

# Putting subjective well-being to use for ex-ante policy evaluation

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# Motivation

- Most studies on ex-ante policy evaluation have focused on the effects of policy reforms on the income distribution only.
- However, it is increasingly recognised that focusing exclusively on income provides a limited picture of social progress (e.g. Stiglitz, Sen, Fitoussi report).
- Other life dimensions (e.g. health, employment, leisure, housing quality) are also highly valued as determinants of a good life and should be taken into account in policy evaluation.



# Aim

- Illustrate how microsimulation can be used for the ex-ante evaluation of policy reforms within a richer evaluative framework.



# Plan of the talk

- Introduction
- Measures of individual well-being
- Data and methods
- Results
- Conclusion



# Introduction

- Tax-benefit microsimulation models are a powerful tool for ex-ante evaluation of policy reforms.
- Most applications consider the effect of potential reforms on the income distribution only.
- Here, we evaluate the effect of hypothetical reforms on three measures of individual well-being:
  - Disposable income
  - Life satisfaction
  - Equivalent income
- We assess whether the choice of well-being measure has an impact on the evaluation results

# Measures of individual well-being: **disposable income**

- Disposable income ( $y_i$ ) is given by:

$$y_i = d(\omega_i, z_i, p_y),$$

$d(\cdot)$  represents the tax-benefit function

$\omega_i$  is market income

$z_i$  is a vector of individual and household characteristics

$p_y$  is a set of parameters of the tax-benefit system

# Measures of individual well-being: **life satisfaction**

- Subjective well-being measures, such as life satisfaction have become increasingly popular
- Numerous studies show that income and non-monetary life dimensions are important determinants of life satisfaction
- Life satisfaction ( $S_i$ ) is given by:

$$S_i = S_i(y_i, l_i).$$

- Individuals with identical vectors  $(y, l)$  may experience different levels of satisfaction for two reasons:
  - Differences in their preferences over life dimensions
  - Differences in their scaling of satisfaction (e.g. aspirations, expectations)



# Measures of individual well-being: **equivalent income**

- Equivalent income is...

*“the hypothetical income that, if combined with the best possible value of all non-income dimensions, would place the individual in a situation that s(he) finds equally good as his/her actual situation.”*



# Measures of individual well-being: **equivalent income**

- Equivalent income can be calculated deriving preference information from subjective well-being regressions (e.g. Decancq et al., 2015).
- We estimate a life satisfaction regression:

$$S_i = \alpha + \pi \ln(y_i) + (\beta + \gamma' z_i)' l_i + \delta' z_i + \varepsilon_i.$$

- The interaction between  $z_i$  and  $l_i$  capture differences in preferences.
- The direct effect of  $z_i$  and the disturbance term  $\varepsilon_i$  are interpreted as capturing aspirations and expectations.

# Measures of individual well-being: **equivalent income**

- Let  $\bar{l}$  be the reference values of the non-income dimensions, equivalent income ( $y_i^*$ ) is defined as:

$$S_i = \alpha + \pi \ln(y_i) + (\beta + \gamma' z_i)' l_i + \delta' z_i + \varepsilon_i = \alpha + \pi \ln(y_i^*) + (\beta + \gamma' z_i)' \bar{l} + \delta' z_i + \varepsilon_i$$

- which yields

$$y_i^* = y_i \exp \left[ \left( \frac{\beta + \gamma' z_i}{\pi} \right)' (l_i - \bar{l}) \right]$$



