Health as component of labour force: conceptualizations in psychology and in economics

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Introduction

The correlation between socio-economic and demographic evolutions was first reported by T. Malthus (1798) who considered that humankind was doomed to remain at near-starvation level that can never be truly won by any socio-cultural system. Since the researchers study the demographic transition of nations paying attention to different rate of mortality, fertility, morbidity and economic growth. Two major economic ideas conceptualized health as a factor of development: Marxist theory of value and human capital theory. In this paper I analyse some econometric models that were elaborated to elucidate the links between health – growth – lifespan expenditure, with these competing ideas as background. I conclude that health is a no less important component of labour force quality, then education and training (recognised already by Marx). But, as healthier are the persons enjoying genetically transmitted protection against incapacity, less expenditure is necessary for their health reproduction. Thus, value of labour force in health is largely independent on health expenditure. Some cross-national studies conclude with surprising findings: As per capita GDP *rises*, the average level of self-reported health gets *worse*. Others show that the support-led process in favour of education without fast economic growth provides remarkable longevity and favourable demographic structure for future development.

Therefore, hypothesis explored here is that health is neither a commodity produced by health care system, nor a lack of infirmity, nor a quantity of medical expenditure, but trust. This trust is a psychological disposition of the population determined by historical factors and concerns. I put forward also the suggestion that health is currently not only a facet of the labour force quality, but also historically introduced target of development.

The paper treats these issues looking on recent societal transformations.

1. Health and economy

Healthy societies are those, where the population benefits of: Physical health, made possible due to genetic predispositions, favourable work conditions, home safety, recreation possibilities; Social health, communication and interaction abilities, support assistance; and Psychological health (activities/roles, cognition, emotional status, self-esteem…)

K. Marx, analysing in 19th century the capacity of the human being to work, introduced the notion of value of labour force, measured in the quantity of human labour socially necessary for its reproduction. Value of labour force depends on the geographic, historic and moral norms of expenditures dedicated to the reproduction of the labour potential in consumption, health, education, or leisure. A complex labour force has a larger value than one that is simpler, because the socially necessary time used to produce it is longer. In turn, a complex labour force produces more marketable values over a period of time than a simple labour force. In original theory of value the magnitude of complexity (or value) of labour force is estimated principally through education and training expenditures. The correlation between them is evidently positive. Thus, the economical progress is inevitably completed by the complexification of the labour force that can cause parenthetically the augmentation of the wages and of the well being of workers under capitalism. In this general logic of growth, the economical and workers' reproducing spheres are not necessarily in contradiction. However, the relationship between them in social regeneration is multi-dimensional and non-linear.

In the Sixties the human capital theory initiates the microeconomic analysis of impact of individual expenditure for health on economic well being. Since the Seventies the economists study the impact of the development of the medical care on the economic well being of the nations. Obviously their intuition point out on the specificity of health as a component of labour force value.

For example, in the econometric models AGORA (1978), (Peaucelle & ali 1981, 1983) the Health care sector is represented by three components: hospitals, the services offered by the doctors and by the pharmacists. The volume of supply of the sector depends on the activity of the hospitals which is related to demographic data of morbidity, to activity of the independent doctors which is related to their number and the rates of prescriptions of analyses and drugs. Such a form of modelling of the Health sector in a macro dynamic model allows the calculation of the multiplier effects of indicators of the health services activities on other sectors of national economy, on the GDP, on the budget of the State, and even on the balance of the foreign trade. Simulations can bring interesting short run replies on the effects of policies touching to the operating modes of the care system. But they cannot inform about the social need (in terms of the health level) for the expenditure to ensure these activities.

One can also seek the optimal volume of the health expenditure. The work of J. Bénard (1983) presents an example of resolution of such a problem. In its model, the sector of Health produces the medical care using the industrial goods and the labour. The care is consumed, so it does not take part in the production of other goods nor of labour aptitude. The algorithms of optimization give rules to distribute and to widen the plate of the health expenditure, allowing the access to the care to the most stripped in income population, and doing the global consumption less damaged possible after such equalization of access. The macroeconomic model of D. Wheeler (1980) tries explicitly to show that the improvement of pubic health supports the growth.

