

## 8

# Labour Migration and 'Smart Public Health'

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### Abstract

*Public health research debates for two decades the effects of inequality on public health. More recent research also considered the additional effects of international trade and world economic openness. These investigations analyse public health outcomes in such terms as infant mortality rates, life expectancies, etc. But with the growing environmental crisis, ideas to weigh economic or social or public health progress by the 'environmental input' necessary to achieve it are increasingly gaining acceptance. We might call such a weighting of infant mortality rates, or life expectancies by the 'environmental input' necessary to achieve them 'smart public health'. Which factors of social organization now contribute then to a responsible use of the resources of our planet Earth to achieve 'smart public health'?*

*We use standard OLS non-linear regressions of ecological footprints per capita and their square on combined public health performances. The residuals from this regression are our new measure of 'smart public health'.*

*Our research results suggest that not inequality, but migration is a very important determinant of 'smart public health'. Migration sending countries find it relatively easy to enjoy combined good public health performances at a relatively small environmental price. Other drivers of 'smart public health' are the share of a country's population in world population, and the UNDP education index. The main bottleneck of 'smart public health' is constituted by the crowding-out effect of public education expenditures on smart health performance.*

*In contrast to earlier research, we come to the conclusion that migration sending countries reap substantial benefits from receiving worker remittances, while inequality and globalization indicators hardly affect the smart public health performance of the sample countries (all countries with available data).*

**Keywords:** *Index Numbers and Aggregation, public health, infant mortality, female survival probability of surviving to age 65, UNDP human development index (HDI), average life expectancy (years), life satisfaction, international migration, remittances.*

## Objectives

This article is motivated by the fact that public health research debates for two decades now the effects of inequality on public health.<sup>1</sup> More recent research also considered the additional effects of international trade and world economic openness. But these investigations analyse public health outcomes in such terms as simple, unweighted infant mortality rates, life expectancies, *etc.* With the growing environmental crisis, ideas to weigh economic or social or public health progress by the ‘environmental input’ necessary to achieve it are increasingly gaining acceptance. Such a research question is typically motivated by economics: to achieve a maximum of results under the constraint of existing scarce resources. Under such given constraints, is the price mechanism, free flows of globalization, and the absence of government intervention much better suited to achieve good results for public health than government interventions to redress inequalities?

We might call such a weighting of infant mortality rates, or life expectancies by the ‘environmental input’ necessary to achieve them ‘smart public health’. Which factors of social organization do now contribute then to a responsible use of the resources of our planet Earth to achieve ‘smart public health’?

The essence of the by now dominant paradigm in public health about a strong correlation between high inequality and low life quality seems to suggest that inequality negatively determines a number of public health variables, like physical health, mental health, drug abuse, and teenage births (Pickett and Wilkinson 2007). Recent contributions, further elaborating the approach, initiated by R. G. Wilkinson, highlighted, for example, the role played by international trade and world economic openness in determining public health outcomes. But in large sections of the economics profession, such as paradigm, critical of inequality and globalization, will not go uncontested.<sup>2</sup>

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<sup>1</sup> The Equality Trust (homepage on the Internet), 32–36 Loman Street, London SE1 0EH. London (UK) (cited 30 May 2011) Why More Equality? URL: <http://www.equalitytrust.org.uk/research/why-more-equality>.

<sup>2</sup> The flagship article of the school of thought, featuring the trade-offs between inequality and public health outcomes is undoubtedly Wilkinson's ‘For Debate – Income Distribution and Life Expectancy’ (1992). This article was followed according to the Web of Science's Documentation system (accessed on May 20<sup>th</sup>, 2014 at Vienna University Library) by 463 studies. One of the central public health profession articles linking trade, world economic openness and globalization to public health outcomes is Blouin, Chopra, and van der Hoeven's, ‘Trade and Social Determinants of Health’ (2009). This study initiated 18 follow-up studies to this day. By contrast, let us just recall here that major sections of Economics hold a sceptical or even very sceptical view about efforts to change existing income distribution patterns and inequality structures by government intervention. Perhaps, the most uncompromising attack in this direction was published by Economics Nobel laureate von Hayek in 1960 in his *The Constitution of Liberty*. His attack on egalitarianism is a true classic of Economics (90 editions were published between 1959 and 2010 in 9 languages and held by