# Methods and data

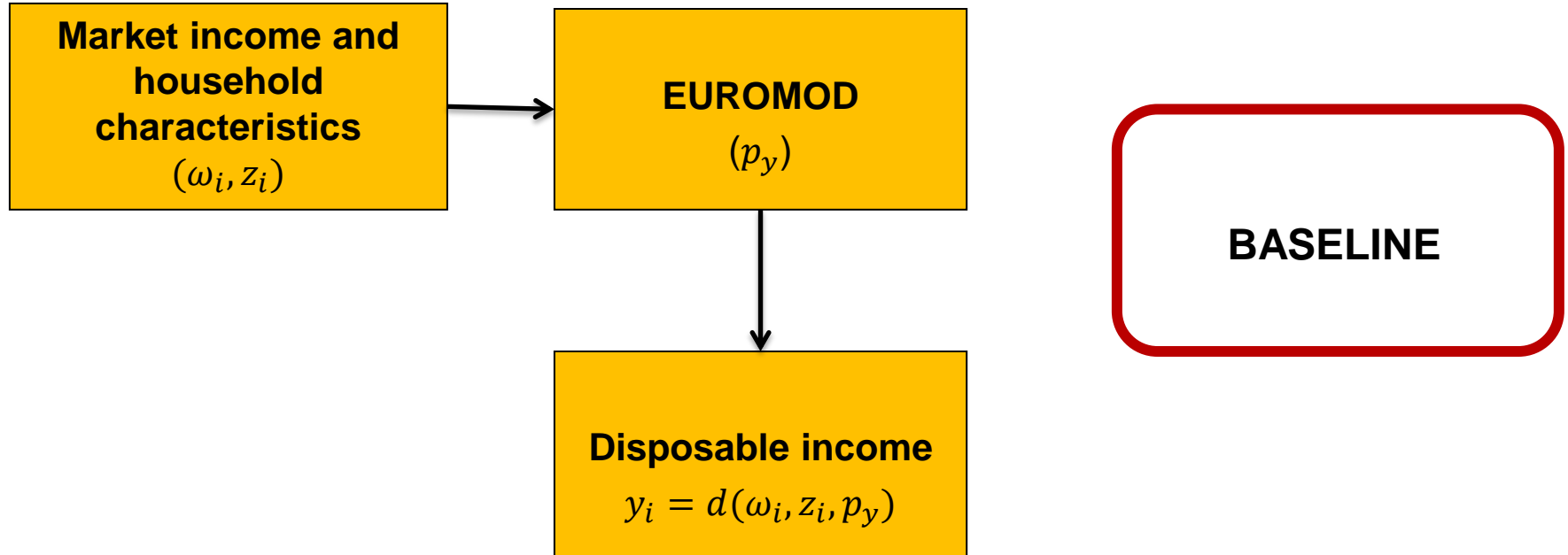
- Use EUROMOD version G2.35 to simulate disposable income
  - in the baseline (2013 policies)
  - and in the counterfactual policy reform scenarios.
- Use EU-SILC 2013 for Sweden
  - to estimate life satisfaction and calculate equivalent income
  - additional information from the ad-hoc module on well-being is used in the estimation of life satisfaction



