Happiness and health: two paradoxes

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PURPOSE

- We aim to contribute to a **process of cross-fertilization between**

two streams on socio-economic determinants {
- **happiness**
- **health**

separate {
- **happiness:** mainly **economists and psychologists**
- **health:** mainly **social epidemiologists**

- **Comparative analysis: illuminating for both of them**

helping us to **understand better {**
- **happiness ↔ health**
- **policy implications**

APPROACH

interrelations { -**subjective happiness**
-**objective health** **} sufficiently independent to be informative**

- **The correlation between self-reported health and subjective happiness is high:** in 18 OECD countries r = 0.85 (Kahneman and Ris, 2004):

  -importance attributed by individuals to health in their self-assessment of happiness

  -these subjective evaluations are too strictly correlated:
  conditioned by **personality** and **culture** of the individual who assesses them

- **objective health indexes are weakly correlated with { self-reported health / subjective happiness**

  e.g. French people declare a much lower index of self-reported health than US citizens but live three years longer

APPROACH

- Important category of health indexes: **quality-adjusted life expectation indexes**:

  they integrate mortality and morbidity indexes with other indexes of quality of life to express health status in terms of equivalents of well years of life

  we ignore this category of indexes, notwithstanding their obvious appeal:

  -their availability is still limited
  -their use is still very controversial for unsettled methodological questions
  (see the recent survey by Hansen and Østerdal, 2006)

- **The objective health indexes are no doubt partial indexes of subjective health** as they cannot cover the whole range of factors that affect it

  however they are able to capture the impact of factors particularly important for subjective health

  in particular they implicitly take account of unconscious sources of happiness and of their duration that by definition do not emerge in subjective assessments.

  This may help us to study the distortions of self-reported health and further distortions in subjective happiness

The determinants of happiness

The role of absolute income and the "happiness paradox"

The economists have traditionally stressed the role of per capita income *Y*
→ focus of economic policy on the growth of *Y*

However, cross section analysis shows:

(1) $W^* = f_1(Y)$, $f_2' > 0$, $f_2'' < 0$.

Time series show that, in developed countries after WWII,
correlation with per capita income is generally nonexistent or slightly negative:

"happiness paradox" {
- **-continuous growth of per capita income**
- **-happiness did not increase, sometimes decreased**

Easterlin (1974): **"hedonic treadmill" but "stimulation goods" (Scitowsky)**

The "satisfaction treadmill"

Aspiration theory:

(2) $W^* = f_2 (Y^* - Y), \qquad f'_2 < 0.$

the elasticity of aspirations to increases of income is found to be close to one (Frey and Stutzer, 2002):

(3) $\Delta Y^* = k \ (\Delta Y), \qquad k \approx 1,$

from which we easily derive that $\Delta W^* = f_2 (\Delta Y^* - \Delta Y) \approx 0,$ i.e. that

happiness does not tend to increase in consequence of ΔY

However {
- aged individuals: lower and declining elasticity
- does not explain the decline of happiness unless we assume growing frustration

The role of relative income and social factors

After a threshold between $10,000 and $15,000 p.y., the influence of absolute income on happiness rapidly fades away, while the crucial role is taken over by relative income Y^R and social relations R :

(4) $W_i^* = f_4 (Y^R),$ $f'4 > 0,$

Other related explanations stress the role of relational goods R:

(5) $W^* = f_5(R),$ $f'_5 > 0.$

It is now widely accepted that unemployment reduces well-being, even after controlling for the associated fall in income (Clark, Frijters, and Shield, 2007):

(9) $W^* = f_9 (U),$ $f'_9 < 0.$

Psychogenetic factors

The theory of adaptation maintains that individuals are characterized by a stable equilibrium state of happiness (Brickman et al. 1978):

(6) $W_i^* = f_6 (W^*_i - X_i^*)$, $f'_6 > 0$ when $W^*_i - X_i^* > 0$, and $f'_6 < 0$ when $W^*_i - X_i^* < 0$.

where X_i^* is the stable equilibrium point (or "set point") of happiness of the *i*

rooted in their own personality as established by genetic and psychogenetic factors *G* (theory of personality) (e.g., Likken and Tellegen, 1996):

(7) $W_i^* = f_7 (G_i)$.