This question is already intriguing enough by itself and is being dealt with today by a growing number of studies, focusing on the environmental price of human progress. Even more intriguing, however, is the question, which factors of social organization contribute to a responsible use of the resources of our planet Earth. In this essay, we will present the first systematic study on how outward migration – or rather, more concretely, received worker remittances per Gross Domestic Product (GDP) – helps the nations of our globe to enjoy a good overall public health system at a relatively small environmental price (henceforth called '*smart public health*'). According to our study, it is not inequality or globalization, which primarily determines this '*smart public health*', but the existence of a system of the economic freedom to migrate, measured by worker remittances. This is potentially an important new start in the entire debate about the societal drivers and bottlenecks of global public health performance, dominated in recent years by the thought that inequality is mainly to blame for the cross-nationally observed public health shortcomings.

The indicators of public health, which we use in this essay, are derived from standard recent international data<sup>3</sup> on infant mortality, female survival probability of surviving to age 65, the United Nations Development Programme (UNDP) Human Development Index (HDI), average life expectancy (years) and life satisfaction (0–10).

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2,201 libraries worldwide according to Worldcat Identites; see <http://www.worldcat.org/identities/lccn-n80-126331> [Date accessed: 20.05.2014]. Major sections of Economics also would believe that world economic openness is good for the poor, on all fronts and not just by promoting economic growth. Efforts to hinder the process of globalization will be to the detriment of economic well-being. One of the most important studies in this direction is Dollar and Kraay's 'Growth Is Good for the Poor' (2002), which led to 276 follow-up studies and which showed that average incomes of the poorest quintile rise proportionately with average incomes in a sample of 92 countries over the last four decades. Dollar and Kraay state that the share of income of the poorest quintile does not vary systematically with average income. It also does not vary with many of the policies and institutions that explain growth rates of average incomes, nor does it vary with measures of policies intended to benefit the poorest in society. This evidence emphasizes the importance of economic growth for poverty reduction. Another influential study in this direction was published by Dreher (2006). His work led to 109 follow-up studies, showing that an index of globalization covering its three main dimensions: economic integration, social integration, and political integration is well associated with good economic outcomes. Dreher used panel data for 123 countries in 1970–2000 and analysed empirically whether the overall index of globalization as well as sub-indexes constructed to measure single dimensions affect economic growth. As the results claim to show, globalization indeed promotes growth. The dimensions most robustly related with growth refer to actual economic flows and restrictions in developed countries. Although less robustly, information flows also promote growth whereas political integration has no effect. While our analysis does not necessarily side with these arguments, it is necessary to emphasize that there is an urgent need in public health for further solid empirical studies on these subjects and realizing that large sections of the science, claiming that it developed the greatest professional competence for issues such as inequality and globalization, start from a consensus, which is completely different from the one, emerging in public health.

<sup>3</sup> All the original variables see at URL: <http://www.hichemkaroui.com/?p=2017> (date accessed: 20.05.2014).

The very idea of 'smart development' was first proposed by Dennis Meadows and has not been really followed up to now in social science ever since (Meadows 1992). In the face of the huge usage of this term in the international media, such a statement is perhaps surprising, but our verdict corresponds to the clear bibliographical evidence on the base of such indices as 'ISI Web of Knowledge'<sup>4</sup> or 'Cambridge Scientific Abstracts/Proquest'.<sup>5</sup>

To present a theory or competing theories of 'smart public health' is virtually impossible, because there has been no measurement, let alone accounting of its cross-national successes and failures in the literature up to now. We really had to start research into this issue from 'scratch'.

Of particular interest in the context of our research is the effect of migration. As it is well-known, migration is part and parcel of what social sciences but also international politics and international law nowadays call the 'four freedoms' of 'capitalism' (i.e. 'market economies'), besides the freedom of goods, services, and capital. A particular earlier flagship survey of the hitherto existing migration theories came to the pessimistic conclusion that migration theories up to that time were either advanced to explain the initiation of international migration or put forth to account for the persistence of migration across space and time (Massey *et al.* 1993). Massey *et al.* suggested that, because they are specified at such different levels of analysis, the theories are not inherently logically inconsistent. As Taylor pointed out in his later, summarizing policy statement on the state of migration theory for the United Nations in 2006, indeed it would be foolish to exclude migration from any future discourse about global development, but that existing hard-core evidence on how migration really affects the development process is limited (Taylor 1999, 2006).

