

Inequality of Opportunity in Health and Healthcare: an overview

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Context

- There is now a large theoretical and empirical literature in economics on inequality of opportunity (IOP) in education, earnings and other socioeconomic outcomes.
- In the last decade, growing literature in the area of IOP in health
 - Invitation to write a chapter on IOP in health and healthcare for the *Oxford Encyclopedia of Health Economics*

After a presentation of the framework of IOP applied to health and healthcare, the questions we want to answer are:

- What is the state of the art on IOP in health and healthcare?
- What's special about health and healthcare w.r.t. IOP literature?
- What's next in IOP in health and healthcare?

The framework of equality of opportunity

How different are health and healthcare outcomes?

- Health outcomes are measurements of individual health status:
 - Self-reported and directly available in the survey
 - Self-reported as part of a set of questions and transformed into a health score or utility
 - Anthropometric measurements, performance tests, biomarkers data collected directly available in some surveys
- Healthcare outcomes are related to healthcare consumption:
 - Self-reported utilisation of various types of healthcare (visit or not, frequency of visits)
 - Self-reported access to various health services (basic health care, nutrition, immunisation, mammography)

From inequality to inequality of opportunity in health I

- Reduction of health inequalities is the main objective of public health policies worldwide (WHO, 2008)
- Pioneering work of the ECuity and the Eurothine projects since 2000
 - Empirical research on the magnitude of health inequality, cross-country comparisons and social determinants
 - *Horizontal* and *vertical* equity at the core of this literature: health needs versus socioeconomic factors
- IOP brought an *explicit* normative understanding of the inequalities and health determinants with a partition of sources of inequality
 - Determinants that belong to individual responsibility (*Effort*) considered as legitimate
 - Determinants which the individual is not responsible for (*Circumstances*) considered as illegitimate → IOP

From inequality to inequality of opportunity in health II

The achievement of equality of opportunities implies to respect 2 principles

- The principle of compensation:
 - inequalities due to circumstances should be compensated for (compensation to individuals for unfair inequalities)
- The principle of liberal reward:
 - inequalities due to responsible efforts should be respected (e.g. respect of the impact of effort on health)

A definition of IOP in health

- The key idea of responsibility in IOP in health is easy to conceptualise:
 - Illegitimate sources are related to circumstances (beyond individual responsibility, e.g. social and family background)
 - Legitimate sources are attributed to consequences of individual effort (consensus in the health field on lifestyles as an example of effort)
- Two important aspects to consider in this context:
 - Reference to an “age of consent” that acts as a threshold below which people can’t be held responsible for their effort ([Arneson 1989](#))
 - The precise definition of effort, which should be **rewarded** and the definition of circumstances, which should be **compensated** since effort and circumstances cannot be assumed to be independent ([Roemer 1998](#); [Jusot et al. 2013](#))

A definition of IOP in healthcare I

- The transposition of the IOP concept to healthcare use or access is not direct
 - How can we define determinants that one can be held responsible for in the context of healthcare use/access?

Healthcare use is determined by health care needs and availability

→ Circumstances beyond responsibility

but healthcare use also represents individual's healthcare habits and preferences

- Two competing views debate on how preferences should be treated:
 - Preferences should be fully respected (individual responsibility for preferences) (Dworkin, 1981)
 - Individuals only responsible of what they can control (Cohen, 1989)

A definition of IOP in healthcare II

- The debate on preferences matters for IOP in healthcare outcomes:
 - Are the factors explaining differences in healthcare ethically justified (Fleurbaey & Schokkaert, 2011)?
 - There is a moral right to healthcare: healthcare is a concern of justice and it is the responsibility of public health sector to provide care according to needs – equity (Daniels, 1985)
 - Illegitimate sources attributed to factors unrelated to healthcare needs (e.g. socioeconomic status, availability of services, geographical status)

Measuring IOP: two perspectives

- 2 different approaches for the **compensation** principle:
 - The ***ex-post approach*** consists in looking at differences in the actual outcome between individuals having the same responsibility (effort)
 - Equality of opportunity if all those who exert the same effort obtain the same outcome.
 - The ***ex-ante approach*** consists in looking at differences in the actual outcome between individuals having the same circumstances (types)
 - Equality of opportunity if all individuals face the same set of opportunities, regardless of their circumstances
- The choice between the 2 approaches is driven either by data availability or ethical viewpoint