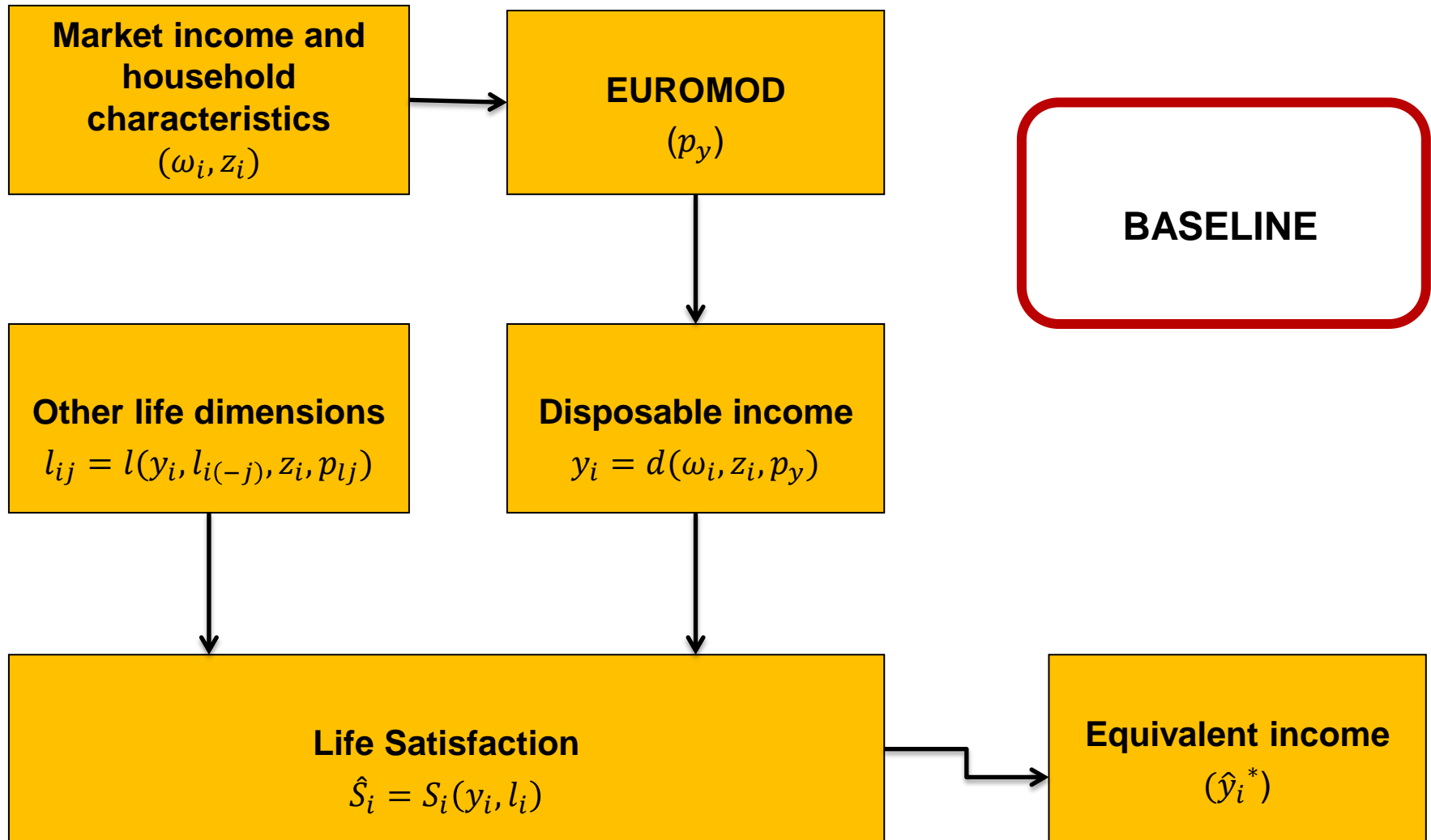
# Methods and data

- We consider four life dimensions:
  - Disposable income (log equivalised household disposable income)
  - Self-Assessed Health (1 “poor health to 5 “excellent health”)
  - Being unemployed (binary)
  - Housing quality (from a regression of imputed rent on a series of housing characteristics)
- Life satisfaction estimated by 2SLS to account for potential endogeneity of self-assessed health.
- We use information about self-rated affects (being nervous, feeling down in the dumps, feeling calm and feeling downhearted) as a third best solution to control for individual-specific time-invariant characteristics
  - Because it is not possible to implement panel methods (a single wave)
  - Because of lack of information on personality traits
- Sample: 5,336 observations

