Handling Equitable Preferences

Özlem Karsu
Bilkent University, Ankara, Turkey
Alec Morton
University of Strathclyde, Glasgow, UK
Nikos Argyris
Loughborough University, UK

Outline

- What is the problem we focus on?

- Equitable preferences

- Using preference information from policy makers

Problems we focus on

Evaluating a set of distributions
(of income, of wealth, of health, of service levels)
across a population, in which individuals are considered
preferentially indistinguishable

The planner has *equity* concerns as well as *efficiency* concerns.

Problems we focus on

Finding the best distribution

Ranking

An example problem

Health Economics (Finding the best QALY allocation profile)

Project	Group 1	Group 2	Group 3
1	10	30	40
2	25	15	25
3	5	50	50
4	15	15	35
5	30	40	10

An example problem

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Many countries, including Turkey, use universal health insurance programs.

Many advantages but also many challenges.

Tighter and tighter budgets:
    Not possible to include all the health technologies in the program.
    Hard to decide which services will be included.

Figure 1 Life expectancy and disability-free life expectancy (DFLE) at birth, persons by neighbourhood income level, England, 1999–2003
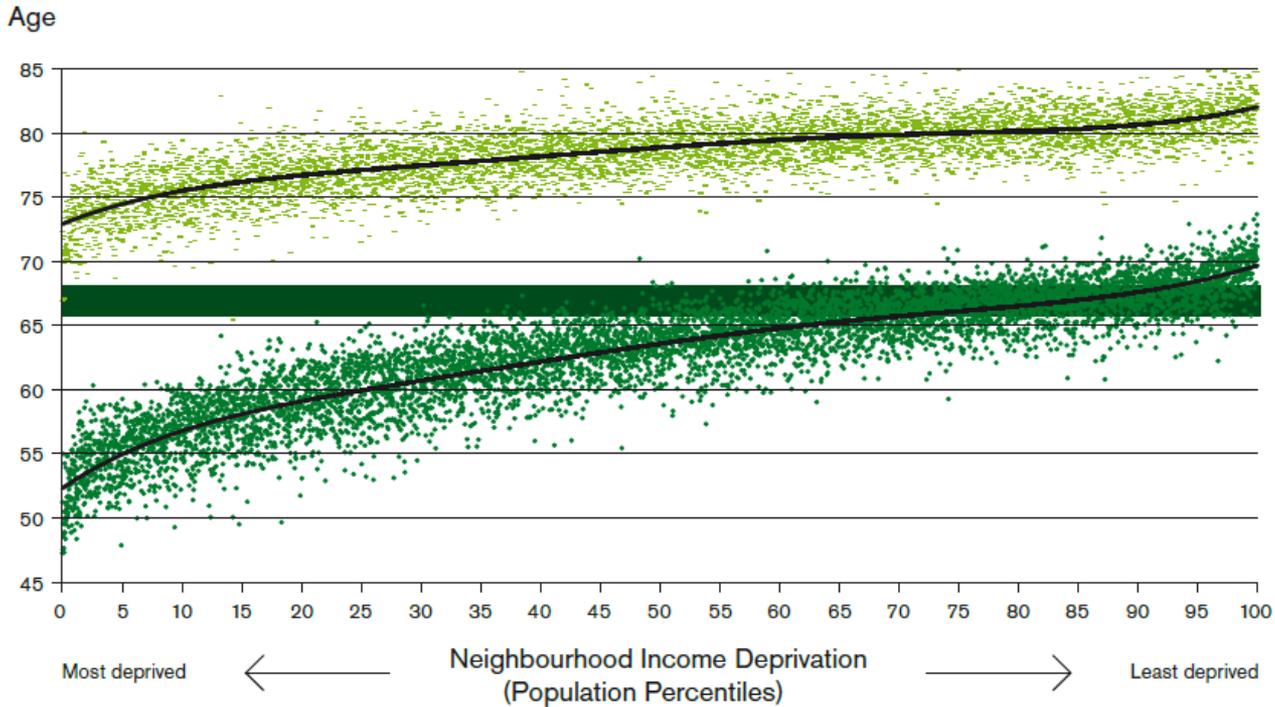
Life expectancy

DFLE

Pension age increase 2026–2046

Source: Office for National Statistics[5]

Source:http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review

Handling equity

Developing good decision support tools to

- find solutions that would be acceptable to many inequity-averse social planners.