The correlation between effort and circumstances

- What is the precise definition of the effort that should be rewarded?
 - Debate about the Asian student (Roemer 1998; Barry 2005) : *“Asian children generally work hard in school and thereby do well because parents press them to do so. The familial pressure is clearly an aspect of their environment outside their control”*

Barry: *“the fact that their generally high levels of effort were due to familial pressure does not make their having expended high levels of effort less admirable and less deserving than it would have been absent such pressure”* → the correlation is irrelevant

Roemer: *“if we could somehow disembodify individuals from their circumstances”* → we should respect the effort purged from circumstances

Transferred to health, one would ask whether it is legitimate to hold sons of smokers less responsible to smoke than sons of non-smokers

- The distinction is meaningful in *ex-post* however *ex-ante* (where only circumstances are observed) one must adopt a Roemer approach

EOP principles across generations I

- What is the precise definition of circumstances that should be compensated?
 - Intergenerational issue on identifying whose effort it is : *“Asian children (..) do well because parents press them to do so”* and *“their generally high levels of effort were due to familial pressure”*

The transmission of values through **parental effort** results in **effort exerted by the next generation** however if one considers that pressure from family to educate children is a parental effort → circumstances to be compensated

“To the extent that the reproduction of inequality across generations occurs through the transmission of cultural traits, it does so substantially (though not exclusively) through intimate familial interactions that we have reason to value and protect. Preventing those interactions would violate the autonomy of the family in a way that stopping parents doing spending their money on, or bequeathing money to their kids would not.” (Swift 2005, Sørensen 2006)

- Impossibility to respect principles of compensation and liberal reward for every generation

EOP principles across generations II

- If one give precedence to the young generation in the application of the two EOP principles, then all initial background is circumstances, including parent effort linked to children effort:
 - The principle of compensation for the young generation is viewed as more important than the principle of natural reward for the past generation → the vector of circumstances includes all past variables
- If one give precedence to the past generation then parental effort must be respected, whatever its consequences on the next generation.
 - The principle of natural reward for the past generation is viewed as more important than the principle of compensation for the young generation → the vector of circumstances should somehow be purged of its consequences to children effort

Empirical investigation on the correlation effort/circumstances

- French Health Survey 2008 (Jusot et al. 2013) : Barry, Roemer, Swift

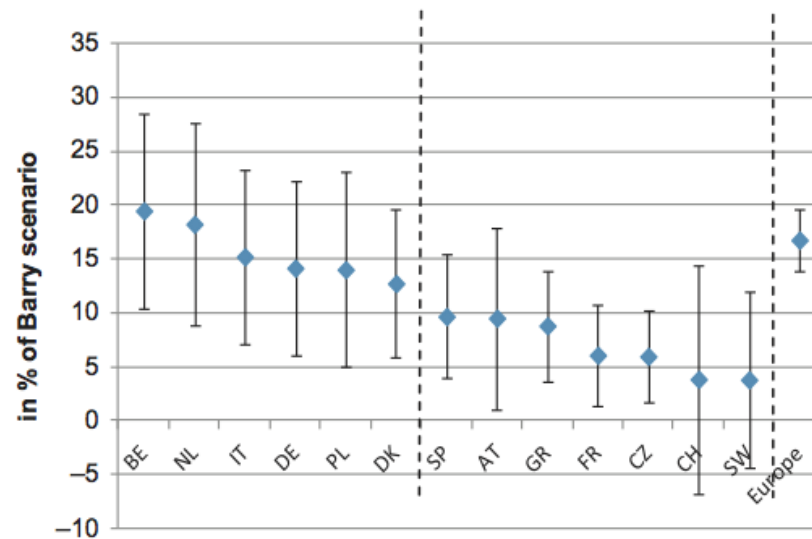
Table III. Decomposition of inequalities in health according to the three sources, circumstances, effort and demographics (Benchmark case bootstrapped with 1,000 replications using percentiles methods)

