired level of happiness which leads to good behavior and good citizenship. Hence, maximizing 'Gross National Happiness' may lead to having very happy individuals who would create less social capital.

This paper attempts to answer an interesting but empirically challenging question: Do changes in self-reported well-being (life satisfaction or happiness) lead to changes in social capital? To date, it has been well-established in the

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literature that well-being and social capital are significantly correlated with each other. The objective of this paper, however, is to establish a stronger relationship, i.e., stronger than simple correlation, between happiness and social capital, which is always a difficult task given the usual endogeneity related problems applied researchers face. It is near impossible to think of an exogenous shock that affects social capital only through its impact on self-reported well-being. In terms of causality, the best approach would be a randomized experiment. However, a true experiment with randomized life-happiness might not give the desired outcomes. Experimental-induced happiness does not last long and it is very hard to imagine such an increase in happiness to have life-lasting effects, especially on social capital behavior. Instead, the best possible approach will be what the medical researchers would call a prospective study. This methodology is mainly used to predict health outcomes with early life experiences. Adopting this approach, this paper looks at people's characteristics in 1984, and ask: do those characteristics help us to predict who will create more social capital in 2007? There is an extensive literature on prospective studies, summarized in long meta-analysis review papers by Chida and Steptoe (2008) and Pressman and Cohen (2005).

One objection to the prospective-study methodology can be the following: happiness in the initial year is not exogenous and therefore it is wrong to impute causality, no matter how potentially interesting the coefficient on happiness is in a social capital equation as we have in this paper. We think there is much to be said for prospective studies, even though we cannot claim here, of course, that happiness is randomly assigned and exogenous. But it is sensible, in our judgement, to (i) avoid bold causal statements and thus (ii) to be cautious throughout the paper, and (iii) to emphasize simply that our findings are consistent with there being some deep link between well-being today and the likelihood of creating more social capital tomorrow.

One issue in our exercise would be the potential endogeniety of happiness. Happiness today may probably be just a reflection of other variables today such as income, so it is not surprising that happiness predicts social capital of the person tomorrow. A fairly good objection to that - it is impossible to defeat it completely without a giant experiment where human happiness is randomized - is two-fold: (i) we use predicted residual happiness (happiness which is unrelated to individual characteristics) from the initial year to predict social capital outcomes two decades later. An important point here to note is that, many of these control variables in the estimation are not fixed (such as marital status, household income, subjective health) but change over the life cycle of a person, especially over long periods such as 20 years. Hence, this shows that we are not estimating the same equation in the initial year and later in life. (ii) When we control for the social capital in the initial year, the coefficient on happiness is barely affected and appears to be very similar during stages of

life-cycle. In other words, the predictive power of people's expressed feelings about their own happiness have a much stronger effect statistically than one can reasonably expect.

The following findings also support our hypothesis: (i) there is an inverted-U shape effect of happiness on social capital which has not been shown before at the individual-level. If there is reverse causation running from social capital to happiness, this should mean that social capital leads to decreases in well-being after a threshold level. The latter is not supported with the current findings, however. The literature offers many explanations for the former, though (ii) the very-long aspect of the data allows us to calculate transitions from the initial year to two decades later. Happiness is much less persistent than social capital variables, which also supports the suggested direction of linkage.

The paper uses the German Socio-Economic Panel (GSOEP), which spans the period 1984 to 2007, and unlike most other longitudinal studies, the GSOEP monitors the indicators of social capital every year.[1] We show that there is a deep link between happiness and social capital. For instance, happier people at the beginning of the survey are found to trust others more twenty years later. And this link appears to be non-linear which can have very important implications for future research. For instance, how will the change in gender ratio effect social capital through happiness? Or how do increasing income levels around the world affect social capital? The influence of these variables on social capital through happiness will be a very fruitful area of research in the future.

As a second contribution, the paper investigates possible underlying factors as to why happiness matters for social capital. The analysis shows that optimism is an important channel linking well-being and social capital. Following the second contribution, the paper finds that predicted residuals from an OLS happiness regression are the strongest predictor of optimism. This finding can create an invaluable opportunity for empirical researchers. Individual optimism is not available in most cross-section and longitudinal data, and research in the area of optimism mostly uses experimental data or specific datasets with low number of observations. However, most survey data have life satisfaction or happiness measure together with other individual characteristics.[2] Hence, one can easily calculate residual happiness in these datasets and can use them as a variable that is highly correlated with optimism.