However, adaptation is not complete (Diener, 1996).

In addition, personality and happiness are affected by the degree of education I:

(10) $W^* = f_{10} (I)$, $f'_{10} > 0$.

Other factors and synthesis

Another influential theory stresses that the growth of per capita income produces **negative externalities** *E* that deteriorate the happiness of citizen:

(8) $W^* = f_8(E), \qquad f'_8 < 0.$

Finally **health** *H is* a major determinant of self-reported happiness:

when people are asked to evaluate the importance of various areas of their lives, good health obtains the higher rating (Frey and Stutzer, 2002, p.56) :

(10) $W^* = f_{11}(H), \qquad f_{11} > 0.$

We can thus summarize the acquisitions of the research surveyed above:

(12) $W^* = F(Y, Y^R, Y - Y^*, G, R, E, I, U, H)$

The determinants of health

Health and the second happiness paradox

- **Subjective happiness is a crucial determinant of health:**

e.g. {
- **length of life** (Palmore, 1969)
- **heart disease** (Sales and House, 1971)
- **suicide** (Koivumaa and Honkanen et al., 2001)

- **Health is reported to be a crucial determinant of subjective happiness**

→ a new happiness paradox emerges:

happiness paradoxes {

FIRST: self-reported happiness and per capita income

SECOND: self-reported happiness and objective health

The role of absolute income

The per capita income of a community is generally considered as a major determinant of its average health

An increase in absolute income:

- relaxes the budget constraints: access to therapies

-higher expenditures in health programs

-better medical/pharmaceutical technologies

-higher education levels → ↑ updated medical knowledge and know-how

The role of absolute income

Empirical literature shows that the relationship between ***Y*** **and** ***H***

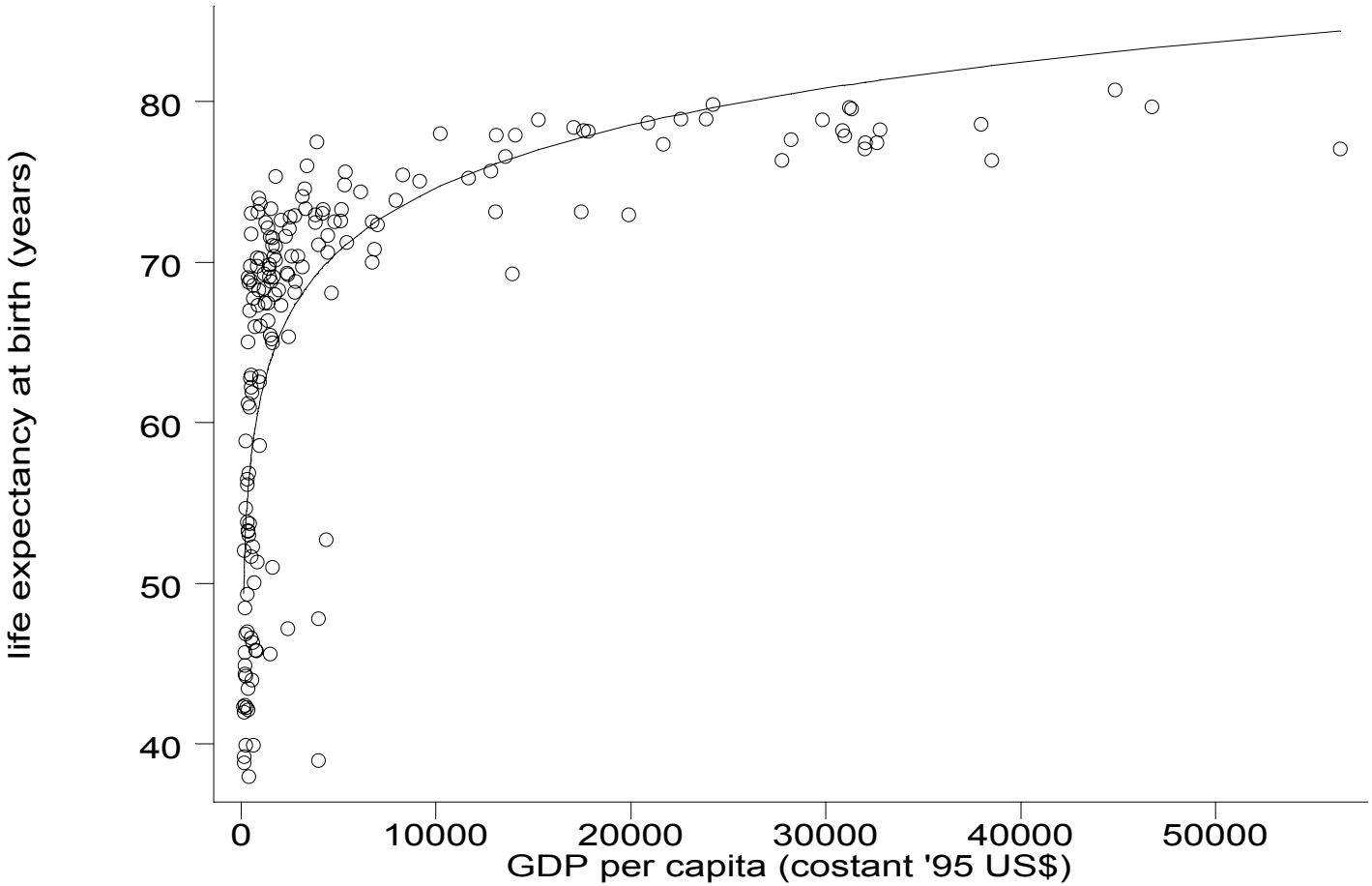
-is strongly non linear
-has a pattern very similar to that of the relationship between ***Y*** **and** ***W***:

