

The econometrics of inequality and poverty
*Chapter 2: Why should we be concerned by inequality
and poverty?*

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1 Introduction

Why should we be concerned by inequality and poverty? The traditional and main stream economic theory is concerned with the formation of income and consumption, not with its distribution. As underlined in Tirole (2017), market is certainly the best instrument for managing scarcity in term of efficiency. However, as equally well noted by Tirole (2017, pages 209-214 of the french edition), markets have deficiencies that have to be corrected. In particular, even *if market are economically efficient, there is strictly no reason why they would produce equity*. The role of the state is to provide redistribution and regulation. Inequality can be seen as a deficit of insurance. So the recent economic theory, as exemplified in Tirole (2017) is concerned about correcting the market deficiencies (imperfect competition, imperfect information, etc...), designing rules so as to provide correct incentives. Once these rules are correctly established we should be in the best of the possible worlds. So why having interest in inequalities and poverty?

We can provide various type of answers to this type of question.

1. Concern of the public, using opinion surveys in China
2. Historical reasons (Grece, christianity)
3. Political philosophy: Rawls and Sen
4. The welfarist approach
5. Economic policy consequences

We shall examine the first one which comes directly from public interest, commenting results from the Chinese General Social Survey about opinions and values. When individuals are asked what is their perceived distribution of earnings for various types of jobs and what would be a fair distribution, we note a large discrepancy between the two. And that discrepancy is not always in the same direction.

The second type of answers comes from historical situations. We shall take the example of the ancient Greece, how society was organized and what was the definition of poverty and what was the degree of redistribution. The treatment of poverty and inequality in term of social justice appeared only lately in history with christianity.

Modern political philosophers are concerned about a just organization of society based on principle of justice. We shall examine the contribution of Rawls (1971) in his Theory of Justice. The principles he promoted lead to consider primarily the fate of the least favoured people. However, Rawls was criticized for having a formal vision of justice, far from implementation problems. The approach of Sen, detailed for instance in Sen (2009) is based on concrete situations with the notions of functioning, later developed with the notion of capabilities.

Finally, economists have developed a particular vision concerning the distribution of income which is known as revealed preferences. How this cope with the previous contributions, and what are its consequences in term of economic policy and of the measurement of welfare and of poverty?

2 Opinion and values

So in this lecture, we are going to devote our attentions to notions that might entail conflicting opinions in many minds as they concern inequality and poverty. Primarily, there is the question of the origin of poverty and justifications for inequalities. This is a philosophical problem. More basically, people have a certain representation of the income distribution, on how much a certain category should earn. People have also a mental representation about the causes of poverty and the justification for redistribution: are individuals poor because they are lazy? In this case they are responsible of their poverty state and it become hard to justify redistribution. Or are individuals poor because of circumstances (earthquakes, land-flood, handicap, lack of opportunity, lack of social mobility, etc...). In this case, they have to be compensated.

In order to put some statistical flesh to these ideas, we shall use the Chinese General Social Survey (CGSS) which contains a lot of information on social values and opinions. We shall use the 2006 wave which is the last available. We have a total of 9 517 observations. This survey was already presented in the introduction.

2.1 The income distribution

Questions were asked about the perceived income distribution of five different categories of jobs in the population and what it should be in a fair world. This is thus an indication about the perception of the income distribution, the aversion for inequality and the desire for redistribution. The categories are peasants, migrant workers, factory workers, senior government officers and CEO (Chief Executive Officers) of private firms. The questions are phrased as follows for peasants:

1. What is the actual mean real income of a peasant as you perceive it
2. What would be the fair income of a peasant

The phrasing is identical for the other categories. Remember that the new national poverty line for China is 2 300 yuan (\$360) per year. We have indicated in Table 1 the perception that individuals have of diverse categories, giving various summary statistics. We have given, minimum and maximum which are not very indicative, but mainly three quartiles and the mean. In the last column, we have given the Gini index, which is an index of dispersion or inequality on a scale between 0 and 1. Usually individuals have a coherent opinion between what their perceived and what they consider as being fair. For the first three categories, which are basically workers, individuals think that they do not earn enough. And there is no much variance in these opinions. This is just the reverse for the last two categories which are supposed to be richer and have a higher prestige. Both the mean and the median of a fair income are lower than the perceived income. This is especially true for Chief Executive Officers. However, for the rich categories, the opinions, both in the perceived real income and the fair income are much more dispersed. This is hard to find a consensus about what would be a fair income for those categories.