This is all the more surprising, since the number of international migrants has increased more or less linearly over the past 40 years, from an estimated 76 million in 1965 to 188 million in 2005. The flow of international migrant remittances has increased more rapidly than the number of international migrants, from an estimated US\$ 2 billion in 1970 to US\$ 216 billion in 2004. Nearly 70 % of all remittances go to less-developed countries (LDC). Remittances were equivalent to 78 % of the total value of exports in El Salvador and 108 % in Nicaragua. Worker remittances are especially affecting the less developed sending countries by the multiplier effect, well-known in economics: \$1 of remittances from international migrants may create \$2–\$3 or more of new income in migrant-sending areas. One person's spending is another person's income. Even if all income in remittance-receiving households is spent on consumption, remittances may stimulate investments by the other households whose incomes go up (Taylor 2006: 9). This optimistic view about worker re-

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<sup>4</sup> URL: <http://wokinfo.com/> (Date accessed: 20.05.2014).

<sup>5</sup> URL: <http://www.csa.com/> (Date accessed: 20.05.2014).

mittances is also supported in the well-received comparative international study by Ziesemer (2009).

Migration is thus seen in many social scientific approaches as a win-win situation (United Nations 2009; Williamson 2002). For several observers, among them Hatton and Williamson (2009), the 'current hysteria' about inward migration in many industrialized countries has no real basis. For them, the Third World has been undergoing an emigration life cycle since the 1960s, and, except for Africa, emigration rates have remained about equal or were even declining since a peak in the late 1980s and the early 1990s. The current economic crisis will serve only to accelerate those trends. Sanderson (2010) was one of the first consistent research attempts to bring in migration as a determining variable of social well-being. Contemporary levels of international migration in less-developed countries are raising new and important questions regarding the consequences of immigration for human welfare and well-being. However, there is little systematic cross-national evidence of how international migration affects human development levels in migrant-receiving countries in the less-developed world. The Sanderson paper addressed this gap in the literature by assessing the impact of cumulative international migration flows on the human development index, the composite, well-known UNDP measure of aggregate well-being. A series of panel data models are estimated using a sample of less-developed countries for the period, 1970–2005. The results indicate that higher levels of international migration are associated with lower scores on the human development index, net of controls, but that the effect of international migration is relatively small.

## Methods

To estimate the effects of migration on 'smart public health', we used a freely-available new cross-national comparative data set, which is publicly available on the Internet without any restrictions.<sup>6</sup> This electronic data set offers Microsoft EXCEL data and a list of the international standard sources, and a codebook in PDF format. It also offers an EXCEL file with the combined UNDP type development performance index, on which this study rests.

Each of these indicators (infant mortality, female survival probability of surviving to age 65, the United Nations Development Programme (UNDP) Human Development Index (HDI), average life expectancy (years) and life satisfaction (0–10) was standardized according to the well-known practice of the United Nations Human Development Programme on a scale, ranging from 0 (worst value) to 1 (best value) according to the formula:

$$Z_{ij} = (X_{ij} - X_j^{\min}) / (X_j^{\max} - X_j^{\min}), \quad (\text{Eq. 1})$$

<sup>6</sup> URL: <http://www.hichemkaroui.com/?p=2017> (Date accessed: 20.05.2014).

where  $X_{ij}$  is indicator  $j$  of country  $i$  and  $Z_{ij}$  its normalized counterpart and  $X^{min}$  and  $X^{max}$  are sample minimum and maximum values of indicator  $j$ . Our final index of public health performance is based on the simple means of the standardized component indices:

$$Index_i = \sum_{j=1}^J w_j Z_{ij}, \quad (\text{Eq. 2})$$

where  $w_j$  are weights assigned to each of the  $J$  indicators, in this case equal weights,  $w = 1$ , is employed. Our performance scale of public health is then compared with the environmental destruction, which a society causes in maintaining its development level. We rely here on data about ecological footprint, which measures how much land and water area a human population requires to produce the resource it consumes and to absorb its carbon dioxide emissions, using prevailing technology.<sup>7</sup> Ecological Footprint is usually measured in global hectares. Existing time series nowadays allow us to grasp the extent of the accelerating environmental constraints, facing our globe.<sup>8</sup>