The rest of the paper is organized as follows. Section 2 provides an overview of the economic literature on well-being and social capital. Section 3 discusses

1. Durlauf (2002) argues that aggregation is a problem in studies which use regional or national social capital measures because of interpersonal externalities. This paper overcomes this problem by using individual-level data.
2. Some of these datasets are the following: German socio-economic panel, British household panel study, DNB household survey from Netherlands, HILDA survey from Australia, the U.S. General Social Survey, World Values Survey, and Euro-barometer.

the data and the construction of the variables used in the paper. Section 4 presents the basic framework and the estimation strategy, while Section 5 presents the empirical findings of the paper. Finally, Section 6 concludes.

II RELATED LITERATURE

Social capital is very important for many reasons. Social capital has been found to be strongly correlated with economic freedom (Berggren and Jordahl 2006) and economic development (Sabatini 2008). It may improve household welfare by enabling families to smooth their consumption (Jacob 2007); may cause growth through innovation (Ter Weel and Akcomak 2009) and higher levels of investment (Knack and Keefer 1997); can even affect stock market participation (Zingales et al. 2005). At the same time, certain aspects of social capital are widely perceived to be beneficial for the economy, particularly in terms of its potential to decrease transaction costs, and encourage cooperative behavior and trust (Zingales et al. 2004).

The concept of happiness has been a major research area in economics recently. Some of the recent findings are as follows. Relative income matters for happiness (Clark et al. 2008) and relative income may relate to happiness through sociability (Becchetti et al. 2008). The level of education bears little relationship with happiness. Education may contribute to happiness indirectly by allowing a better adaptation to changing environments, but it also tends to raise aspiration levels (Ferrante 2009). See Frey (2008) for a survey of literature and other recent findings on happiness.

III DATA

Happiness is a categorical variable, taking values between 0 and 10 (where 0 is totally unhappy and 10 is totally happy), and is available for every year in the survey. The paper considers the sample of people who were interviewed in 1984 from West Germany and for a robustness check, the paper also employs the post-1992 panel, which includes 12726 people from West-Germany and 5780 people from East-Germany. The income variable is the real monthly total household income. The annual number of doctor visits is used as the measure of health which is available for every year. Measures of trust are available in 2003, and in addition, very importantly, the frequency of volunteer work, attendance at cultural events, attendance at social gatherings, involvement in local politics, attendance at religious events, and involvement in community events are monitored every year between 1984 and 2007. Attachment to neighborhood is available for every year from 1991 to 1999.

GSOEP also includes information on individual optimism, which is available for the years 1999 and 2005. Optimism is a categorical variable, take the values 1–4, where 4 is totally optimistic, 3 is more optimistic than pessimistic, 2 is more pessimistic than optimistic, and 1 is totally pessimistic. The following is a list of the measures of social capital used in the paper: (1) attachment to neighborhood, (2) attendance at community events, (3) attendance at religious events, (4) attendance at cultural events, (5) desire to vote, (6) helping others, (7) membership of organizations, (8) respect for law and order, (9) social participation, (10) volunteer work, (11) Five different measures of trust— 1: on the whole do you trust people, 2: nowadays can't trust anyone, 3: caution when dealing with strangers, 4: most people are exploitive or fair, 5: most people are helpful or act in own interest.

IV EMPIRICAL FRAMEWORK

We would like to predict social capital in 2007 by the happiness level at the starting year of the survey. When we study the effect of initial happiness on social capital later in life say at time t controlling for individual characteristics at time t, there is an endogeniety problem. For instance, happiness is a function of gender in 1984. Hence, initial happiness will also be a function of gender in 2007. In order to solve this endogeniety problem, we do the following: we estimate an OLS[3] happiness regression in the initial period with the right hand side variables including gender, age, age-squared, health status, real household income, marital status, work status, years of schooling, household size, and the number of children. Then, we calculate the residuals from this regression and use the predicted residual happiness as a predictor of social capital later in life. It must be noted that the predicted residuals would solve the endogeneity problem if they were obtained from a cross-sectional model rather than a panel model. The residuals in a panel model are correlated over time and can not be used to solve reverse causation. The following cross-sectional model of happiness is estimated to retrieve the residuals:

$$Happiness^{*}_{i,1984} = \phi X_{i,1984} + \xi_{i,1984},$$

where the column vector $X_{i,\,1984}$ includes individual-specific variables in 1984, ϕ is a row vector of coefficients, and ($\xi_{i,\,1984}$) are the residuals which are *unrelated* to the individual characteristics ($X_{i,1984}$).