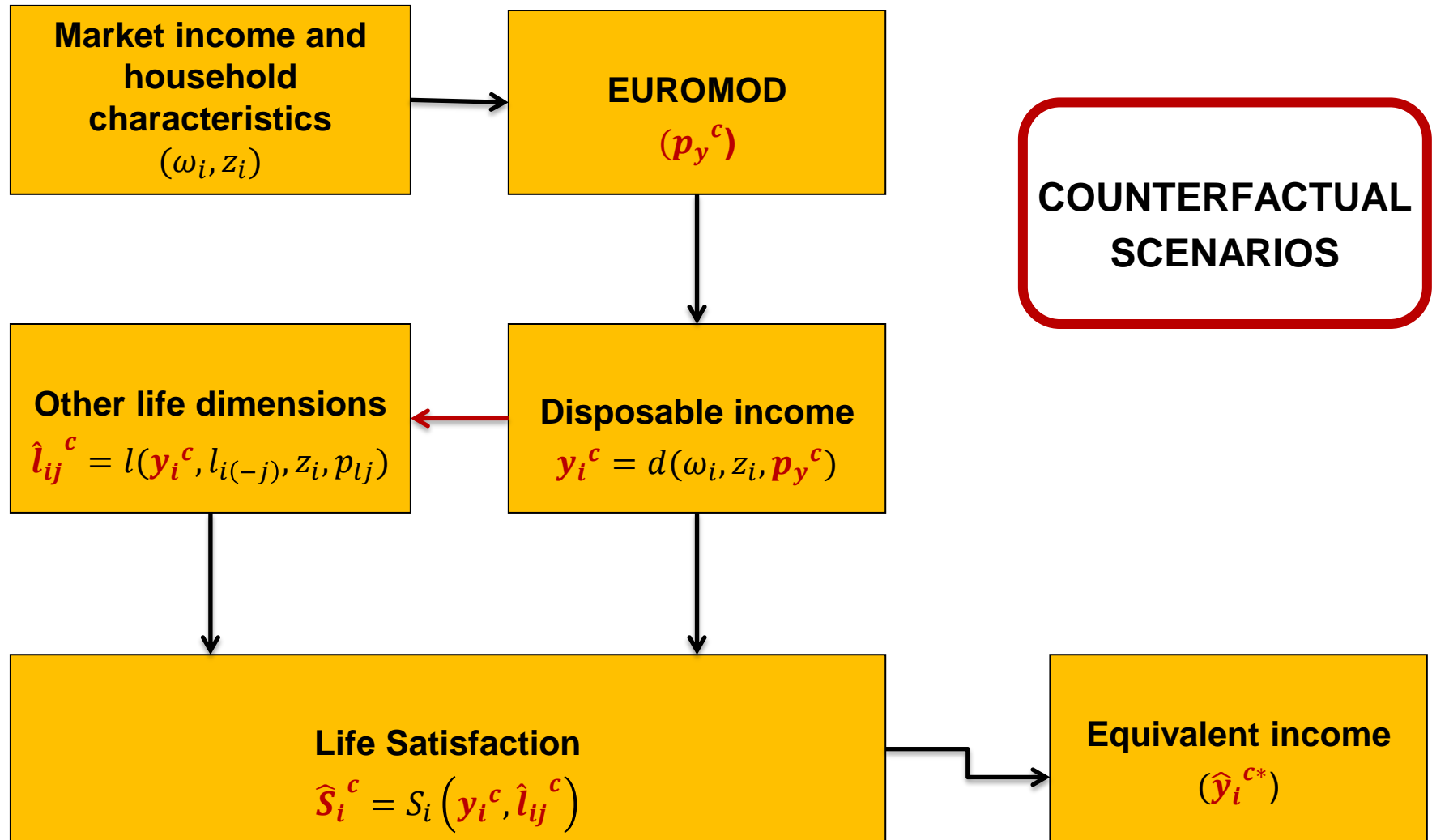
# Methods and data



# Methods and data



# Methods and data





# Results

- Life satisfaction estimation
- Portrait of the deprived
- Distributional effects of hypothetical reforms
- Well-being inequality
- Social Welfare



# Life satisfaction in Sweden (2SLS)

	Model 1	Model 2
Disposable Income (log)	0.142*** (0.044)	0.081** (0.039)
Self-reported health	0.669*** (0.085)	0.247*** (0.082)
Unemployed	-0.870*** (0.189)	-0.621*** (0.170)
Housing (in 1000SEK)	0.129*** (0.048)	0.036 (0.043)
Health x Male	0.114 (0.085)	0.143* (0.077)
Health x High. Education	0.018 (0.104)	0.095 (0.093)
Health x Age over 40	0.145** (0.067)	0.041 (0.059)
Unempl. x Male	0.337* (0.203)	0.326* (0.182)
Unempl. x High. Education	-0.504* (0.282)	-0.328 (0.253)
Unempl. x Age over 40	0.117 (0.202)	0.196 (0.181)
Housing x Male	0.012 (0.028)	0.021 (0.025)
Housing x High. Education	-0.037 (0.030)	-0.018 (0.027)
Housing x Age over 40	-0.112* (0.059)	-0.015 (0.052)
Down in the dumps		-0.195*** (0.032)
Calm		0.341*** (0.028)
Nervous		-0.130*** (0.025)
Downhearted		-0.345*** (0.029)
_cons	4.153*** (0.572)	6.808*** (0.566)
$\bar{N}$	5336	5336
$R^2$	0.203	0.361

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Health regression (first stage of 2SLS)

	Model 1	Model 2
Chronic Illness	-0.360*** (0.021)	-0.327*** (0.019)
Limitation in activities	-0.523*** (0.018)	-0.448*** (0.017)
Unmet need for treatment	-0.243*** (0.028)	-0.163*** (0.027)
Unmet need for dental treatment	-0.251*** (0.033)	-0.164*** (0.031)
Disposable Income (log)	0.101*** (0.020)	0.064*** (0.019)
Unemployed	-0.162*** (0.048)	-0.032 (0.046)
Housing (in 1000SEK)	0.019** (0.007)	0.010 (0.007)
Down in the dumps		-0.099*** (0.015)
Calm		0.098*** (0.014)
Nervous		-0.065*** (0.012)
Downhearted		-0.075*** (0.014)
_cons	4.130*** (0.193)	4.506*** (0.199)
$\bar{N}$	5336	5336
$R^2$	0.353	0.419