Table 1: Summary statistics about real and fair income (yuans per month?)

Category	Perception	Min	Q_{25}	Q_{50}	Mean	Q_{75}	Max	Gini
Peasant	Real	5	200	370	488	600	25 000	0.445
	Fair	20	500	700	833	1 000	100 000	0.353
Migrant worker	Real	50	600	800	877	1 000	30 000	0.276
	Fair	8	800	1 000	1 210	1 300	200 000	0.281
Factory worker	Real	50	700	900	1 044	1 100	35 000	0.264
	Fair	98	1 000	1 100	1 408	1 500	300 000	0.285
Gov officer	Real	98	3 000	5 000	8 311	8 000	300 000	0.534
	Fair	98	2 500	4 000	6 215	5 000	300 000	0.498
CEO	Real	98	5 000	9 000	21 390	20 000	300 000	0.633
	Fair	98	4 000	7 000	17 380	10 000	300 000	0.638

2.2 Poverty and redistribution

Opinion variables in the CGSS are reported on a four-level scale tracing agreement to a given proposition (1 for totally disagree and 4 for totally agree). The three statements that we have kept are as follows:

1. Government should tax the rich to help the poor.
2. Individuals are poor because society is not well-functioning, especially because of mis-governing.
3. Individuals are poor because they these people choose to be lazy and this is of their own responsibility.

These three variables are related to poverty and its causes. The first variable, *qe4714* in the data, expresses the desire for redistribution. It represents a summary of what we have seen above about perceived income and fair income. From the empirical frequencies reported in Table 2, we see that there is a vast majority (81%) in favour of redistribution. There is a weaker majority (67%) that do not agree with the proposition that individuals are poor because their are lazy. Finally, there is a strong majority (77%) that agree with the opinion that individuals are poor because of circumstances and malfunctioning of the society. How are these opinion

Table 2: Attitude and perceptions, empirical frequencies (without weights)

	1	2	3	4
Redis. Pref.	0.027	0.166	0.508	0.297
Poor. lazy	0.216	0.457	0.243	0.082
Poor. circum	0.024	0.201	0.573	0.200

correlated? We can compute a matrix of correlation between these ordinal variables. The desire for redistribution is positively correlated with circumstances (0.21) while it is slightly negatively

correlated with the lazy opinion (-0.09). On the contrary, the two variables causes of poverty are roughly uncorrelated (0.01).

3 Historical treatment of poverty and inequality

History can bring some answers concerning inequality and poverty. We contrast the situation in ancien Greece to the Christian revolution where certain forms of poverty were praised.

3.1 The ancient Greece

In a contributed paper of Leroux and Livet (2009), the historian Isabelle Koch underlines that both Plato (The Republic) and Aristotle (The Politics) consider poverty as a factor of social instability and a lack of social cohesion and integration. How to integrate the poor in the functioning of society? The main question is totally pragmatic: how to redistribute in order to prevent the poor classes from starting riots.

Let us briefly describe the social and political situation in the Athens of the fourth century BC. The city is political independent. Its population is divided into citizens (people who receive this quality due to their birth), foreigners (meteques) who are living in the city, but are born from parents foreign to the city and slaves. Being a citizen gives political rights and political duties: take part to political assemblies where laws are voted and to judicial assemblies. Being a citizen gives the economic right to own a piece of land. This right is denied to the foreigners.

There is not a one to one mapping between the social classes and the distribution of wealth. The social value is to take part to the democratic life. For this, you need time and thus work is not valued, except for peasants. There are some very rich slaves ruling domains or banks (very rare in number in fact) and poor citizens. Being rich for a citizen means having enough money to pay somebody to work for you. In the nineteenth century, to be rich meant having sufficient rents to avoid working.