- determine the most preferred solution of the social planner among these solutions.

Mathematical modelling
Multicriteria decision making

In health care domain:
More transparent, fair and scientificly sound decisions.

A decision support system that:

- helps the policy makers decide which services (or health technologies) to offer.

- evaluates the healthcare projects considering both efficiency and equity concerns.

Equitable preferences
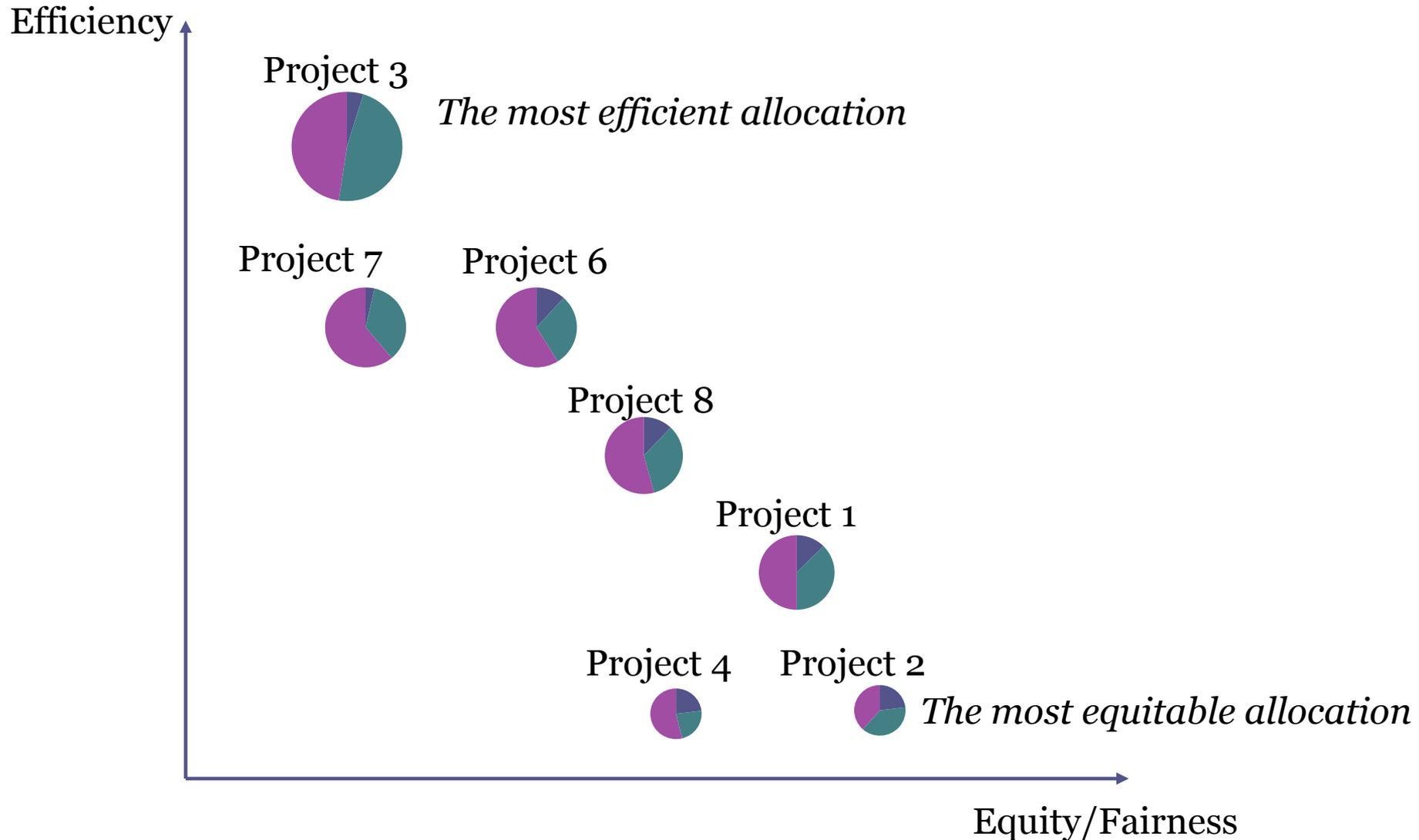
Efficiency

Project 3

The most efficient allocation

Project 7   Project 6

Project 8

Project 1

Project 4   Project 2

The most equitable allocation

Equity/Fairness

Properties of equitable preferences

Assume that the more the outcome level, the better.