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Evaluation of counterfactual policy scenarios

- Four counterfactual policy reforms are simulated:
  - **A: Additional Social Assistance payment**  
Additional 4,000 SEK per month for recipients of social assistance
  - **B: Increase of Child Benefit Amount**  
Increase of basic amount of child benefit from 1,050 SEK to 2,000 SEK per month for children aged 0-15.
  - **C: Additional Payment of Housing Allowance for Pensioners**  
Additional 2,000 SEK per month for recipients of housing allowance for pensioners
  - **D: Improvement in Housing quality**  
Improvement of  $\frac{1}{2}$  standard deviation in housing quality for the 4% of individuals with the lowest housing quality
- All reforms are simulated under budget neutrality by increasing the top tax rate of government income tax.

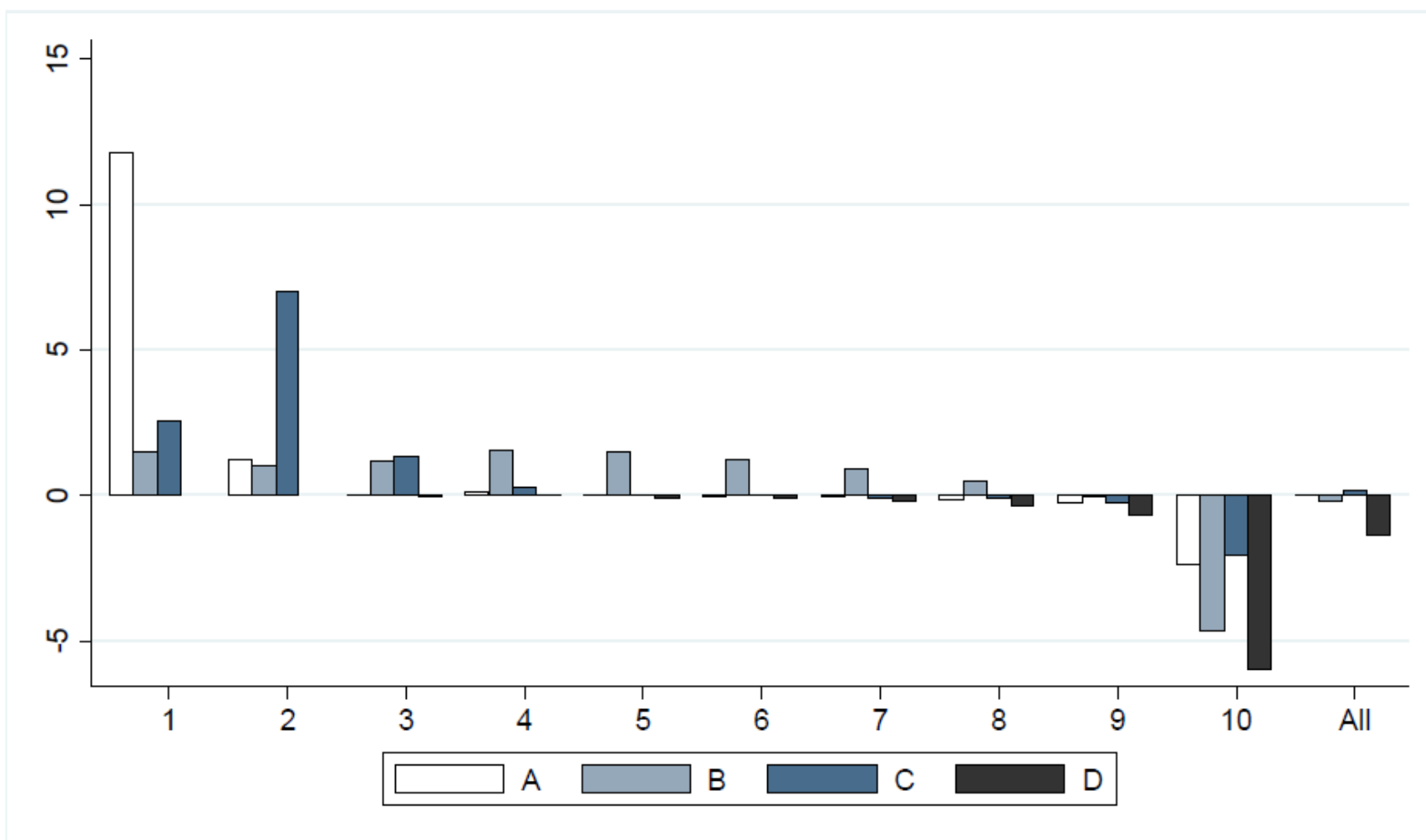


# Evaluation of counterfactual policy scenarios

- For life satisfaction and equivalent income two sets of results can be produced:
  - Effect of policy reforms without indirect effects of income and housing quality on health (S1 and EI1)
  - Effect of policy reforms accounting for indirect effects of income and housing quality on health (S2 and EI2)
- Here, we focus on results S2 and EI2.
  - The overall results and policy ranking is consistent with or without accounting for indirect effects of income and housing quality on health
  - The effect of policy reforms is in general larger under S2 and EI2

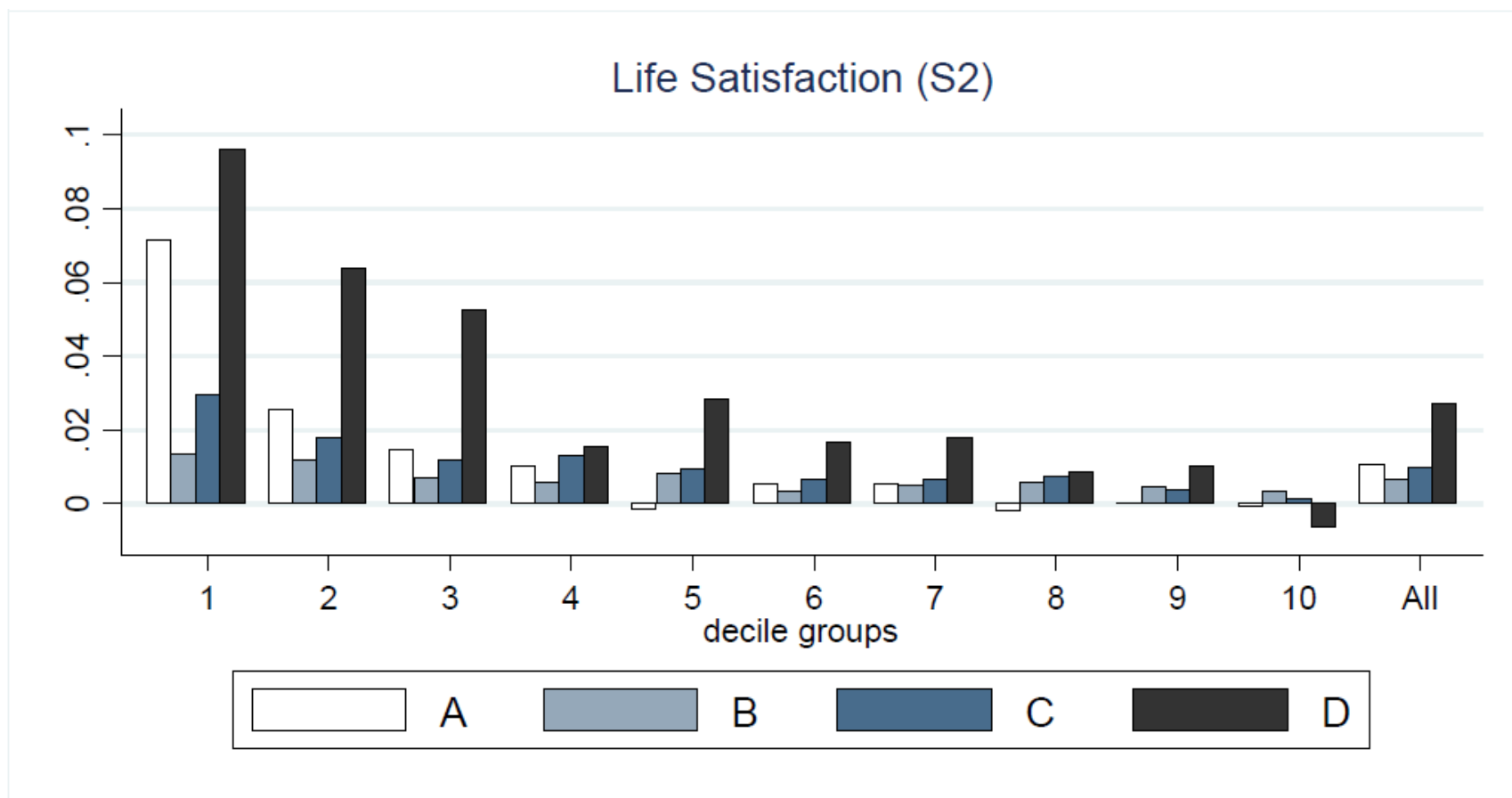
# Distributional effects of counterfactual scenarios: disposable income