Economic literature continues to grant a wide place to health expenditure. This expenditure is considered often as a factor of capital eviction from production process, as a factor, which can implement economic growth or, if too large, to impede it. Heshmati (2001) studied this possible occurrence for the countries of the OECD. His results indicate that countries converge to their steady state of income per capita, and that health care expenditure has significant effect on the economic growth and the speed of this convergence. Muysken & al (2003) shown theoretically the positive association between per capita income and health status of a country, but not with health expenditure.

Thus, the interest for the analysis of the direct effect of health on the economy becomes acuter, but the results are still unsatisfactory. From my point of view the principal problem consists in considering the health care expenditure as necessary for the labour force complexification. It is clear that health is a no less important component of labour quality, then education and training (recognised already by Marx). But, as healthier are the persons enjoying genetically transmitted protection against incapacity, less than average (even zero) expenditure is necessary for their health reproduction. Thus, value of labour force is largely independent on health expenditure. As long as the human activity is evaluated in terms of its capacity to create the marketable goods (at least in the societies based on labour-wage nexus), the expenditure for health may be socially unnecessary.

2. Empirical evidence of lifespan and provision of physical health

The demographic analyses of populations' lifespan give precious images of their typical bodily well being and of their labour potential.

Demographists define mortality and life expectancy. Death is the permanent ending of all bodily functions in an organism. More often, it will be thus a final consequence of more or less long process of degradation of vital

forces. Certainly, it is possible to count, that human organism is constructed to last in limited time and that each individual is biologically intended to die once in this exhausted time. But the process which conducts from health to illness and to death as medical predilection takes very much different sources, and the death hour can be removed meanwhile because of external events or human behavior.

Individual is not lonely in relation to environment; she/he is a part of a group which characteristics cause simultaneously his conditions of life and type of behavior. This implies a big variety of positions, both between the populations, and between groups that compose each population. Human lifespan has increased enormously last century, and relative differences in mortality rates of compared populations vanish with age, and mortality convergence is observed due to the exhaustion of initial differences in redundancy levels. However biologists and demographists are not agreeing among them, because they are uncertain, about the forces that reduce mortality. The poor understanding of the factors driving mortality decline, and the difficulty to forecasting mortality is due in part to the pronounced irregularity of annual to decadal mortality change (Caselli & al.(2003), Dupâquier (1999), Thumerelle (1996), Livi-Bacco (1997), Chesnais (1995)).

Population groups considered for the heterogeneity of lifespan and mortality are usually discriminated by age and sex and also accordingly to their ethic, socio-economic and geographic states.

Life tables and overall mortality levels by age and sex were elaborated at the turn of the XXI century for 191 countries by World Health Organisation starting with a systematic review of evidence from surveys, censuses, sample registrations, population laboratories and vital registration on levels and trends of child and adult mortality. New millennium eve, in overall, 330 millions of people lived in African countries where the child mortality was high and adult mortality was very high. By contrast, 410 millions in Europe and 153 millions in Western Pacific lived in the countries where child mortality was very low and adult mortality low.

In 22 countries or areas, females have an average life expectancy at birth of at least 80 years. Japan (84 years) shows the longest life expectancy for women in the world, followed by China-Hong Kong region (82.6), France and Martinique (82.0), Switzerland (81.9), Sweden (81.8), Spain (81.6), Iceland and Norway (81.3), Australia and Italy (81.0), Canada, Austria and Guadeloupe (80.9), Finland (80.8), Netherlands (80.7), Belgium (80.6), Greece (80.5), Israel (80.4), Malta (80.1), and China-Macao region and Cyprus (80.0).

Fourteen countries or areas of the world reported that men are expected, on the average, to live 75 years or more. Japan and China-Hong Kong region recorded the longest life expectancy for males (77.2) followed by Sweden (76.7), Iceland (76.4), Israel (76.0), Switzerland (75.7), Martinique and Norway (75.5), Netherlands (75.4), Greece (75.3), Australia and Singapore (75.2), China-Macao region (75.1) and Cyprus (75.0).

Life expectancies reported by countries in Africa remain lower than those reported by countries in other parts of the world. However, females in Algeria, Cape Verde, Libya, Mauritius, Réunion, and Tunisia have an expectation of life at birth in excess of 70 years. Average life expectancy for males is reported to be less than 50 years in 27 African countries or areas, and for females in 19 countries or areas.