There is no solidarity between the different classes of poor individuals (slaves, citizens, foreigners) because they do not have the same rights. Rich citizens provide large redistributive contributions which are in between taxes and sponsorship and which meant to contribute to the functioning of the city: organizing banquets, preparing the war, organizing festivals. These private spending are a source of honour for the rich class, but they can also lead some of them to a financial disaster too. However, it is quite difficult to escape them. One reason being that these spending are not perceived as an act of charity by the poor, but as a right. The rich have to redistribute to the poor so that they take part to the political assembly and vote according to their views.

In order to avoid a too great influence of a minority of rich citizens, the city (in fact Pericles) created a kind of salary to take part to the public assemblies. The sum perceived is not important, but cumulating them provides a way for getting a minimum income. There were a lot of discussions on the bad effects of these allocations because it led political decisions to be taken by maybe incompetent people. But they are a cement for the city because they benefit mainly to the poor.

3.2 What do we learn from Greece?

The Athenian situation is illuminating for several reasons.

- It provides an objective definition of the poor: not being rich enough to buy a slave. This is an absolute definition of poverty.
- Poverty and inequality are considered within a social contract expressed by being a citizen of Athens. There are enormous social values.
- Inequality in the distribution of wealth and income is accepted, but wealth is not exactly private. It is seen as a common belonging of the city. This justifies the obligation of redistribution.
- There is a kind of basic income, a topic which is very much debated nowadays.

3.3 Christianity and the notion of justice

In ancient Greece, the main question is not to redistribute resources in order to progress in the field of justice. Redistribution is just a way to have a functioning society for the citizens (not for the others). The analysis of poverty in term of social justice started only after the christianization of the Roman empire. There is a strong accent put on the fate of the least favoured in the Christian message. During the Middle Ages, poverty was even viewed as a virtue with the development of Mendicant monk order (franciscans especially). This was completed by suspicion against money with the church forbidding lending with interest. This attitude totally changed with reformation in the sixteen century. The fundamental question became who has received the grace from God and who has not. Being rich and successful was the sign that people had received the grace and were elected by God. This gave rise to a strong development of capitalism in protestant countries in the nineteen century

4 Modern theories of justice

Contemporary political philosophers were largely at the development of the theory of justice. We have essentially two very big names: John Rawls with his major book: *A Theory of Justice* (Rawls 1971) and the Nobel Prize (in Economics) Amartya Sen with many contributions out of which we point out his recent book *The Idea of Justice* (Sen 2009). But they are of course not the only ones.

In order to find ones' way among the diverse theories of justice, it is interesting to recall the tale of the flute which was introduced in Sen (2009). The aim of this tale is to show that there is no universally accepted solution when there is a question of justice. Libertarian and marxists, utilitarians, and egalitarians would all give the flute to a different person. The tale is about the story of a craftman who manages to make a flute out of a piece of wood. The second character is a flute player who has no instrument on which to play. The last character is a very poor person who has nothing, who is in severe needs but does not know how to play the flute.

1. A *libertarian* or a *Marxist* would give the flute to the craftsman who has exercised his labour on a dead piece of wood and managed to give life to it, making it a productive piece of wood. Taking the flute from him would be an alienation of his work.
2. A *utilitarian* might want to give it to the person who can play the flute the best, here the flute player. That would maximize the utility for all that have to listen to him playing the flute. This is socially rewarding.
3. Finally, an *egalitarian* would give the flute to the poor person who has strictly nothing. He is the poorest and needs it most. He would be his first present in his life. Remember the tale of the little bear Michka and father Christmas (Santa Claus).