3. Since happiness is a categorical variable which is ordered in nature, the usual method of estimating the model is ordered probit. However, the coefficients and t-statistics from OLS appear to be quite similar to those from the ordered probit.

The paper next examines the impact of predicted residual happiness from the initial year on social capital outcomes later in life. For instance,

$$Socialcapital^{*}_{i,2007} = \phi X_{i,2007} + \hat{\xi}_{i,1984} + \zeta_{i,2007},$$

where the column vector $X_{i,2007}$ includes individual-specific variables and ϕ is a row vector of coefficients. Importantly, $X_{i,2007}$ are the variables mentioned above, such as marital status, health indicators, etc., which are not fixed over time but may change dramatically during the life cycle. $Socialcapital^{*}_{i,2007}$ is the level of social capital in 2007, and $\hat{\xi}_{i,1984}$ is the predicted residual happiness from 1984.

V EMPIRICAL RESULTS AND ROBUSTNESS

Table 1 reports the coefficients from an OLS regression of self-reported happiness (0–10) on the usual determinants for the years 1984 and 2005. The residuals from the OLS regression then is used as the explanatory variable in our estimation.

Table 1

The correlates of happiness in 1984 and 2005

Dependent Variable	Self-reported happiness			
	OLS			
Independent variable	1984		2005	
	Coefficient	*t*	Coefficient	*t*
age	− 0.03*	3.5	− 0.07**	13.4
age-squared	0.37**	4.5	0.75**	13.88
education years	0.02*	2.3	0.03**	5.2
household size	− 0.23**	9.2	− 0.31**	16.8
log income	0.65**	13.4	0.95**	32.0
children	0.19**	5.9	0.25**	10.7
female	0.23**	5.0	0.16**	5.7
working part-time	− 0.21*	2.2	0.01	0.2
vocational training	0.34*	2.9	0.25*	2.5
irregular part-time	− 0.41*	3.2	− 0.12	1.8
not working	− 0.31**	5.9	− 0.21**	5.8
married	0.29**	4.2	0.16**	3.4
annual doctor visits	− 0.02**	13.1	− 0.02**	20.5
R-squared	0.06		0.12	
Observations	10814		18078	

Notes: The regression of happiness on individual characteristics in 1984 and 2005. Happiness takes values 0–10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Full-time working, divorced, and male are omitted categories. *t* denotes *t*-statistics.
**, *denotes 1% and 5% significance respectively.

A The link from happiness to social capital

Table 2 investigates the effect of happiness on different measures of personal trust using the same empirical strategy explained above. However, we can not control for the initial level of trust, since trust variables are available for only one year (2003). The results show that a one percent increase in '1984 residual

Table 2

The impact of happiness on trust

Dependent Variable: Measures of trust in 2003				
Independent variable:	Residual happiness 1984		Residual happiness 1992	
	Marginal Prob.	*t*	Marginal Prob.	*t*
residual happiness as a continuous variable				
1) On the whole trust people	0.12**	4.6	0.19**	8.6
2) Nowadays can't trust anyone	− 0.09**	3.9	− 0.17**	8.5
3) Caution when dealing with strangers	− 0.09**	4.1	− 0.04*	2.1
4) Most people are fair or exploitive	0.25**	5.3	0.36**	9.2
5) Most people are helpful or act in own interest residual happiness as categorical variable	0.19**	4.2	0.26**	7.1
6) On the whole trust people second quantile	0.58**	3.9	0.41*	3.4
third quantile	0.51*	3.4	0.71**	5.9
fourth quantile	0.52*	3.4	0.92**	7.6
7) Nowadays can't trust anyone				
second quantile	− 0.49*	3.6	− 0.45**	4.6
third quantile	− 0.45*	3.3	− 0.67**	6.9
fourth quantile	− 0.40*	2.9	− 0.75**	7.7
8) Caution when dealing with strangers				
second quantile happiness	− 0.26*	2.1	− 0.12	1.4
third quantile happiness	− 0.47**	3.8	− 0.17*	1.9
fourth quantile happiness	− 0.37*	3.0	− 0.17*	1.9
9) Most people are fair or exploitive				
second quantile happiness	0.59*	3.3	1.11**	8.7
10) Most people are helpful or act in own interest				
second quantile happiness	0.50*	2.9	0.69**	5.6
Number of observations	3178		6429	