Among the 25 largest countries, the gap in average life expectancy between women and men is largest in the Russian Federation (13.4 years), Ukraine (10.8 years) and France (7.8 years). The gap is the smallest in Iran (1.5 years), and India (0.6 years). In Bangladesh life expectancy for males exceeds that for females by 0.4 years.

It is possible to discriminate two basic types of the population reproduction. One of them is characterized by average and even low parameters of birth rate. Both low parameters of mortality rate and stabilization of population growth provoke so called "demographic winter", which characterizes essentially economically advanced countries of the world. There are twenty-eight countries whose fertility is below the level of replacement of the generations. The appreciation of fertility is estimated as "too low" in seven countries Armenia, Austria, Czech Republic, Italia, Lithuania, Poland, and Spain. All Anglophone countries and all Scandinavian countries, as

well as Belgium, the Netherlands, and three nations of Central and Eastern Europe: Slovenia, Yugoslavia and Moldavia estimate that the level of their fecundity is low, but satisfactory.

Another type of the population reproduction is characterized by very high birth rate, reduction of mortality rate and as consequence by sharp natural increase of population, called "demographic spring" or “population explosion”. In the sub Saharan countries the population aged less than 14 years represents 36% and only 17% in the OECD countries. In some cases the state may take measures to reduce the population growth. For example, in China, in the biggest country of the world in terms of population carried out specific demographic policy, and the natural increase has decreased with 28 %? up to 11 %? becoming even lower than world average, equal to 23 %? (in that number developing region average is of 26%?, and in advanced - 11 %?). Birth rates are dissimilar in large regions (continents), but also between the states included in them. For example, in Asia the average birth rate makes 26 %?, including the highest (44%?) in Oman and Yemen and the lowest (10%?). - in Japan. Similar position is observed in Africa where birth rate is equal to 40 %? with variation between 51%? in Mali and Angola and 17%? in Mauritania.

Regional healthy life expectancies at birth (disability-adjusted life expectancy) are ranged from a low 37 years in health for African males to a high at almost 70 years in health for females in the low mortality countries of mainly Western Europe. This is approximately two time difference in healthy life expectancy between two contrasting regional populations in the world. In Russia, healthy life expectancy was 66.4 for females, three years below the European average, but just 56 years for males, seven years below the European average. It is a consequence of increase in adult male mortality in the early 1990s. Indeed from 1987 to 1994 the risk of premature death increased by 70% for Russian males. The bottom ten countries are in sub-Saharan Africa, where the HIV epidemic is increasing dramatically. Life expectancy in this area has been reduced 15-20 years in comparison to life expectancy without HIV.

At the present time the curable causes of death are:

- Diseases and injuries
- Impairments and disabilities
- Physiological and pathophysiological
- Behaviour and environmental
- Structural (Access to health care, for example)

Analysing the disease regional burdens three categories of diseases and injuries are usually distinguished:

1) Communicable diseases: infectious and parasitic, respiratory infections, maternal conditions, perinatal conditions and nutritional, bringing about 31% of fatality in the world;
2) Noncommunicable diseases: malignant neoplasm, other neoplasm, diabetes mellitus, endocrine, neuro-psychiatric, sense organ, cardiovascular, respiratory, digestive, genito-urinary, skin disease, musculo-skeletal, congenital abnormalities and oral; explaining nearly 60% of deaths;
3) Injuries: unintentional (motor vehicle accidents, poisoning,…) and intentional (war, homicide, self inflicted) causing more than 9% of deaths in the world.

Younger people are most likely to die from infections and acute conditions and older people are most likely to die from chronic and degenerative illnesses and their complications. Therefore the aging of society means that in the population as a whole there is a relative increase in the importance of chronic and degenerative illnesses.

There is discernible contrast in epidemiological patterns between rich and poor regions. Thus in the more developed countries, the share of disease problem due to communicable, maternal, perinatal and nutritional

conditions is around 5%, it is 70-75% in Africa. Specially, the leading cause of death in Africa is factious and parasitic illnesses and first of all HIV diseases, causing in the group of worst situation 28% of deaths, more than all noncommunicable diseases fatal for 20.2% of population in this continent. For more comparison, in this group of countries homicide and violence cause 1.2%, and wars less then 1% of deaths.