$$(13)\quad H = \varphi_1(Y), \qquad \varphi_1' > 0, \qquad \varphi_1'' < 0.$$

cross-section studies:
-the health of the poor has higher income elasticity than that of the rich

cross-country evidence:
-life expectancy increases with average per capita income in poor countries
-this relationship tends to vanish for relatively rich countries (Preston, 1975)

Cross-country relationship between per capita GDP and health (2000)



Source: World Bank

The role of absolute income

similar results emerge also in single-country cross-section studies:

using a survey on health and income in Britain, Wilkinson (1992) finds that **several health indicators** increase rapidly as income rises from the lowest to the middle classes of the income distribution, while no further health improvements occur at higher income levels

similarly, using data from the National Longitudinal Mortality Survey in the USA, Deaton (2001) observes that **the male (age adjusted) probability of death** decreases rapidly as income grows at low family income levels, while it flattens out at high family income levels

The role of relative income

- The concave relation between ***Y*** and ***H*** implies:
  ↓income inequality → ↑ the average population health

- In recent years several studies have argued that:

  Y^R, independently of *Y*, has a crucial influence on health

$$(14) \quad H = \varphi_2 (Y^R), \qquad \varphi'_2 > 0,$$

where Y^R is the relative income that may be measured in different ways

- After a threshold of about $5,000 p.y. ($4,000 in Cornia et al, 2007):

  income inequality emerges as a crucial determinant of health even by controlling for other factors including absolute income

The role of relative income

In a pioneering study on a data set referring to nine OECD countries, Wilkinson (1992) found evidence of a strong correlation between life expectancy and income distribution that is argued to be independent of absolute income

Similar results emerged in several other studies that focused on different groups of countries and periods of time (see Borghesi and Vercelli, 2007)

Also at the local level a close relationship emerged between inequality and mortality rates in the US states (Kaplan et al., 1996)

Among the 282 US metropolitan areas the ones with the most unequal income distribution turned out to have the highest mortality rates (Lynch et al, 1998)