4.1 Rawls and the veil of ignorance

Rawls has proposed a method which could be used to solve the above flute riddle. This is the method he is using in order to build his theory of justice. This is a mental experiment called the *veil of ignorance*. Rawls thinks that all individuals are basically selfish which means that an individual faced to a decision problem is going to choose the most advantageous alternative for him. The *veil of ignorance* is a thought experiment that consists in putting individuals in a position where they have to think about justice principles without knowing their future position in society. This means not knowing in a future hypothetical society what is going to be their gender, their race, their possible handicap, their social class. As individuals are rational and adverse to risk, they would not like to be a victim of discrimination in this future society. As a consequence the first principle of justice is that the social planner must focus all his attention to the poorest members. This thought experiment justifies thus the position that the fate of the least favoured has to be privileged because everybody imagines that he could be that person. This view is thus opposed to pure utilitarianism which looks at maximizing the utility of the greatest number. Rawls' principle is equivalent to the maximin in a decision problem. It is also justice as equity. Minorities have to be protected.

Starting from this principle, how can we apply it in a given society. This immediately casts the question of inequalities: are they just or unjust? The veil of ignorance promotes two principles: principle of freedom and principle of difference:

1. Inequalities must be socially acceptable, which means that they must be related to occupations or positions that are accessible to everybody, obeying to the principle of *equality of opportunity*. This means that society has to be mobile and social mobility has to be guaranteed by institutions.
2. Inequalities have to be socially useful. A talented person deserves a higher income if the whole society can take advantage of his talent. Consequently differences in earnings should depend on work and merit in order to avoid discouragement that would be harmful to society. The second use of inequalities is that if we want to redistribute to the poor, there must be something to redistribute.

Rawls justifies progressive taxation because individuals are not responsible for their talents. There is a genetic lottery and talents are distributed at random. And anyway, we have seen in the introduction that IQ is much less unequally distributed than income. So what is progressive taxation? Progressive income taxation means that the ratio $t(x)/x$, the amount paid in taxes, $t(x)$, divided by the level of income x (or the tax base) is an increasing function of x . It arises from principles of vertical equity. Taxes are designed so as everyone experiences an equal loss of utility. A concave utility function justifies progressive income taxation because it assumes a decreasing marginal utility of income.

4.2 Sen and the capabilities

The academic field of political philosophical in the twenty century was dominated by the debate between Rawls and Sen. Rawls (1971) had an immense impact on political philosophers. The main point of the debate between Rawls and Sen is about applicability. In a way, Rawls (1971) has developed an abstract notion of justice, based on a thought experiment (the veil of ignorance) and the design of just institutions. For Sen, justice has to be defined within a social context. If Sen (2009) recognised the necessary of just institutions, he insists that *what happens to people* must be a central concern for a theory of justice. In his previous works Sen, has developed the concepts of functionings (summarized in Sen 1992) and later of capabilities with Sen 1993.

The concept of **functionings** focuses on the need to attain some basic multidimensional outcomes that can be observed and monitored relatively easily. Functionings can be understood to be constitutive elements of well-being. One lives well if he enjoys a sufficiently large level of functionings. The functioning approach would generally not attempt to compress these multidimensional elements into a single dimension such as utility or happiness. Utility or happiness are viewed as a reductive aggregate of functionings, which are multidimensional by nature. The functioning approach usually focuses instead on the attainment of multiple specific and separate outcomes, such as the enjoyment of a particular type of commodity consumption, being healthy, literate, well-clothed, well-housed, socially empowered. Modern household panels have a whole set of questions concerning basic functioning such as a well-heated house, good relations with neighbours, health status and so on.

The **capability** approach is defined by the capacity to achieve functionings, as defined above. Having the capability to achieve "basic" functionings is the source of freedom to live well, and is thereby sufficient in the capability approach for one not to be poor or deprived. It puts considerable value on freedom of choice: a person will not be judged poor even if he chooses not to achieve some functionings, so long as he would be able to achieve them if he so chooses. This distinction between outcomes and the capability to achieve these outcomes also recognizes the importance of preference diversity and individuality in determining functioning choices. It is, for instance, not everyone's wish to be well-clothed or to participate in society, even if the capability is present.

5 Welfare or not welfare

We have received many reasons explaining why it is important to study poverty and inequality. First in relation with some strand of the literature on political philosophy and second in relation with the opinions expressed by the public. The question is now how to proceed and what is the point of view of economists. This is well detailed for instance in Duclos and Araar (2006).