By contrast, in the groups of the healthier populations the principal causes of fatality are noncommunicable illnesses such as: cardiovascular diseases (principal cause for Americans (Cuba, USA and Canada) and European countries, with 41.1% of fatality, and countries of Western Pacific with 35.1 % of fatality), and malignant neoplasm (respectively 26% in certain European countries and 30% of fatality in Western Pacific). Remarkably, the fourth leading cause of death in Europe is road traffic accidents.

In the countries of Eastern Mediterranean and in South Asia the principal causes of deaths are cardiovascular diseases, infectious and parasitic, respiratory infections, prenatal conditions and unintentional injuries.

The two main responses which have been given to assume healthy lifespan that are: the fighting against degenerative diseases in economically developed part of the world with ageing population, and the monitoring of sanitary programs for the areas of the world with young, but less healthy population, can be questionable for the future.

Policy targets will be differentiated depending on fertility, mortality and immigration trends in populations. The industrialised countries face principally the problem of ageing of their societies. For seven most economically developed countries the authors (Tuljapurkar and al (2000)) forecast values of the dependency ratio (that is, the ration of people over 65 to working people) in 2050 that are between 6% (UK) and 40% (Japan). In developing countries the main objective is prevention and care of the communicable diseases.

3. Social health and labour productivity

Over the past century science has made regular progress against disease, and given the dramatic biomedical advances for humans in recent years, it would be risky to bet the long-term affects of demographic trends on Medicare costs and on the institutions of capitalism such as: priority to economic growth, budgets, fiscal policy, and Social security.

Knowles & Owen (1997), using the precepts of widened model of Solow, realised an empirical analysis of the relationship between health (life expectancy), the aptitude to work and the labour productivity. Their econometric estimations, with the data for 84 countries, shown that the variation of the income per head on the period 1960-1985 may be explained by the growth of life expectancy, especially in the developing countries. Other things being equal, the production lowers in case of absenteeism of workers for causes of disease, and the productivity drops also if they continue to work being suffering. The economical performance declines even in absence of diseases clinically identified, for after-effects of the accidents reasons or for the chronic diseases (Rizzo & al 1996 for the United States case).

It is important to make sure that increase of quantity and quality of health services is growing in a way consistent with individual and social preferences, not simply because of distortions arising from the structures of institutions formed at previous periods. Nowadays, older people become functionally able to prolong their working lives, but capability to do it depends on their perceived health. People may choose to take their additional years of life as retirement years rather than as working years, and consequently societies may need to save more to support those additional years of retirement. The new employment insurance should cover to some extent the risks related to the erosion of the previously institutionalized employment relationship. Working time preferences are shifting and becoming contingent on phases of life-cycles, family situation, educational plans and disability.

The active policy to assume the Transitional retirement regime due to ageing consists in finding at short term institutional responses for three types of types of problems:

- adjustments between taxes and replacement benefits assuming equilibrium of financial system;
- creation of provision funds assuming the transitional way to new system of taxes;
- bargain efficient combination between retirement by capitalisation and by repartition