The standardized residual (SR) values of Table 1 – our final performance scale of ‘smart public health’, measuring how much of infant mortality reduction, female survival to age 65, a good Human Development Index, a high average life expectancy and a good life satisfaction are achieved at a minimum ecological footprint and are computed as observed minus predicted development outcomes,  $Z$ , divided by the square root of the residual mean square,  $\hat{\sigma}$ .

$$SR_i = (Z_i - \hat{Z}_i) / \hat{\sigma} \quad (\text{Eq. 3})$$

High positive outliers imply a very high smart public health performance, while countries below the fitted trend line are the countries with a low smart public health performance. Having established a residual-based smart public health indicator family, we now can look more realistically at the cross-national determinants of smart public health performance (see Table 1). We are aware about the limitations of our approach but we think that our estimates cover the wide range of existing international data in the field. Even with different components of our indicator, the results would not dramatically differ.

**Table 1.** Performance of countries in respect with smart public health

Country	Smart public health	Rank	Country	Smart public health	Rank
1	2	3	4	5	6
Jamaica	1.780	1	France	0.132	71
Philippines	1.745	2	Belgium	0.119	72

<sup>7</sup> URL: <http://www.footprintnetwork.org/en/index.php/GFN/page/glossary/> (Date accessed: 20.05.2014).

<sup>8</sup> URL: <http://www.happyplanetindex.org/learn/download-report.html> (Date accessed: 20.05.2014).

1	2	3	4	5	6
Cuba	1.707	3	Turkey	0.100	73
Sri Lanka	1.699	4	Poland	0.058	74
Costa Rica	1.670	5	Ukraine	0.043	75
Vietnam	1.650	6	Bolivia	0.037	76
Dominican Republic	1.488	7	Spain	0.029	77
Indonesia	1.480	8	Australia	0.025	78
Colombia	1.404	9	Iceland	0.024	79
Moldova	1.211	10	Hungary	0.015	80
Guatemala	1.204	11	Norway	0.001	81
El Salvador	1.180	12	United Arab Emirates	-0.003	82
Morocco	1.164	13	Iran	-0.012	83
Georgia	1.162	14	Paraguay	-0.014	84
Tunisia	1.143	15	United Kingdom	-0.017	85
Armenia	1.129	16	Ireland	-0.044	86
Tajikistan	1.110	17	Canada	-0.066	87
Peru	1.105	18	Denmark	-0.085	88
Argentina	1.084	19	Portugal	-0.088	89
Egypt	1.053	20	Latvia	-0.094	90
Jordan	1.033	21	Hong Kong, China	-0.106	91
China	0.893	22	New Zealand	-0.114	92
Ecuador	0.874	23	Cambodia	-0.117	93
Albania	0.870	24	Azerbaijan	-0.152	94
Honduras	0.866	25	Congo	-0.242	95
Malaysia	0.853	26	Bosnia & Herzegovina	-0.270	96
Bangladesh	0.846	27	Greece	-0.273	97
Algeria	0.840	28	Guyana	-0.297	98
Syria	0.798	29	Kuwait	-0.328	99
Kyrgyzstan	0.789	30	Czech Republic	-0.337	100
Brazil	0.783	31	Lebanon	-0.339	101
Nicaragua	0.756	32	Senegal	-0.378	102
India	0.754	33	Togo	-0.423	103
Trinidad and Tobago	0.750	34	Madagascar	-0.445	104