Percentage change in household disposable income by income decile group



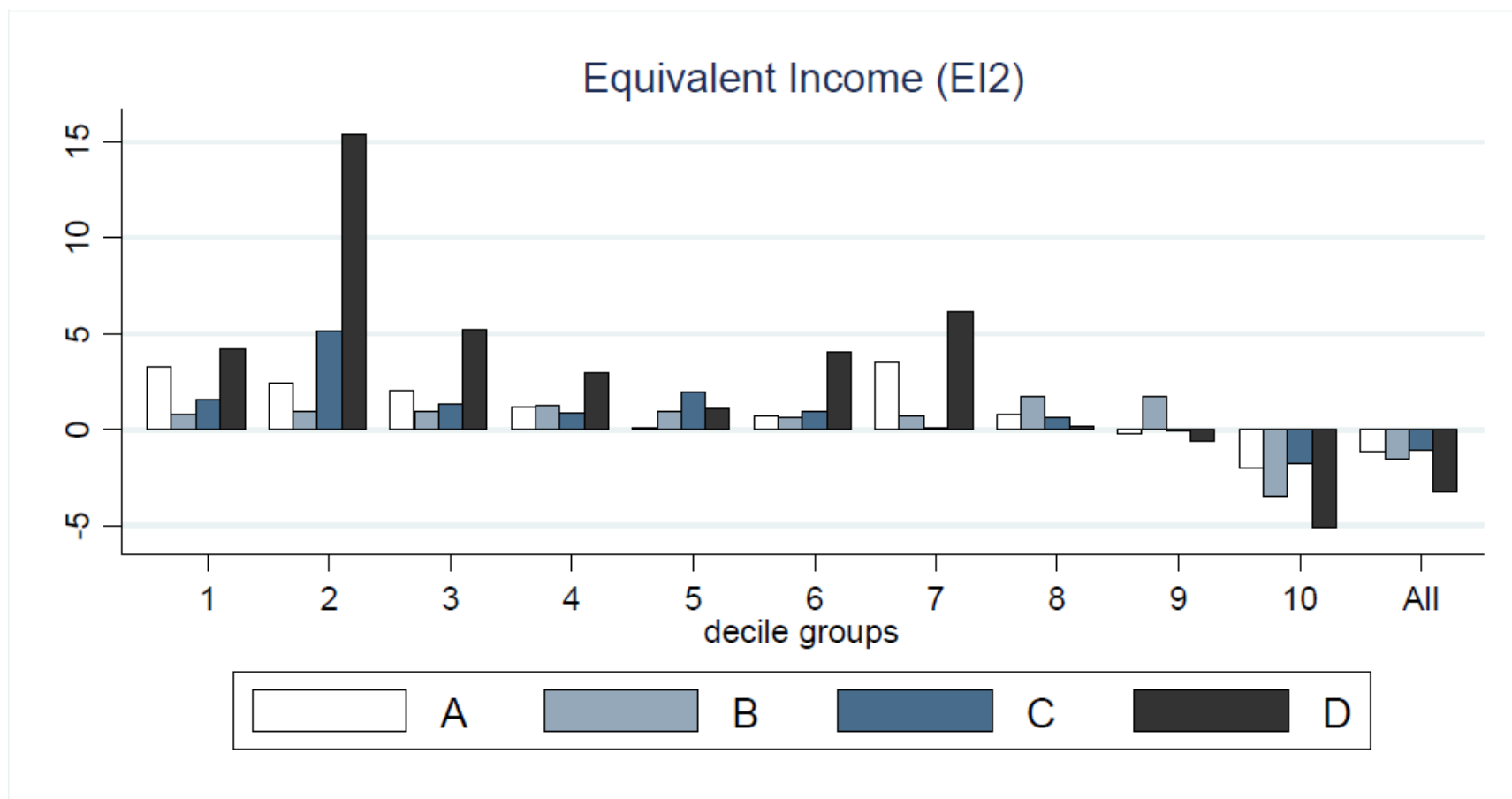
# Distributional effects of counterfactual scenarios: life satisfaction