The role of relative income

- **Income inequality → relative deprivation:**

  source of loss of self-esteem and depression
  (see Sapolsky, 1998; Brunner and Marmot; 1999 Wilkinson, 2002)

  people compare themselves with reference groups and suffer from chronic stress when comparison is unfavorable (Deaton, 2001)

- **Physiological mechanism: activation of hormones** that affect the **cardiovascular and immune systems**
  (Wilkinson, 2002, pp.15-16)

  → similar to economic **"short-termism"**

The role of relative income

Inequality engenders mistrust and hostility, the more so the more incomes are considered non-proportional to individual effort and merit

→ **negative effects on people's health**

→ **the most egalitarian developed countries have the highest life expectancy**

The close relationship between income inequality and mortality rates emerges also in time series referring to single countries including Russia and the UK

The role of other social factors

Health is strongly affected by a series of social factors *R*

connected with relative income but in part independent of it:

(see, e.g., Ryff and Singer, 2000)

$$(15) \quad H = \varphi_3(R), \quad \varphi_3 > 0.$$

For example, stress-related mortality of married people is significantly lower than that of people who are widowed, divorced and single (Cornia et al., 2007)

In order to withstand physiological and psychological shocks, a crucial role is played by the intensity and quality of social relations, or what is often called **"social capital" (social trust, hostility)**

The role of other social factors

In particular, the **lack of social trust** was shown to be positively and significantly correlated with mortality in the USA (Kawachi et al., 1997), with a correlation coefficient that ranges between 0.71 and 0.79 depending on the kind of social trust indicators used for the analysis

Analogously **hostility** was found positively correlated with mortality. For example, Williams et al. (1995) estimated that mean hostility scores of ten cities in the USA were strongly and significantly correlated with their mortality rates after adjusting for race, age, gender, income and education level of the individuals

These factors however, depend also on the culture and infrastructures of the community where individuals leave

The influence of environmental externalities on health

- **Bad environmental conditions are directly responsible for about 25% of all cases of preventable illness all over the world** (WHO, 1997); this effect is expected to increase (climate change)

  we have thus to consider negative environmental externalities *E* as crucial determinant of health:

$$(16) \quad H = \varphi_4(E), \qquad \varphi'_4 < 0.$$

  - **Atmospheric pollution**
  - **Water pollution**
  - **Soil pollution**

Other factors: medical technology and instruction

- **Progress in medical-pharmaceutical technology *T* played a crucial role in the progressive improvement of the indexes of health in the last century**:

$$(17) \quad H = \varphi_5(T), \qquad \varphi'_5 > 0.$$

In order to get insights on the other determinants of health we have to study the **deviations from this common trend due to specific factors**

- **Another crucial determinant of health is instruction:**

$$(18) \quad H = \varphi_6(I), \qquad \varphi'_6 < 0, \qquad \varphi''_6 > 0,$$

the relationship between instruction and health is strongly non linear as health increases sharply by moving from primary to secondary education and above

the **level of education of mothers** is a major determinant of health of all family members, especially the children
(Caldwell 1979, Bicego and Boerma, 1993, Hertzman 1995)

Other factors: unemployment and genetic factors

- **A fundamental determinant of health is unemployment *U*:**

$$(19) \quad H = \varphi_7(U), \qquad \varphi_7 < 0.$$

Loss of employment, especially if unanticipated and in the absence of a public safety net, heavily affects health (Cornia et al., 2007)

Unemployment implies not only a lower income but also a loss of social status and self-respect (Sen, 1997)

- **Also genetic factors *G* may have a sizable impact on health:**

$$(20) \quad H = \varphi_8(G).$$

two factors {

mutation of genes

polygenic inheritance: bias towards specific chronic diseases

The main determinants of health

The main determinants of health considered in the epidemiological literature do not exclude each other

Health Function: $H = \Phi (Y, Y^R, G, R, E, I, U, T, W^*)$

where we assume that the partial derivatives for each factor have the same signs already discussed

The capital letters that appear in the argument of the function Φ may be considered as **vectors of variables some of which have a flow dimension and others a stock dimension**