1	2	3	4	5	6
Belize	0.732	35	Belarus	-0.489	105
Saudi Arabia	0.718	36	Ghana	-0.560	106
Luxembourg	0.713	37	Uruguay	-0.574	107
Chile	0.697	38	Russia	-0.645	108
Thailand	0.670	39	Malawi	-0.646	109
Bhutan	0.619	40	Mauritania	-0.733	110
Nepal	0.583	41	Macedonia	-0.760	111
Pakistan	0.567	42	Kazakhstan	-0.797	112
Panama	0.555	43	Djibouti	-0.853	113
Laos	0.519	44	Benin	-0.921	114
Venezuela	0.484	45	Kenya	-0.966	115
Croatia	0.480	46	Mongolia	-1.043	116
Malta	0.470	47	Guinea	-1.047	117
Netherlands	0.439	48	Estonia	-1.091	118
Mexico	0.407	49	South Africa	-1.156	119
Bulgaria	0.398	50	Cameroon	-1.220	120
Singapore	0.386	51	Congo (Dem. Rep. of)	-1.249	121
Germany	0.385	52	Uganda	-1.262	122
Korea (Republic of)	0.376	53	Rwanda	-1.277	123
Haiti	0.349	54	Tanzania	-1.455	124
Uzbekistan	0.315	55	Nigeria	-1.463	125
Slovakia	0.312	56	Burundi	-1.480	126
Switzerland	0.288	57	Sudan	-1.516	127
United States	0.281	58	Zambia	-1.545	128
Myanmar	0.274	59	Mozambique	-1.545	129
Romania	0.274	60	Ethiopia	-1.593	130
Sweden	0.273	61	Chad	-1.749	131
Austria	0.242	62	Angola	-1.811	132
Lithuania	0.229	63	Mali	-1.889	133
Cyprus	0.214	64	Zimbabwe	-1.956	134
Finland	0.196	65	Sierra Leone	-2.032	135
Japan	0.193	66	Niger	-2.104	136
Italy	0.173	67	Burkina Faso	-2.120	137
Yemen	0.145	68	Central African Rep.	-2.382	138



1	2	3	4	5	6
Slovenia	0.138	69	Namibia	-2.457	139
Israel	0.135	70	Botswana	-3.052	140

*Notes:* Public health performance is measured by a combined UNDP-type index of infant mortality, female survival probability of surviving to age 65, the United Nations Development Programme (UNDP) Human Development Index (HDI), average life expectancy (years) and life satisfaction (0–10). The data for the standardized performance indicators are given in the data sheet 'Smart development Heshmati Tausch Final UNDP type indicators 2011', the energy efficiency indicators are found in the file 'Data for energy efficiency analysis May 2011' (see Tausch 2010). The codebook of this data file lists the data definitions and sources.

Our standard comparative cross-national data operationalize standard economic, sociological and political science knowledge in international development accounting. We compare the predictive power of all these standard predictors, using standard ordinary least squares (OLS) stepwise regression procedures, based on IBM SPSS XVIII, weeding out the relevant from the irrelevant predictors of smart public health. The final model is based on standard forward OLS multiple regression with the most significant predictors from the prior, preliminary weeding out exercise.

The independent variables, used in our research to explain performance along this new international scale of smart public health in the first decade of the new Millennium, range from standard social science cross national development accounting explanatory variables, measuring the dimensions of feminism, demography, economic freedom, geography, dependency and world systems theories, to migration, convergence effects of poorer countries growing more rapidly than richer countries, Muslim population shares and membership of a country in the Organization of Islamic Cooperation, military expenditures and military personnel rates, human capital formation, and participation in European economic and monetary integration, thus reflecting contemporary social science and public health research practice of cross-national development accounting.<sup>9</sup>

The independent variables are (arranged in alphabetical order) as follows (Table 2).

<sup>9</sup> For a recent exhaustive argumentation about drivers and bottlenecks of global development see Tausch *et al.* (2012).