Notes: Each row reports the estimates for various outcomes. The residual happiness in 1984 (1992) is the residuals after the basic happiness regression in 1984 (1992) in Table 1. All other independent variables are from 2003. Rows 1–5 report the estimates when residual happiness is used as a continuous independent variable, and rows 6–10 those when it is used as a categorical variable (split into four quantiles where the first quantile is the omitted category). The dependent variables are the categorical variables: (1–3) 1=totally disagree, 2=disagree slightly, 3=agree slightly, 4=totally agree; (4) 0 or 1; (5) 0 or 1. Marginal Prob. is the effect of a one unit increase in happiness on the predicted probability of the outcome (calculated at the second outcome for the regressions 1–3), multiplied by 10. Control variables: age, age-squared, labor force status, years of schooling, annual doctor visits, number of children, real household income, household size, gender, and marital status. *t* denotes *t*-statistics.
**, *denotes 1% and 5% significance respectively.

happiness' leads to a 12 percent increase in the probability of being in the 'slightly trusting' category (second choice). This implies that there is deep link between happiness at the starting year of the survey and personal trust twenty years later. Another measure of trust is the answer to the question whether one shows caution dealing with strangers. Happier people are found to be less cautious dealing in strangers, with a *t*-statistics of 4.1. It is found that, on the whole, happier people believe that most people are fair (not exploitative) and most people are helpful (do not act in their own interest). We use other measures of social capital such as the 'desire to vote' as outcome variable in the Appendix and our results are robust to the use of these measures. These findings suggest that happiness at very early stages of life can help us predict personal trust even two decades later.

An important observation here is that the effect of happiness on social capital is not linear. We transform residual happiness in to quantiles depending on the outcome measure. For instance, the coefficient on the quantiles are -0.26, -0.47, -0.37, respectively when the outcome measure is caution dealing with strangers. The relationship is not only non-linear but also is inverted U-shape. We also consider using the residuals from 1992 in the same table as a predictor. Four important observations are the following: (i) non-linearity and inverted U-shape is also present (ii) the coefficients on the 1992 panel are higher (iii) the choice of base year for happiness does not change our results (iv) even though we can not control for year fixed effects, (iii) implies that temporary shocks do not change our results.

B Controlling for initial level of social capital

The results above will not be convincing if there are omitted variables correlated with social capital and are fixed over time. Therefore, in Table 3, we control for the level of social capital in the initial year. This will help us in a degree to control for omitted fixed effects which can bias our estimates. Social capital in the initial year is a function of fixed individual characteristics (for instance, gender) in the initial year. Having social capital from the initial year together with individual characteristics can create multi-collinearity and hence bias our estimates. However, we find that this is not the case. (i) the correlations between predicted residual happiness from 1984 and the measure of social capital used in the estimation are less than 0.2[4] (ii) When we look at the coefficients on happiness with and without controlling for initial social capital, we observe that they do not change much. (iii) unreported R-squared also confirm this hypothesis. If there is multi-collinearity, we expect to have a few significant variables and a high R-squared. The unreported control variables are found to be very significant and pseudo R-squared is less than 0.1.

4. Correlation is calculated with alpha command in STATA. It computes interim correlations (covariances) and Cronbach's alpha between any two variables where one or both of them can be categorical variables.

Table 3

The impact of happiness on social capital: 1984 Panel

Independent Variable:	Residual happiness 1984					
Dependent variable:	social capital measures in 1992		social capital measures in 1999		social capital measures in 2007	
	Marginal Prob.	*t*	Marginal Prob.	*t*	Marginal Prob.	*t*
no control for initial value						
1) volunteer work	0.05**	5.8	0.06**	6.2	0.05**	3.8
2) attend community events	0.05**	5.6	0.05**	4.2	0.05*	2.9
3) attend cultural events	0.06**	3.8	0.05**	4.2	0.05*	2.8
4) social involvement	0.05*	3.2	0.05*	2.2	0.05*	2.0
5) attend religious events	0.03**	5.5	0.03**	4.9	0.02*	2.7
6) neighborhood attachment	0.07**	6.6	0.03**	5.7		
control for initial value						
7) volunteer work	0.04**	4.7	0.05**	4.8	0.03*	2.4
8) attend community events	0.04**	4.9	0.05**	3.8	0.04*	2.4
9) attend cultural events	0.05*	2.9	0.03*	3.4	0.04*	2.3
10) social involvement	0.03	1.8	0.04	1.7	0.04	1.7
Number of observations	5859		4073		2401	