- Anonymity

Project	Group 1	Group 2	Group 3
1	**10**	**30**	**40**
2	25	15	25
3	5	50	50
4	15	15	35
5	**30**	**40**	**10**

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- Pigou-Dalton Principle of Transfers

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2	**25**	**15**	**25**
3	5	50	50
4	**15**	**15**	**35**
5	30	40	10
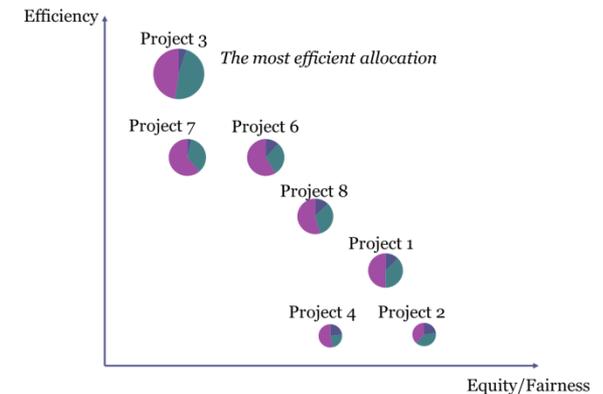
Efficiency — Equity/Fairness

Project 3 — The most efficient allocation

Project 7, Project 6, Project 8, Project 1, Project 4, Project 2

Equitable Dominance

- Rational social planner
- Anonymity, PD transfers

An allocation is equitably dominating another if it is more preferred by all SPs having an equitable preference model
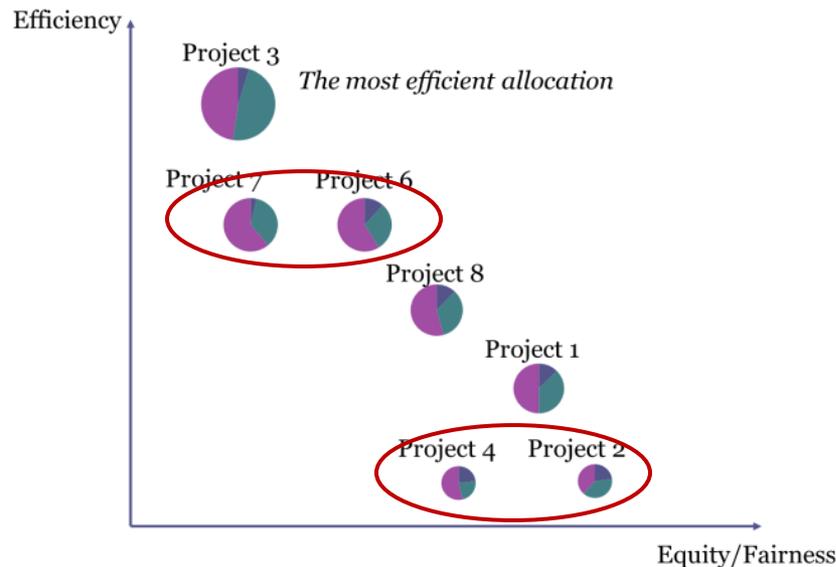
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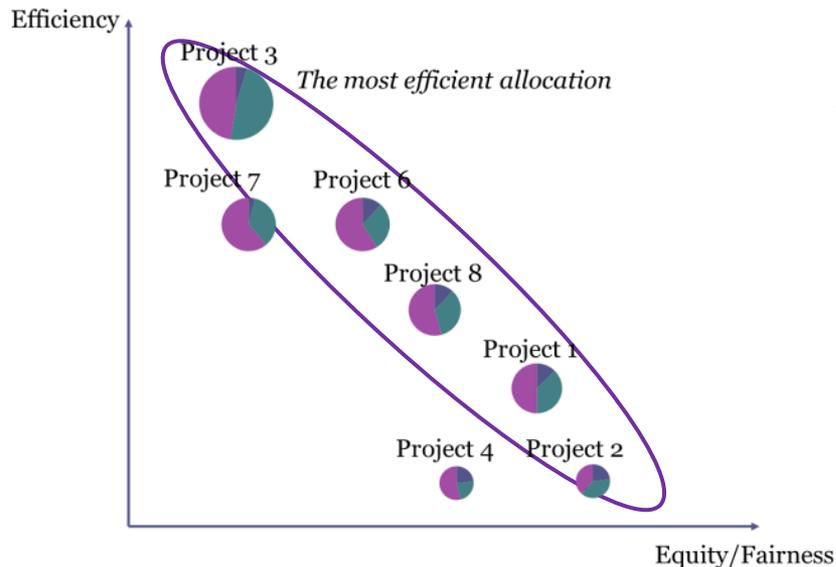