In the economic literature, we can find two opposed, but nowadays complementary, approaches to the measurement of inequality and poverty: the welfarist and the non-welfarist approaches. To summarize the debate that we have introduced at the macro level:

- Individual welfare can be measured in monetary term and is the result of individual decision. A macro measure is the GDP per capita. It can be completed by some measure of human capital.
- A measure of individual welfare has to take into account the social context of the individual, the relation with other people and with nature. We thus have to introduce various notions of capital: physical, natural and social capital. We have also to take into account depreciation of these different capital stocks.

More precisely, the welfarist approach assumes that individuals maximize their utility function under a budget constraint in a surroundings where markets and information are perfect. So the key variable is income and eventually wealth. This is the traditional view of economists, known as *revealed preferences*.

The non-welfarist approach insists on the multidimensional aspect of well-being. In a world where markets are not perfect, where information is limited, the maximization of utility under a budget constraint cannot provide all the necessary information concerning the degree of well-being reached. Other pieces of information are needed. The maximization of individual utility function is not enough. The non-welfarist approach build on the work of Amartya Sen, as we can guess from the previous section.

5.1 Pure welfarist approach

The welfarist approach relies on the notion of revealed preferences. The utility function of an individual and his level of utility can be inferred from his decisions as decisions are supposed to be taken according the principle of maximum expected utility. This does not work of course in the case of imperfect markets, imperfect information, discrimination and so on.

The second difficulty comes from the fact that we want to compare individual utilities to form a social judgment. How are we going to measure the actual pleasure derived from experiencing economic well-being? Even if we manage to establish a relation between individual utility and collective well-being, it is highly problematic to compare that level of utility across individuals. It is well-known that such a procedure poses serious ethical difficulties: preferences are heterogeneous, personal characteristics, needs and enjoyment abilities are diverse, households differ in size and composition, and prices vary across time and space.

To be operational, pure welfarism requires the observation of sufficiently informative revealed preferences. For instance, for someone to be declared poor or not poor, it is not enough to know that person's current characteristics and income status: it must also be inferred from that person's actions whether he judges his utility status to be above a certain poverty utility level.

The working definition of poverty for the welfarist approach is therefore a lack of command over commodities, measured by low income or consumption. These money-metric indicators are often adjusted for differences in needs, prices, and household sizes and compositions. The main tool is the welfare function which has as argument the income distribution, where income is corrected for household composition, housing prices and so on.

Income and consumption clearly represent far-from-perfect indicators of utility and well-being. **Indeed, economic theory tells us little about how to use consumption or income to make consistent interpersonal comparisons of well-being.** Besides, the consumption and income proxies are rarely able to take full account of the role for well-being of public goods and non-market commodities, such as safety, liberty, peace, health. In principle, such commodities can be valued using reference or shadow prices. In practice, this is difficult to do accurately and consistently.

5.2 Difficulties of implementation

Both approaches, welfarist and non-welfarist, causes **difficulties of implementation**. We have seen the difficulties entailed by considering the sole income as a measure of well-being. Deprivation of functionings are easy to measure in household surveys. However, if the achievement of all basic functionings implies non-deprivation in the space of all capabilities, the converse is not true. Failure to achieve all basic functionings does not imply capability deprivation.

The multi-dimensionality of the non-welfarist criteria also translates into greater implementation difficulties than for the usual proxy indicators of the welfarist approach. In the welfarist approach, the size of the multidimensional budget set is ordinarily summarized by income or total consumption, which can be thought of as a one-dimensional indicator of freedom. So it is rather trivial to define a poverty level for the welfarist approach. It is much more difficult to define a poverty level for each dimension of multidimensional approach. And we do not know what to say if one is constrained in one dimension, but not in the others. There is a difficulty of aggregation.

5.3 Another approach with happiness economics

The main object of the controversy between the two approaches is a question related to the measurement of individual welfare. Is income sufficient, or should we use other indicators for individual welfare. Income is relatively easy to measure. Building a social welfare function is then a textbook exercise. The approach by functionings is more appealing, but there are problems of measurement and aggregation.