Notes: Each row reports the estimates for various outcomes. The residual happiness in 1984 is the residuals after a basic happiness regression in 1984. The estimates are the marginal probabilities of residual happiness. Rows 1–6 show the estimates without controlling for the initial values of social capital, while rows 7–10 show the estimates controlling for the initial values of social capital. The dependent variables are the categorical variables which take values of 1–4. Marginal Prob. is the effect of a one unit increase in happiness on the predicted probability of the outcome (calculated at the second outcome), multiplied by 10. Control variables: age, age-squared, labor force status, years of schooling, annual number of doctor visits, number of children, real household income, household size, gender, and marital status. *t* denotes *t*-statistics.
**, *denotes 1% and 5% significance respectively.

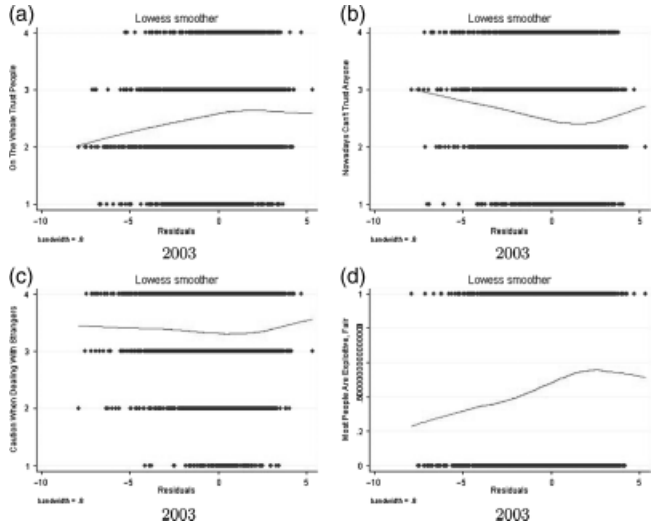
Another observation is that: (i) the effect of happiness at the starting year of the survey can predict social capital in 1992, 2000, and 2007 as well. This imply that permanent shocks such as German unification do not change our results. (ii) the coefficients on happiness are very similar during life-cycle. This might imply that happiness gathered very early during the life cycle is having very long-lasting effects on social capital. For instance, the coefficient on initial happiness on the frequency of volunteer work is 0.05, 0.006, and 0.005 respectively in years 1992, 2000, and 2007. Another issue here is that the number of observations decline towards the end of the survey. To deal with attrition, we weight our observations with the inverse of the longitudinal staying probabilities provided in the data and results are robust to this specification.

C Inverted U-shape link between well-being and social capital

As shown in Table 2, the relationship between residual happiness and social capital is not linear (the coefficients of different happiness quantiles