Equity-Efficiency Trade-off

Approach

- Get preference information from the social planner

- Use tractable mathematical models (LPs) to check whether an alternative distribution is better than another

- Refine the ranking accordingly

Example

| Alternative	(x)
x_1	(1,2)
x_2	(3,2)
x_3	(2,2)
x_4	(4,3)
x_5	(2,6)
x_6	(8,0.5)
x_7	(0,10)
x_8	(3.5,3.5)
x_9	(5,2.5)
x_{10}	(6,4)

Example
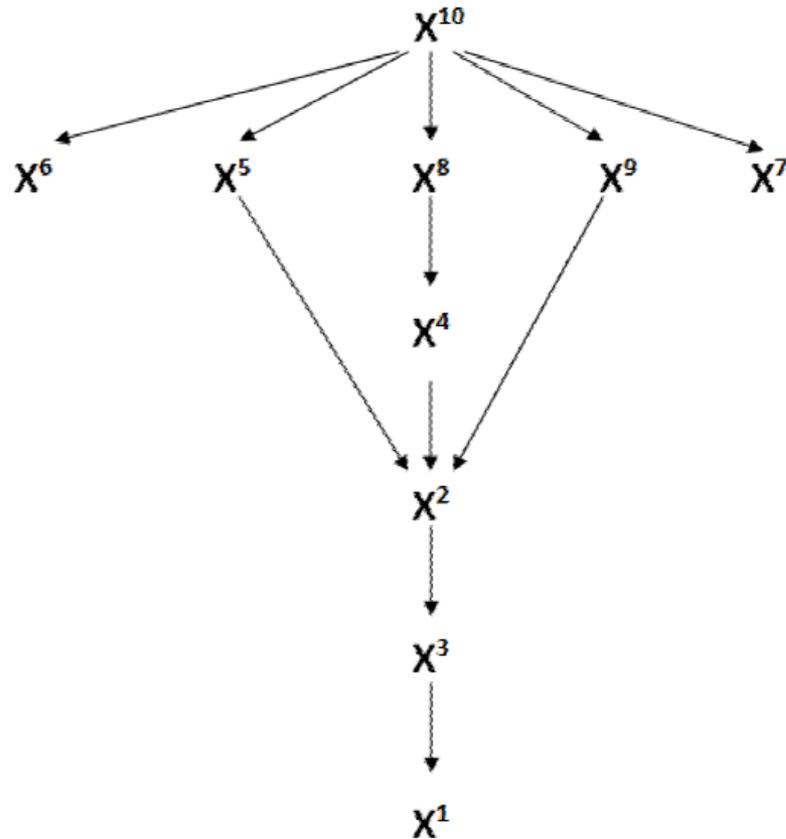
Initial Quasiordering

Introduce preference information: $x_4 \succ x_5$.
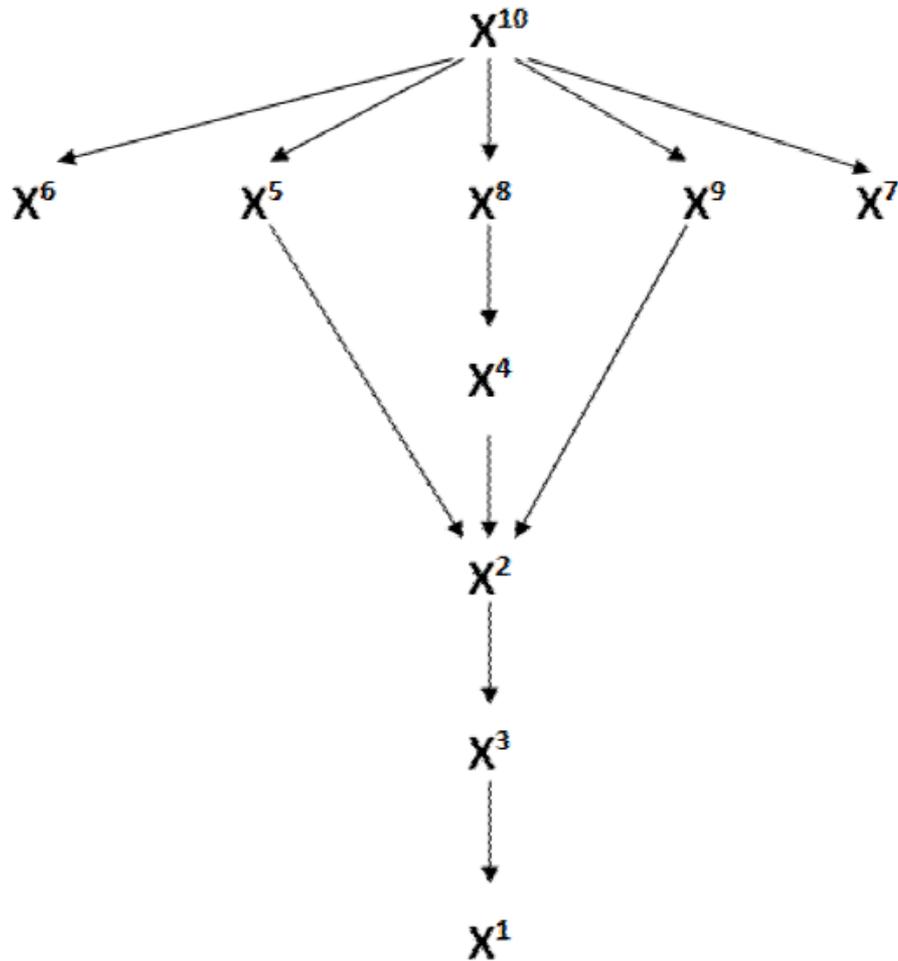
Initial Quasiordering