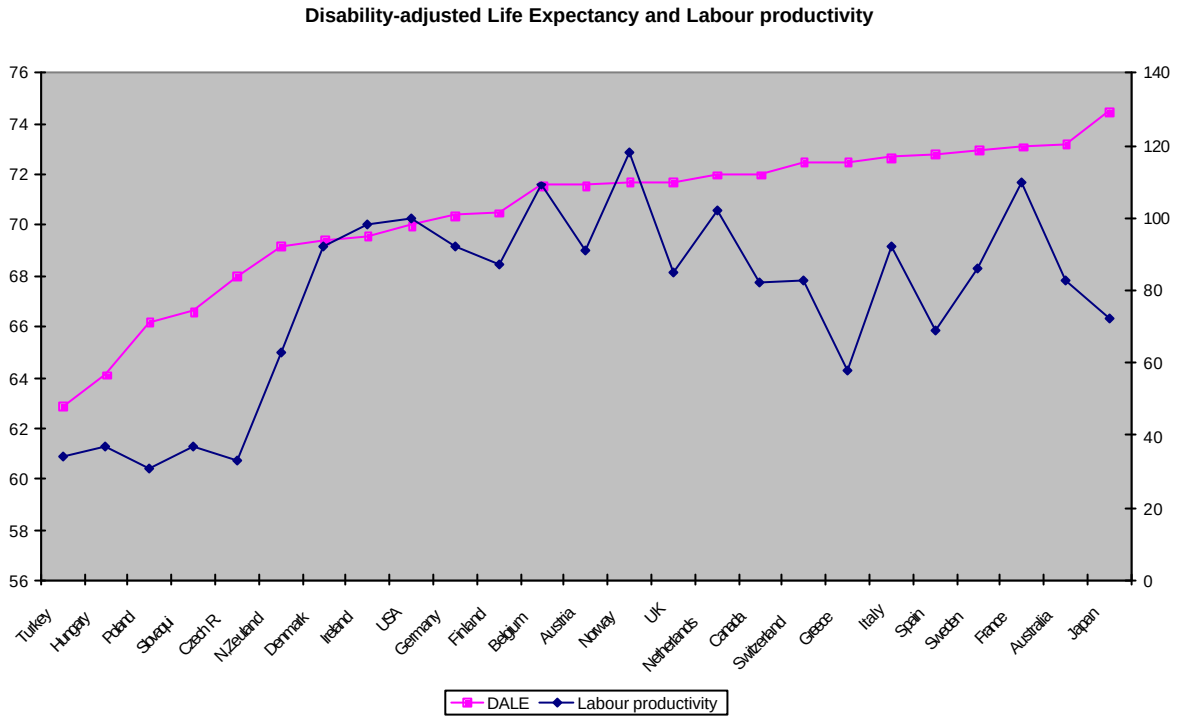
Yet longer life does not cause a fundamental resource problem at long term. By contrast, lower fertility means there are fewer working-age people in the population relative to the elderly, without altering the health or functional status of the elderly. Population aging due to low fertility dos fundamentally alter the resource constraints facing society. To avoid the low fertility cause of ageing process the pro-natalist and pro-immigration policies might be initiated.

When societal objectives change and not economic growth but human development overcomes, the analysts measure the Social health and activity as socially needed and individually vital, at the place of labour productivity.

Although, Amartya Sen (1998) shows that life expectancy has a significantly positive relation with economic growth of nations mainly if this growth is conductive to the incomes of the poor people increase and of public health expenditure increase. More, he points out the defects in basic education, and especially in woman (mothers) education. Indeed, the support-led process without fast economic growth provided remarkable longevity and favourable demographic structure for future development in Cuba than do the people of other Caribbean country Haiti. In Haiti adult literacy keep on 49% and life expectancy is of only 53 years. Age groups repartition is: youth to instruct 40.5% in a charge of active population, 55%, as for population aged 65 and above, it represents 3.5%. In Cuba adult literacy is at the level of 97% and life expectancy of 76 years (23 year more than in Haiti), active population 69%, youth represents 21%, and population aged 65 and above 9.3%. Moreover, Cuban scientific advantage and especially in bio-technology may and certainly will improve the health of other developing countries for solidarity reasons, and also because relevant social services this country developed, are very labour intensive, and thus are relatively inexpensive in this low-wage economy.

In my previous work Peaucelle (2002) I questioned how the demand for health, in the different historic circumstances, modifies the hierarchy of sciences and brings about the industrial restructuring. The demand for health was appreciated through the public opinion polls and the foreground programs of the governments. The intellectual potential was looked under the angle of capacity to promote science, technology and firms' innovation. It was shown that France and Russia are similar in the way to valorise the knowledge and the culture, and they are dissimilar as for the importance attached to health. It comes out from the statistical analyses of economic variables and those representing the human potentialities in the production work for the various countries of Europe of the Nineties that the capacity to innovate goes from pair with the rise in education, and the growth of the incomes goes with the lengthening of the healthy lifespan.