Figure 1

Non-linear linkage from happiness to trust

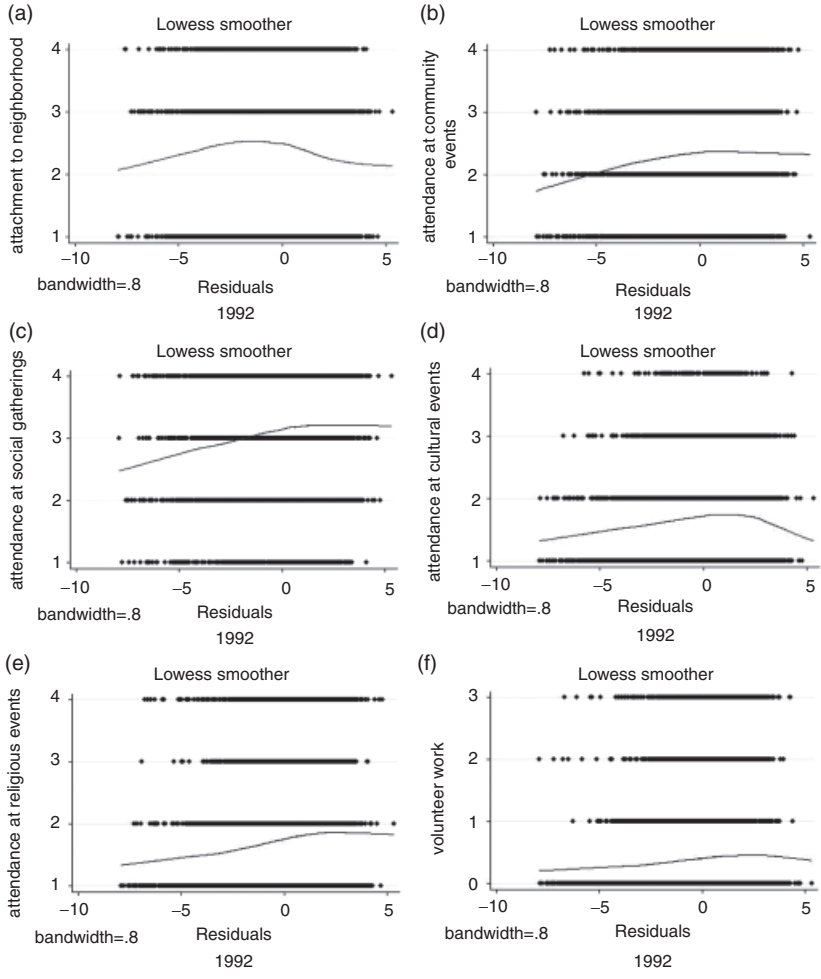


are different). We investigate the shape of this relationship in two ways. First, we use nonparametric estimation techniques (lowess in this analysis). Figure 1 shows that there is an inverse U-shaped relationship between trust measures in 2003 and residual happiness in 1984. The same relationship is found for the other measures of social capital in Figure 2 as well. Second, we confirmed the findings above with unreported parametric regressions. We use the absolute value of the predicted residuals as an estimator and find that the coefficient on this variable is negative. This suggests that extreme values of happiness decrease social capital. We also create a dummy variable which takes the value 1 if predicted residuals are positive and 0 if it is negative. We find a positive coefficient on the dummy variable. These analysis confirm the inverted U-shaped finding in the non-parametric analysis.

The inverse U-shaped relationship between social capital and happiness might suggest that, on average, too much happiness and too much unhappiness are both costly for the society, leading to lower social capital. In line with this finding, Puri and Robinson (2007) finds that extremely optimistic people are less likely to pay back their credit card debts. They find that the differences between optimists and extreme optimists are remarkable, and suggest that over-optimism, like overconfidence, may in fact lead to behaviors that are unwise.

Figure 2

Non-linear linkage from happiness to social capital



D Residual happiness as an indicator of optimism

The evidence suggests that there are persistent difference in happiness across individuals in Germany, which lead to differences in social capital. Psychologists attribute such differences to optimism or self-esteem. However, due to a lack of data, this has not been studied extensively in the economics literature. In the GSOEP, respondents are asked about their view on life and the future in general in 1999 and 2005. Table 4 show that residual happiness is the strongest

Table 4

Can optimism explain persistent cross-sectional differences in happiness

	Ordered Probit			
Dependent Variable	Optimism in 1999		Optimism in 2005	
Independent variable:	Marginal prob.	*t*	Marginal prob.	*t*
residual happiness 1984	0.21**	8.3	0.97**	6.0
age	− 0.09*	3.0	− 0.06	0.2
age-squared	0.01*	2.3	0.01	0.5
education years	0.01	0.5	0.23	1.6
household size	− 0.27**	3.8	− 0.31	1.9
log income	0.38*	2.8	0.29*	3.6
children	0.28*	2.8	0.14*	2.1
female	0.09	0.7	0.08	1.2
working part-time	− 0.25	1.3	0.14	1.1
vocational training	0.25	1.7	0.23	0.1
irregular part-time	− 0.27	0.9	− 0.05	0.3
not working	− 0.32*	2.1	− 0.33*	3.4
married	0.29	1.3	0.16*	2.6
annual doctor visits	− 0.02**	8.2	− 0.08**	4.9
R-squared	0.03		0.03	
Number of observations	4193		2908	

Notes: The residual happiness in 1984 is the residuals from a basic happiness regression in 1984. Other independent variables are from 1999 and 2005. Optimism takes values 1–4 (4=totally optimistic, 1=totally pessimistic). Log income is the log of real monthly household income. Self- reported health takes values 1–5, and is treated as a continuous variable. Full-time working, divorced, and male are omitted categories. Marginal Prob. is the effect of a one unit increase in happiness on the predicted probability of the outcome (calculated at the second outcome), multiplied by 100. The marginal probabilities of log income, children, and labor force are multiplied by 10. *t* denotes *t*-statistics.
**, *denotes 1% and 5% significance respectively.

predictor of optimism in 1999 and 2005. Marginal probabilities suggest that a one unit increase in residual happiness increases the probability of being 'optimistic' by 0.02 in 1999 and 0.09 in 2005.