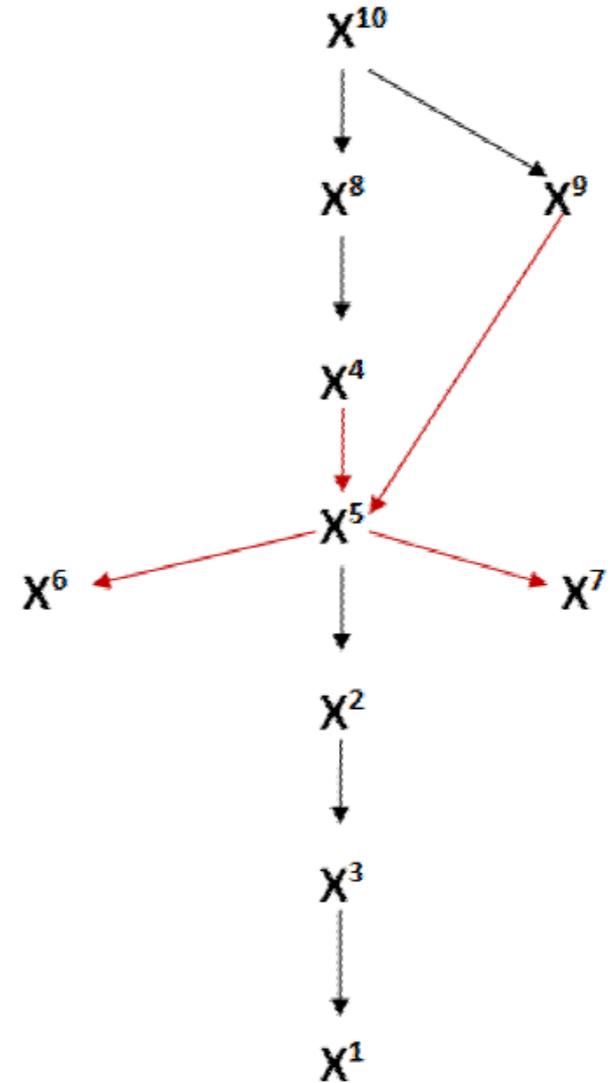
Updated Quasiordering
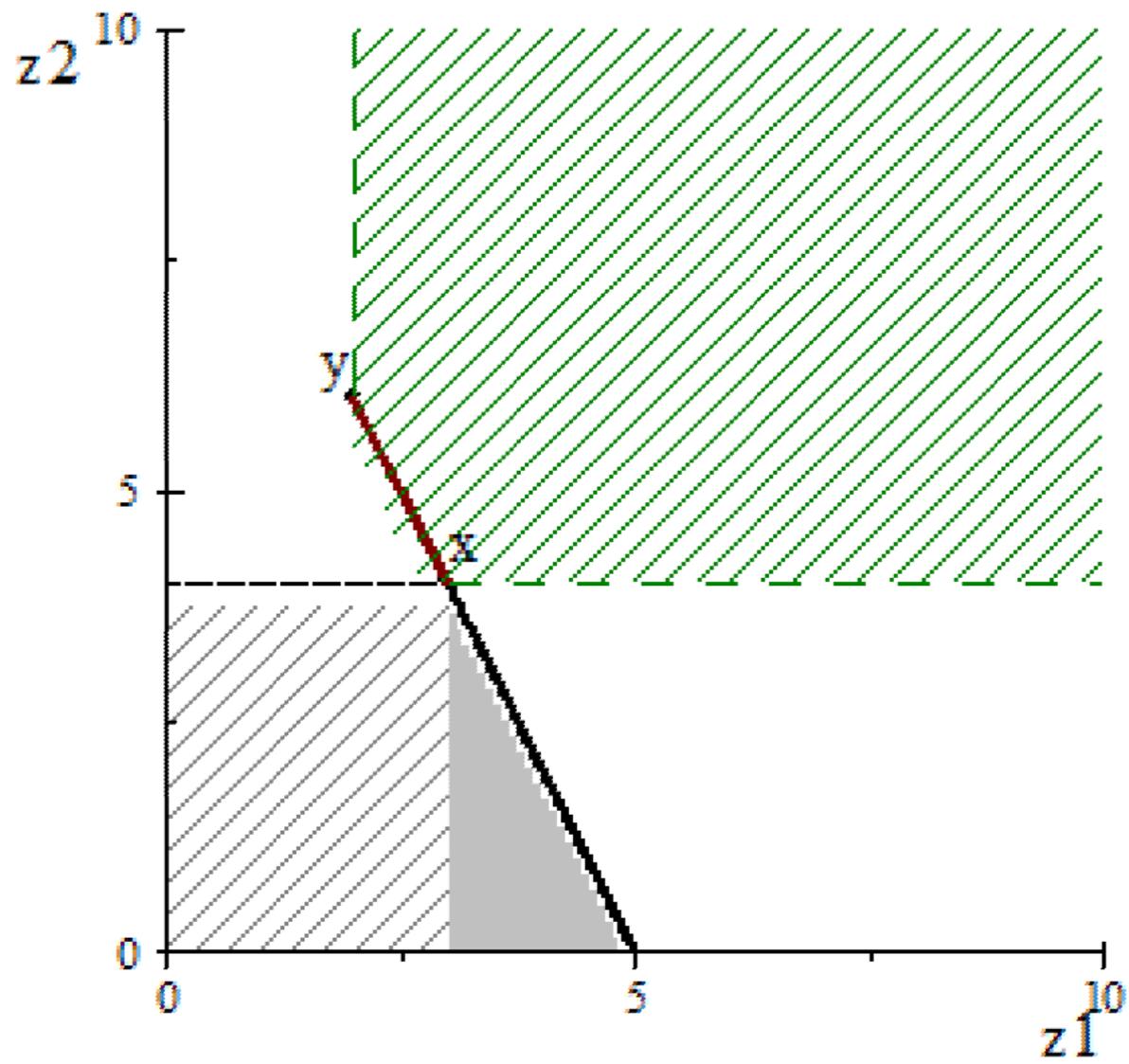
Computational Challenges

Elicited information: $(2, 6) \succ (3, 4)$

Symmetry:
$(2, 6) \succ (4, 3)$
$(6, 2) \succ (3, 4)$
$(6, 2) \succ (4, 3)$

Conclusions

Increasing informed decision making in health care resource allocation is important:

Health care:
- is relevant to almost every member of the society
- has significant consequences on peoples' wellbeing.

Future Work: Expert Jugdement in Healthcare

More to be done in:

- Determining consequences (performance scores) of healthcare projects.

- Expert judgement may have to be used in order to estimate these parameter values.

  - Lack of data collection
  - Constraints hindering evidence-based data collection

- Elicitation and aggregation of expert judgements in health technology assessment and health care resource allocation domains.

- Integration of expert judgements into the decision support systems in a *structured, transparent and scientific* way.

Future Work: Multidimensional Equity

More to be done in:

Handling equity concerns in multiple dimensions.

Thank you