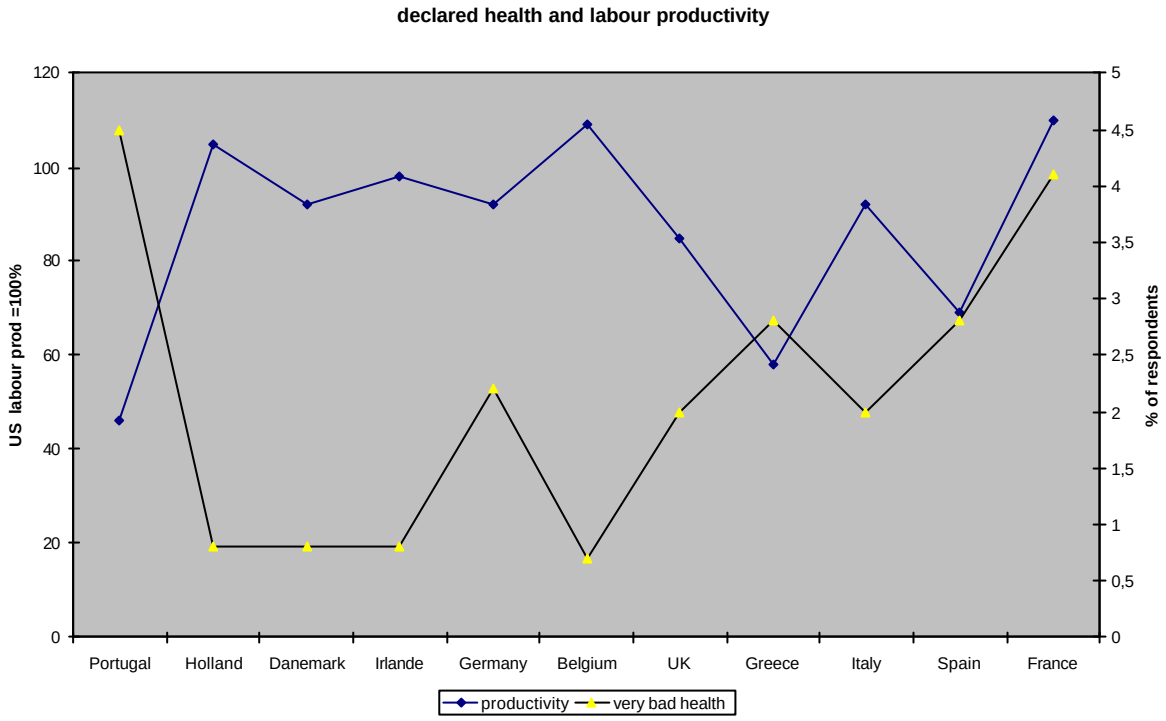
There after I plot the data of health status, in terms of disability-adjusted life expectancy, and hourly labour productivity, in percentage if labour productivity in USA, for 25 countries. Observed by this simple way, the labour productivity is not correlated with healthy lifespan. The low productivity of New Zealand, Greece, Spain, Australia and Japan in comparison with Finland, USA, Norway and Sweden allows presuming on existence of other more powerful reasons that explain the level of productivity. I suggest also that lifespan is not an appropriate characterization of health in the context of labour satisfaction and of motivation for action.



Sources: Mathers & ali (2000) and http://www.bls.gov/fls/flsdescr.htm, http://www.oecd.org/dataoecd/30/14/29861140.xls for GDP per hour worked (1990 US$)

My suspicion is comforted as one analyses the results of self-reported data on health status or perceived health from surveys of particular populations. For example, Sadana & ali (2000) constructed a guess of population health by asking persons if their faculties such as: cognition, communication, dexterity, mobility, pain, vitality, sexual activity, fertility, vision, or speech are satisfactory or not. The study concludes with surprising findings: As per capita GDP *rises*, the average level of self-reported health gets *worse*. For instance, the comparison of France with Russia shows that wealthier country France, spends much more resources on health (2,125 $ in France and only 251 $ in Russia), and presents the best figures of disability free life expectancy in Europe 73.1 years (and only 61.3 years in Russia, worse situation in Europe, in 1997), but is in worse situation than Russia according to perceived health level. Indeed, the striking evidence between the two countries is that in France the female health level is only of 58% and 59% for males. In Russia, the levels are respectively of 60% and 63% at the same age. By comparison, the physical condition of surveyed population in China was at the level of 98%.

Plotting for some countries the data of labour productivity per hour and the appreciations of the health by surveyed persons, we can see a strong correlation. In the following graph are reported some systematic negative connections, except for France, between the share of very bad health in population and its relative labour productivity.