Table 5 shows that residual happiness, on average, is positive for optimistic people, and becomes more positive as the level of optimism increases. However, residual happiness is negative for pessimistic people, and becomes more negative as pessimism increases. Positive and negative residuals can be interpreted as follows: some people are 'happier' than expected, with the indication being that these people are 'optimistic'. However, some people are associated with negative residuals, which implies that they are 'less happy' than expected—hence they are 'pessimistic'. This interpretation of residual happiness is also supported by the findings in Table 4. An important observation here is that residual happiness can predict optimism better in later stages of life although the R-squared are nearly the same.

Table 5

Is residual happiness an indicator of optimism

	1999		2005	
	number of observations	mean residuals	number of observations	mean residuals
totally optimistic	3503	0.70	3546	0.80
more optimistic than pessimistic	5911	0.07	8560	0.25
more pessimistic than optimistic	2495	− 0.79	4859	− 0.66
totally pessimistic	473	− 1.91	1035	− 1.65

Notes: This table shows averages of residual happiness in 1999 and 2005 for different levels of optimism. Residual happiness is the residual of a basic happiness regression in the corresponding year. Optimism takes values 1–4 (4=totally optimistic, 3=more optimistic than pessimistic, 2=more pessimistic than optimistic, 1=totally pessimistic). − 1.91 means that the average of residuals from the happiness regression in 1999 is − 1.91 therefore indicates that 473 people who are totally pessimistic.

The finding above offers a new tool for empirical researchers who would like to measure optimism in various datasets. Although an exact question on optimism does not exist in most survey data (or it exists only for a couple of years in some longitudinal data), one can easily calculate residual happiness in these data. Life satisfaction or happiness is available in most longitudinal data together with other characteristics. Hence, this will provide a measure of optimism which is available for many individuals over many years. We hope this interpretation of residual happiness will facilitate research on optimism.

E Robustness

One may argue that the happiness-social capital relationship may be affected by the health conditions of individuals (and in addition, happiness may itself be affected by health). The results (unreported) are robust to controlling for various health measures available at different frequencies (i.e., annual doctor visits, self-reported health, being disabled, hospital stays, hospital visits, and presence of chronic illness). Another potential bias can come from omitting risk-taking behavior which can relate to social capital and happiness at the same time. The results are also robust to controlling for subjective risk-taking behavior. The correlations among the independent variables are checked for all covariates, and no correlations between any two variables are found to be higher than 0.3, suggesting that multi-collinearity is not a problem. These include the correlations between the predicted residual happiness and corresponding social capital variable used in the estimation. For instance, the correlation between

predicted residuals from 1984 and 'on the whole trust people' variable is only 0.12 and 'with caution dealing with strangers' is only 0.9. Finally, a random sample of the respondents in 1984 is also used in the analysis in order to check for sample selection, and the results are found to be robust to random sampling.

VI CONCLUSION

This paper offers new findings which support the hypothesis that the link from happiness to social capital might exist. For instance, happier people at the beginning of the survey are found to trust others more twenty years later. Second, we find an inverted-U shape effect of happiness on social capital which has not been shown before at the individual-level. This might suggest that, on average, too much happiness and too much unhappiness are both costly for the society, leading to lower social capital. The paper also presents residual happiness as a measure of optimism which might be a nice tool for empirical researchers. Although level of optimism is not measured directly by questions in most longitudinal data, one can easily calculate residual happiness and consider it as a strong predictor of optimism.

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SUMMARY

This paper offers new findings which support the hypothesis that a causal link from happiness to social capital might exist. The paper exploits the very long German socio-economic panel of around 15000 people. Using the prospective study methodology, it finds that happier people contribute more to social capital. Both parametric and nonparametric results suggest that there exists an inverted-U shape relationship between happiness to social capital. Moreover, optimism appears to be an important channel through which happiness is linked to social capital. The paper also presents residual happiness as a measure of optimism which might be a valuable tool for empirical researchers. The results are robust to inclusion of various controls including the initial level of social capital, random sampling, non-linearity, different measures of social capital, and estimation techniques.