Determinants of health and determinants of happiness: a comparative analysis

Although the literature on the determinants of happiness and health developed quite independently, they pointed out about the same list of main determinants

Health function $H = \Phi\ (Y, Y^R, G, R, E, I, U, T, W^*)$

Happiness function $W^* = F\ (Y, Y^R, Y - Y^*, G, R, E, I, U, H)$

The only substantial differences:

- the absence in the health function of **frustrated aspirations**
  (in the case of health frustration matter but less focused on income; Marmot, 2005)

- the presence of the **health technology**
  (general technology matters for happiness through income and consumption)

Further determinant of happiness

- **Leisure**: the necessary disaggregation of leisure activities sends back to factors already considered such as social relations, absolute and relative income, health

- **Inflation**: we have doubt about the genuine independence of its influence: inflation acts mainly through modifications of absolute and relative income and disruption of social relations and sends back to other factors

- **Institutional factors:** this line of research is certainly stimulating and inspiring but it is not yet clear to what extent the influence of institutions on happiness are independent of their impact on factors already considered such as social relations.

The second happiness paradox : the ageing population

↑life expectancy → ageing of pop. → ↓ self-r. health →↓ subjective happiness

empirical evidence

- self-reported health declines with age
- the importance of health increases with age

Happiness declines from youth to working age but increases again, though moderately, since around the age of retirement (Frey-Stutzer, 2002)

this may be related to:

- **increasing free time of senior people**
- **decreasing responsibilities**
- **downsizing of aspirations**
- **progressive natural selection of the healthier and happier individuals**

The negative effect exerted by ageing on health and happiness is more than compensated by other factors correlated with age

The second happiness paradox: the shortcomings of general objective health indexes

the comprehensive objective health indexes do not capture all the effects of health on happiness

In particular there are specific health indexes strictly correlated with subjective unhappiness, such as frequency of depression and suicides, that increased progressively in the post-war period

Subjective health and happiness depend not only on the length of life but crucially also on its quality:

a long life is not necessarily a happy life

this is well known since long: e.g.“STRULDBRUGS”, Swift, 1726)

Policy implications

The twin paradoxes are not genuine paradoxes: many convincing explanations
(**over-determination** may be solved through more sophisticated statistical methods)

The real paradox is that policy makers still focus on GDP and its growth
(Bhagwati, 2004; B.Friedman, 2005)

We know since long that it is an **extremely inadequate index of well-being**:

Not registered {-**the exhaustion of natural resources**
-**the deterioration of natural and social capital**
-environmental and social externalities

Unduly registered -**defensive expenditure**

Policy implications

Alternative indexes that aimed to correct the shortcomings:

- **NEW** (Net Economic Welfare) suggested by Nordhaus and Tobin (1973)

  has grown more slowly than GDP in the post-war period in industrial countries

- **ISEW** (Index of Sustainable Economic Welfare) by Daly and Cobb (1989):

  while the US GNP increased from 1951 to 1986 at an average rate of 1.90%, the ISEW grew much less (0.53%) and became negative since the early 1970s

→ the alternative indexes of well-being focus on

the **same determinants considered in the literature on happiness**

Policy implications

Also the second happiness paradox is basically explained by the inadequacy of the general indexes of objective health

We should gather in a continuous and systematic way data on **self-reported health** in order to understand better the role of subjective perception of health and its relationship with objective health

The quantitative indexes of health should be corrected in order to take account of the quality of life

The existing **quality-adjusted indexes of health** should be systematically computed and publicized

(diffusion hindered by unsettled methodological problems:
see, e.g., Zeckhauser and Shepard, 1976)

Policy implications

The analysis of the determinants of happiness and health suggest similar policy measures:

- **Focus on the growth of well-being rather than GDP**
- **↓ poverty**
- **↓ inequality**
- **↓ unemployment and precarious jobs**
- **↑ Investment in instruction**
- **↑ Investment in art and creative activities**
- **↑ Investment in environmental and social capita**

All these policy measures are likely to improve { health / well-being } of citizens