Sources: Sadana & ali (2000) and http://www.bls.gov/fls/flsdescr.htm, http://www.oecd.org/dataoecd/30/14/29861140.xls for GDP per hour worked (1990 US$)

4. Social psychology about health and labour (human activity)

The fact that every society guesses its health status largely independently on their healthy life expectancy allows me to conclude that Health is a trust, an expression of the social totality, or a part of the semantic and system structure of social consciousness.

The theme of social totality was in the heart of Lev Vygotsky (1896 - 1934) psychology works which have been elaborated into principle of Marxian dialectical materialism. He initiated the idea that mental processes are social and historical in origin, and that human consciousness have been directly formed by the practices of human activity and the corresponding forms of culture.

As such, Health must be seen as a societal need, a need recognised by community in historical perspective. The labour motivation and social health are situated approximately at the same level of consciousness' maturity and they are likely complementary. The trust is achieved, in part, by the behaviour of social groups into specific environment, 'unitary economies' (Kondratiev (1931)).

In so called knowledge-based society the sense of satisfaction and criterion of acting efficiently became fussy. On the one hand, people knows its health status and asks for adequate medication, on the other hand, abnormality gives to a modern person a sense of cultural exclusivity and may be excessively cultivated (for example, anorexia). To develop this point about the relationship between ill health and intellectual action, I venture some lines of Dostoevsky novel "Notes from the underground".

But, gentlemen, whoever can pride himself on his diseases and even swagger over them? Though, after all, everyone does do that; people do pride themselves on their disease… But yet I am firmly persuaded that a great deal of consciousness, every sort of consciousness, in fact, is a disease.

Even in toothache there is enjoyment. …In that case, of course, people are not spiteful in silence, but moan; but they are not candid moans, they are malignant moans, and the malignancy is the whole point. The enjoyment of the sufferer finds expression in those moans; if he did not feel enjoyment in them he would not moan. … I ask you, gentlemen, listen sometimes to the moans of an educated man of the nineteenth century suffering from toothache, when he is beginning to moan, …not simply because he has toothache, not just as any coarse peasant, but as a man affected by progress and European civilisation, a man who is "divorced from the soil and the national elements," as they express it now-a-days. His moans become nasty, disgustingly malignant…. In all these recognitions and disgraces it is that there lies a voluptuous pleasure. …

Since Dostoevsky wrote the novel in 1864, many authors have observed the worrying relationship between individual creativity and consciousness about self health status. One recent case occurred to me: the biologist Jean-Pierre Changeux (2002) hypothesises that scientists work desperately hard at their problems most likely because they get pleasure from this mental process in itself. The logical development would be in such “divorced from natural life” society: suffering (ill health) provides voluptuous pleasure and creativity.

Other pieces of evidence give us an idea about historical character of health status. If only fifty years ago the medical secrecy was an ethical trust strictly respected by doctors and patients, today, it is widely spread out to notify infirmity and diseases and to insist on them publicly. Such claiming concerns especially the VIH infections, cancer, human genetic diseases, and all categories of handicap. The people in many societies do not intend to look healthy and wealthy, but asks for health. It modifies the trust on normality and brings about the adaptation of workstations, the flexible working hours, and finally, the division of labour in general.

The conception of health as a trust acknowledges a variety of health-labour policies in accordance with the principle of full employment targeting.

In elaborating health-labour policy it is important to start by evaluating social links either locally, within a ‘unitary economy’, considering demographic, educational, health status, and migration practices. The psychological significance should be taken into account of the feasibility study of every project into labour nexus development, because the human behaviour is spread by waves started by belief immerging in small group of persons sensible to project objective. After that the diffusion of new mode of behaviour depends on the position and weight of this group.

Also the conduct of health-labour policy depends on the concrete knowledge of transmission channels which have been exceedingly altered recently. The price liberalisation, or so called shock therapy, in Eastern Europe in earlier 1990th was initiated with expectation to increase economic incentives and labour motivation. Unfortunately, the impact was extremely disastrous for human dignity, pride, moral values, and eventually for health, job satisfaction, and wealth of a large majority of the population. The shock, provoked by attacks of 11 September 2001, on Western World maxim, modifies their ethical trust also, altering State policies and individual behaviour. People still get socially sick. The health becomes better thought-out then wealth with mitigated consequences for general labour productivity.

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