Full model	Contribution of circumstances (SE)	95% confidence interval	Contribution of effort (SE)	95% confidence interval	Contribution of demographics (SE)	95% confidence interval	Total inequality (SE)	95% confidence interval
Barry's scenario	45.69% (4.233)	[38.91; 55.59]	6.71% (1.446)	[3.73; 9.67]	47.59% (4.126)	[38.13; 54.19]	0.435 (0.0292)	[0.413; 0.526]
Roemer's scenario	46.43% (3.980)	[41.04; 56.35]	6.14% (1.268)	[3.53; 8.48]	47.43% (3.999)	[37.79; 53.31]	0.435 (0.0299)	[0.415; 0.530]
Swift's scenario	44.54% (3.892)	[38.97; 54.17]	8.14% (1.660)	[4.71; 11.58]	47.32% (3.852)	[38.02; 53.00]	0.437 (0.0310)	[0.418; 0.536]

- Swift viewpoint leads to a 33% increase in the share of legitimate inequalities.
- Efforts overall count little (6-11%) so it does not make a large difference to consider one view rather than another
- Regardless of the viewpoint, the bottom line is that the share of IOP in health related to circumstances remains very large in comparison to the share related to efforts.

Empirical investigation on the correlation effort/circumstances

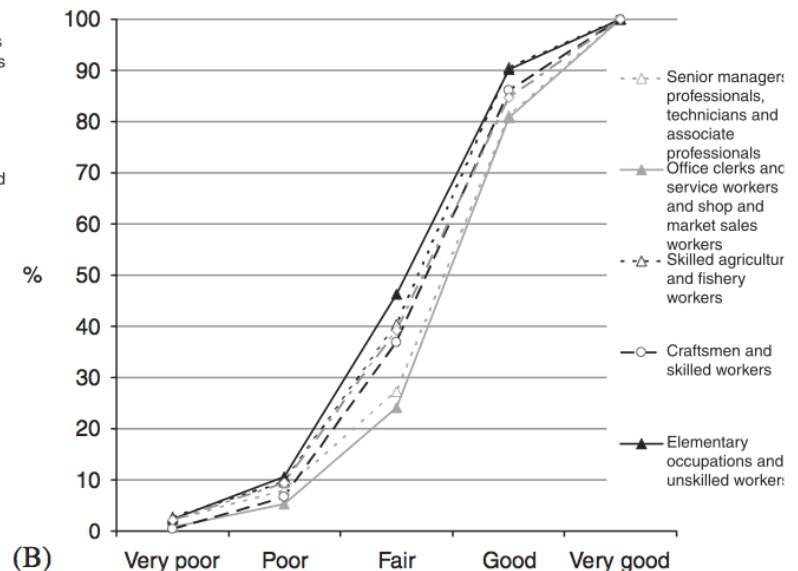
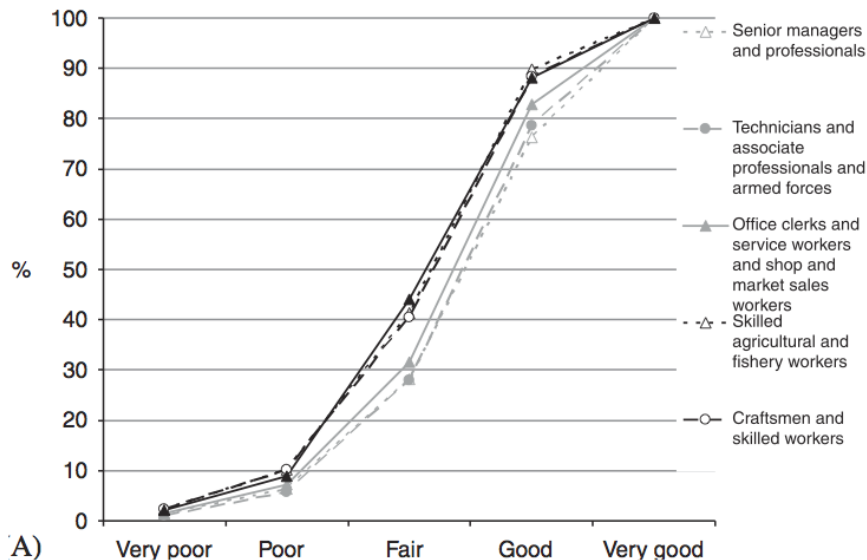
- SHARELIFE 2008 – 13 countries (Bricard et al. 2013) : Barry, Roemer