**Table 2.** The potential societal drivers and bottlenecks of smart public health

<ul style="list-style-type: none"> <li>• % women in government, all levels</li> <li>• % world population</li> <li>• 2000 Economic Freedom Score</li> <li>• Absolute latitude</li> <li>• Annual population growth rate, 1975–2005 (%)</li> <li>• Comparative price levels (US = 1.00)</li> <li>• Foreign savings rate</li> <li>• FPZ (free production zones) employment as % of total population</li> <li>• Immigration – Share of population 2005 (%)</li> <li>• ln GDP per capita</li> <li>• ln GDP per capita <sup>2</sup></li> <li>• Membership in the Organization of Islamic Cooperation (OIC); Muslim population share per total population</li> </ul>	<ul style="list-style-type: none"> <li>• Military expenditures per GDP</li> <li>• Military personnel rate ln (MPR+1)</li> <li>• MNC outward investments (stock) per GDP; MNC PEN – stock of Inward FDI per GDP; MNC PEN: DYN MNC PEN 1995–2005</li> <li>• Net international migration rate, 2005–2010</li> <li>• Openness-Index, 1990 (export-share per GDP + import-share per GDP)</li> <li>• Population density</li> <li>• Public education expenditure per GNP; UNDP education index</li> <li>• Worker remittance inflows as % of GDP</li> <li>• Years of membership in EMU, 2010, Years of membership in the EU, 2010</li> </ul>
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The choice of a country to be included in the final analysis (175 countries) was determined by the availability of a fairly good data series for these independent variables (if not mentioned otherwise, UNDP data for the middle of the first decade of the new millennium). In the final regressions, we applied the ‘list wise deletion of missing values’ routine (*i.e.* only entering countries with complete data into the statistical analysis, in total 115).

The statistical design of our study is thus based on the usual, SPSS XVIII ordinary least square standard regression analysis of the ‘**kitchen sink type**’ of economic growth and economic, social and political performance.

## Results

Table 2 shows the estimation results for the drivers and bottlenecks of ‘smart public health’. Which are the countries best combining the task of a maximum of ‘public health’ with a minimum of ecological footprint per capita? Our model explains 29.9 % of the total variance of ‘smart public health’, and is based on the analysis of the 115 countries with complete data; the F-value is 13.183 and the error *p* of the entire equation is 0.000, and constitutes the best available estimate from our independent variables. The constant, which is significant, has a value of –1.657. The drivers of ‘smart public health’ are the share of a country’s population in world population, indicating the relative size of a nation, the UNDP education index, measuring the levels of education in a given country, and worker remittance inflows as percent of GDP. The main bottleneck of

'smart public health' is constituted by the crowding-out effect of public education expenditures on human development.

**Table 3.** OLS regression results of drivers and bottlenecks of smart public health (dependent variable is SR)

Independent Variable	B (un-standardized regression coefficient)	Standard error	Beta	t-value (Student's test)	Error probability
Constant	-1.657	0.348		-4.760	0.000
% world population	0.055	0.029	0.152	1.894	0.061
Public education expenditure per GNP	-0.097	0.042	-0.196	-2.283	0.024
UNDP education index	2.437	0.430	0.478	5.666	0.000
Worker remittance inflows as % of GDP	0.044	0.010	0.352	4.461	0.000
<i>Memorandum item: statistical properties of the equation</i>	Adj. R <sup>2</sup>	Df.	F	Error prob. of the entire equation	
	29.900	114	13.183	0.000	

### Conclusion

Our residuals-based reformulation of smart public health realistically captures the trade-off between Global Ecological Footprint per capita and development performance and offers us a better idea about smart public health performance at different stages of socio-economic development.<sup>10</sup> Our results show that traditional indicators of economic globalization and also inequality have little influence on combined smart public health performance, but that hitherto neglected elements of social science theories, such as migration, gain in importance. Also such factors as the demographic weight of a country and scale effects of public health provision, and education cannot be overlooked. In contrast to most of the current thinking on the issue, we can show that levels of public education expenditures crowd out health performance, while levels of achieved education, measured by the UNDP education index, have a beneficial

<sup>10</sup> The inclusion of the UNDP-standardized equality score (= performance in avoiding a high ratio of income differences between the richest 20 % and the poorest 20 %) only has a minor effect on our results: for the 106 countries with complete data. The equality score achieves an error probability of 13.5 %. As expected, equality has a positive effect on smart public health, but the effect is far smaller than existing approaches would suggest.

effect on 'smart public health'. True enough, we have to state that worker remittances redistribute global well-being and the achievement of good public health outcomes at relatively low ecological resource use to the countries of the 'global South' and away from the rich democracies of the OECD.

We are aware that our answers to the questions raised in this article might be incomplete. But we hope to have provided at least some preliminary guiding posts for further research on this important subject how the four economic freedoms affect smart public health and to have shown that primarily not inequality, but migration matters for public health. If we have expressed this perspective sufficiently clear, then our essay already achieved its aim. Further research might concentrate on such issues as 'smart infant mortality reduction' or 'smart life expectancy'.

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