In the last thirty years was developed a whole strand of the literature know as *Happiness Economics*. See e.g. Frey and Stutzer (2002) for a survey. This term is rather misleading,

because it refers to a notion which is not so well-grounded (except perhaps in psychology) and has a journalistic flavour. It would be better to speak about subjective well-being.

The main claim of happiness economics is that individuals can report a subjective evaluation of their well-being and that this reporting has an economic content. The report is done on a Likert scale as the one we have seen concerning opinions about the causes of poverty and the desire for redistribution. The declared level of subjective well-being can be used as a gauge for aggregating (using a regression) various indicators of deprivation in order to build a poverty index, an inequality or a development index.

6 Policy and welfare

Economists were engaged in an axiomatic building of welfare functions, inequality and poverty indices. Essentially we have the contributions of Atkinson (1970) for an axiomatic building of a welfare function and an associated inequality index, all based on the aversion for inequality, and Atkinson (1987) and Sen (1976) on the measurement of poverty. However, beyond this axiomatic building, the way welfare is considered can have serious consequences, first for economic policy and second to qualify the evolution of society in a period of high economic growth.

6.1 Policy implications

A welfarist approach would favour opportunities of getting a higher income. But individuals might not use this greater income for educating for instance because the return of education are too far away in the future. A non-welfarist approach would provide free and compulsory education, as Jules Ferry did in France. The fulfilling of basic functionalities (health, education) requires investment in public goods. Furthermore, social cohesion concerns are arguably not well addressed by the maximisation of private utility, and raising income opportunities will not fundamentally solve problems caused by adverse intra-household distributions of well-being, for instance. However, that approach can be criticized too. The welfarist school conversely emphasizes that individuals are generally better placed to judge what is good for them. There is then an emphasis on the freedom of individual choice.

6.2 New measures of welfare

A macro economist would tend to compare countries using the tool of GDP per capita. A micro-economist would consider household composition and introduce equivalence scales. However, both make use of a monetary index. The United Nations have promoted the use of another measure, where the GDP per capita is completed by a measure of human capital, taking into account health status and literacy. This is the Human Development Index. The data comes from the United Nations Programme for Development (PNUD). They can be obtained at <http://hdr.undp.org/en/statistics/>.

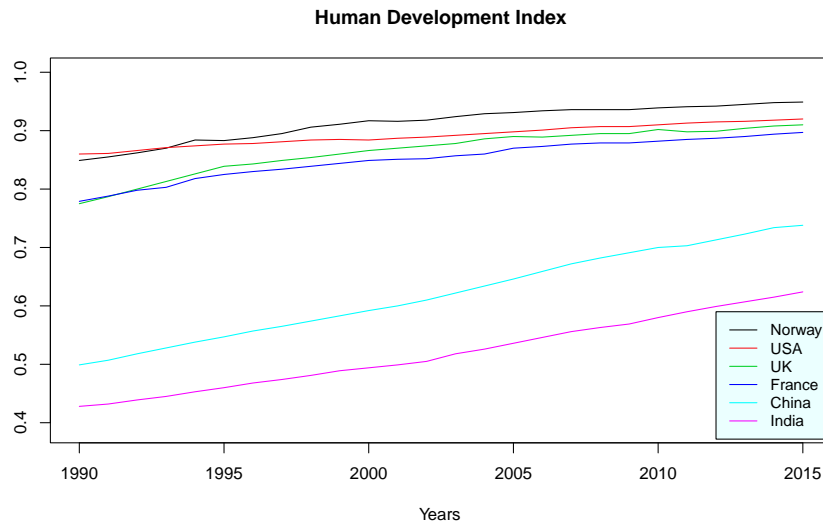


Figure 1: Evolution of the HDI for six countries

7 Conclusion

The reasons for having interest in poverty and inequality are numerous and varied. The main reason could be that there is a strong social demand for this topic. For instance in France, every September, INSEE (the National Statistical Agency) published a record of the evolution of poverty and inequality and a large echo to this publication is made in the press. However, we have seen that defining and measuring inequalities and poverty are not a simple matter. This series of lectures is devoted to the measurement of these two notions and to the analysis of the statistical and econometric tools necessary to achieve that goal.

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