- Efforts (lifestyles) are correlated to circumstances: magnitude of IOP in health is sensitive to the ethical viewpoint
- The share of IOP explained by circumstances is large compared to the share explained by effort, whatever the ethical viewpoint and

Empirical methods for IOP I

- Types of methodologies: non-parametric, parametric, or both
 - Non-parametric approach** (Lefranc et al. 2009): dominance criteria and bilateral tests to compare CDF of outcomes conditional to circumstances (types) and groups with the same effort (tranches)
 - Parametric approach:** Econometric modelling with reduced-



Trannoy et al. 2010 (A) Father's PCS (B) Mother's PCS

Empirical methods for IOP II

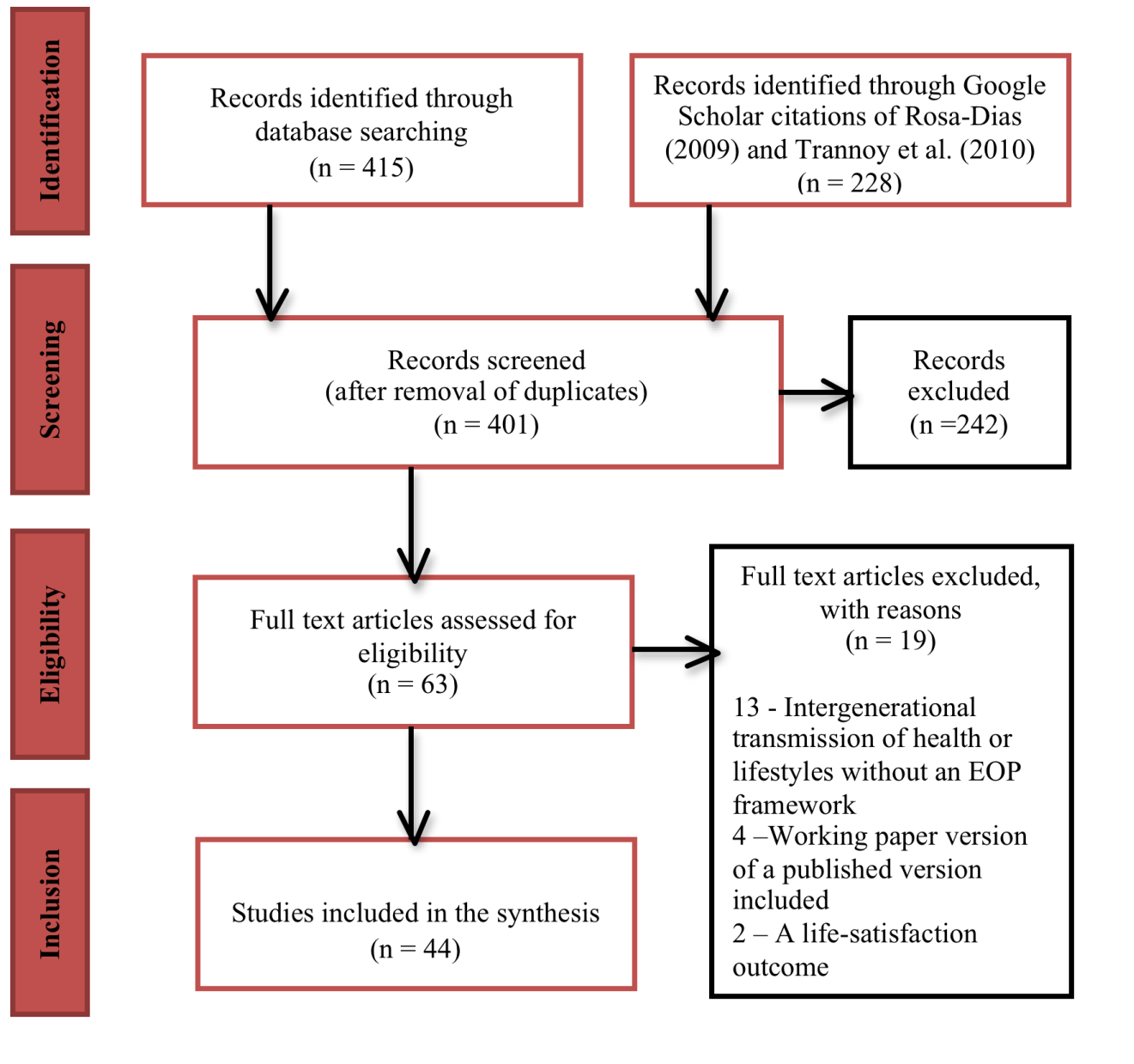
Types of inequality measurements:

- **Direct measures** assess how large is the inequality when only the share of inequality due to circumstances remains
 - *Direct unfairness* (Fleurbaey & Schokkaert 2011): level of inequality if all individuals chose to exert the same reference level of effort
- **Indirect measures** assess how much inequality remains after opportunities are equalized
 - *Counterfactual decomposition*: comparing inequality in the actual outcome distribution to inequality in a counterfactual outcome distribution where all individuals have the same circumstances → debatable (Schokkaert, 2018)
 - *Fairness gap* (Fleurbaey & Schokkaert 2011): distance between the observed outcome and the outcome that would exist if all individuals had the same reference set of circumstances.

**What is the state of the art of
IOP in health and healthcare?**

A review of empirical work on IOP in health and healthcare

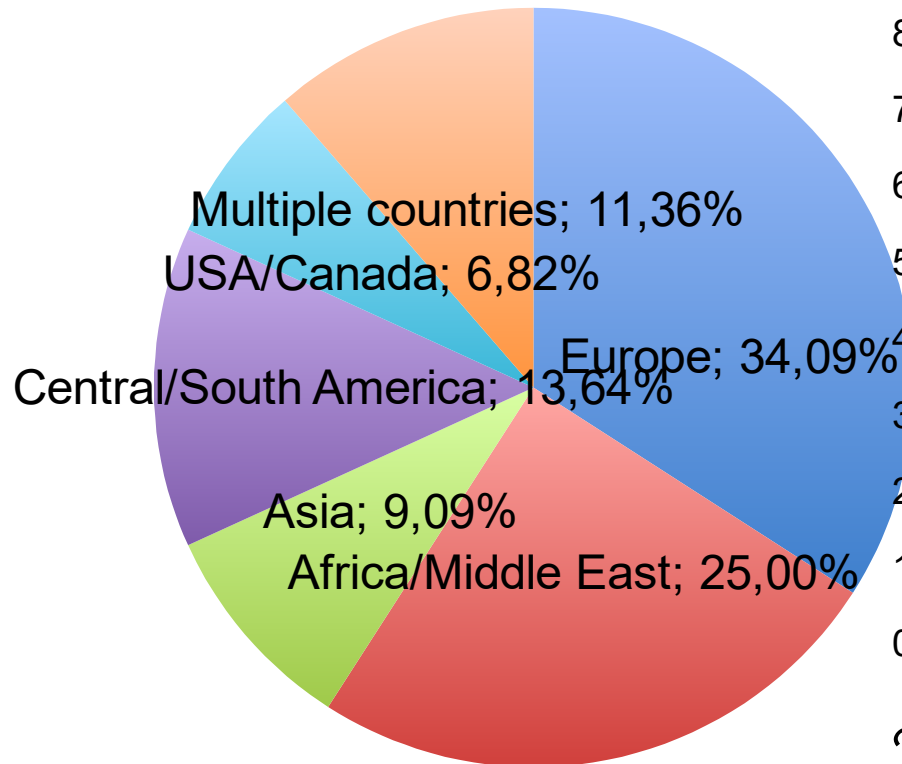
- Reviews of empirical work on IOP in other outcomes already available (Brunori et al. 2013, Roemer and Trannoy 2014, Ferreira and Peragine 2016, Ramos and Van De Gaer 2016)
- We searched literature databases from 1946 to February 2018
 - Searches were designed to identify studies by combining the search term ‘inequality’ or ‘inequalities’ with the terms ‘health’ and ‘opportunity’ or ‘opportunities’.
- To be eligible for inclusion papers had to use the concept of equality of opportunity as a framework for the study:
 - A wide literature in social epidemiology and public health has looked into the importance of early life conditions for health over the life course and health status through various mechanisms
- A total of 44 studies were included, spanning 9 years: 2009 to 2018



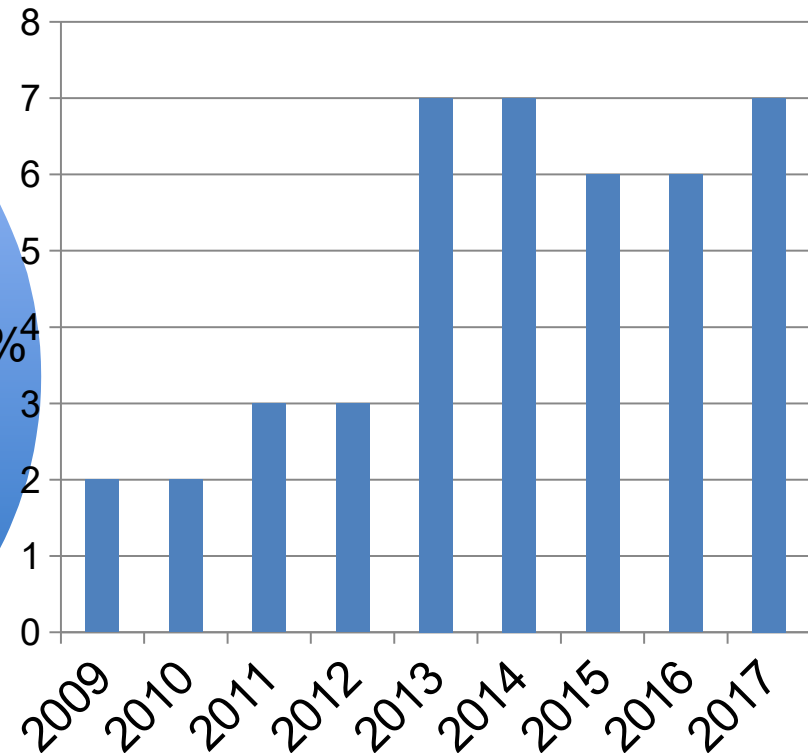
Flow diagram of excluded and included studies

The 44 included studies

County data used



Publication years



Key dimensions in the literature

- Included studies were grouped according to 2 relevant dimensions:
 - The population of interest: adults or children
 - The empirical method: *ex-post* or *ex-ante* perspectives
- 2/3 studies focused on adults and among them:
 - 48% used an *ex-post* perspective
 - 38% considered *ex-ante* perspective
 - 14% combined *ex-ante* and *ex-post* perspectives
- 1/3 studies considered children's health related outcomes
- The distinction between the *ex-ante* and *ex-post* perspectives in children makes less sense because they are below the age of consent and could not be considered responsible for their behaviour

Ex-ante IOP in health and healthcare (n=15)

- More than half of the studies were on European countries
- Most studies considered health status as the outcome (87%)
- Only 2 papers used health care outcomes: health care habits, physician visits and preventive care
- Methodologies included non-parametric (33%), parametric (47%), both (20%).
- Two studies used a pathway analysis (current SES)
- Various inequality indices were used:
 - Direct unfairness
 - Fairness gap
 - Shapley measure
 - Gini, Atkinson, and Concentration index
 - Variance or R-squared decomposition

Ex-post IOP in health and healthcare (n=18)

- Half of the studies used data from UK or England, outside Europe, 2 studies in USA, 1 in Canada, 1 Chile, 1 China
- No studies looked into IOP in healthcare outcomes
- All studies included parametric modelling (94%) except one semi-parametric. 7 studies also included non-parametric methods
- Most studies adopted a Barry viewpoint on the efforts to reward but 4 studies used a Roemer viewpoint
- Various inequality indices were used:
 - Direct unfairness and fairness gap
 - Variance, counterfactual, Shapley and R^2 decomposition
 - Gini, Atkinson, Theil, Sen Welfare and Dissimilarity index
 - Generalised Lorenz curve

IOP in child health and healthcare (n=15) I

- All studies focused on one or several LMICs according to the WB
- More than half of the studies used DHS data
- 6 studies used health outcomes, 4 healthcare specific outcomes, and 5 considered both of them.
 - Health outcomes included WHO indicators on child growth and malnutrition, early child development outcomes, anthropometrics
 - Health care outcomes were related to access to services, clean water and adequate sanitation.
 - Most studies considered outcomes before the age of 5 (73%)
- The vector of circumstances variables varied between studies:
 - parental education level, proxy of wealth, region of residence, urban/rural status, distance to health facilities, further parental or household variables (height-for-age, weight-for-age, religion, etc)

IOP in child health and healthcare (n=15) II

- Methodologies included parametric (80%); 1 study used non-parametric and 2 studies used both.
- Most parametric studies (75%) assessed IOP using the Human Opportunity Index ([Paes de Barros et al. 2009](#)) along with a dissimilarity index and a Shapley decomposition to estimate the marginal contribution of each circumstance to IOP.
- Other inequality measures included the Theil-T index and the Oaxaca-Blinder decomposition of the inequality between urban and rural areas.

What's special about health and healthcare with respect to IOP literature in general?

Efforts in health

- The literature on IOP in health has contributed to the development of the *ex-post* approach for measuring inequality of opportunity
- Effort is private information: difficult to observe and measure but the description of effort in health is less open to criticisms in health than in other fields
- All *ex-post* papers but one used a smoking-related variable:
 - Individuals widely agree that smoking is an individual choice for which one can be held responsible (Le Clainche and Wittwer 2015)
- Some papers used BMI as an effort variable
 - Does obesity represent a lack of effort or is a combination ageing, socioeconomic status, and health problems?

Data availability

- Empirical research on IOP in health and healthcare is driven by data availability:
 - Particularly noticeable for ex-post IOP studies, which require to observe both circumstances and efforts variables.
 - Health-related behaviors such as smoking, height, weight, alcohol drinking are measured in most of health interview surveys
- A relatively small number of studies included parental health related characteristics but when included, their contribution was substantial:
 - Limited availability of such data in surveys - challenges to measure it.
- Few studies ex-ante IOP in healthcare outcomes, no ex-post
 - Efforts in healthcare such as preferences are much harder to come by

Health matters beyond health

- Health inequalities are important in the public debate
- Health greatly contribute to both well-being and productivity
- One's "stock of health determines the total amount of time he can spend producing money earnings and commodities" (Grossman, 1972)
- The IOP in health and healthcare literature contributes to highlighting unfair inequalities in welfare, in addition to already substantial literature showing inequalities of opportunity in income or education.

What's next in IOP in health?

Challenge 1: Residuals and luck

- A specificity of IOP in health relates to that part of health inequality that can be explained by a parametric regression model.
- Most models of health outcomes explain about 20% of the variance
- A large residual part remains whatever the number of circumstances and efforts variables considered in the analysis:
 - issue of the importance of unobserved variables
 - normative status of “luck”.
- Theoretical IOP literature has discussed the type of luck that can be pushed towards circumstances or effort (Dworkin 1981, Fleurbaey 2008, Roemer and Trannoy 2014, Schokkaert 2015)
- How can this debate be translated to empirical studies on IOP in health and healthcare?

Challenge 2: IOP in health care

- Few studies ex-ante IOP in healthcare outcomes, no ex-post
 - *“health care itself can be viewed as a transfer of resources, but it would make little sense to advocate that everyone should receive the same amount of health care within a group of circumstances”*. (Fleurbaey and Schokkaert, 2011)
- The debate on the role played by preferences as being formed under the control of the past generation or being under the full responsibility of individuals could be further developed when studying EOP in healthcare
 - discrete choice experiments are increasingly used to measure individual preferences regarding health and healthcare (Clark, Domino et al. 2012)

Challenge 3: Genes, age and sex

- Health presents a specific challenge with age and genetic inheritance, and to a lesser extent sex
- Should genes, age, sex be considered as circumstances to be compensated or not?
- There is a need to discuss further the normative status of these parameters for IOP in health and healthcare
- The way to treat age has not been at the forefront in studies of IOP in income, however the ageing process and biological determinants clearly matter for a share of health and healthcare outcomes
- There is an increased availability of data regarding biomarkers, genome sequencing and genetic testing – could this be used to reduce unobserved circumstances?

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