Percentage change in life satisfaction by satisfaction decile group



# Distributional effects of counterfactual scenarios: equivalent income

Percentage change in equivalent income by equivalent income decile group





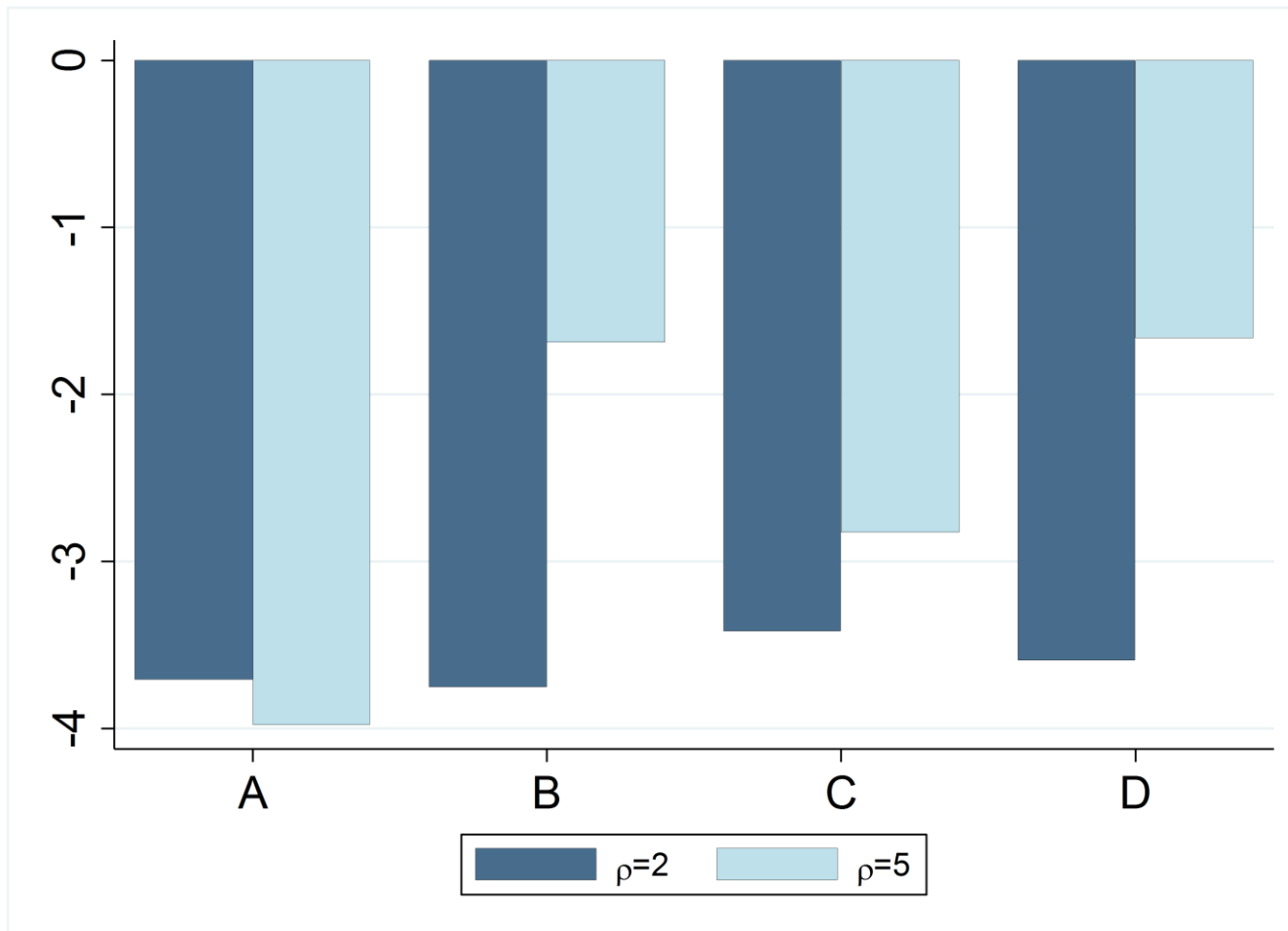
# Well-being inequality

- We consider the effects of the reforms on inequality for each of our well-being concepts
- Results are provided for:
  - Gini coefficient (generalised Gini with  $\rho = 2$ )
  - Generalised Gini with  $\rho = 5$ , which gives more weight to individuals at the bottom of the distribution.



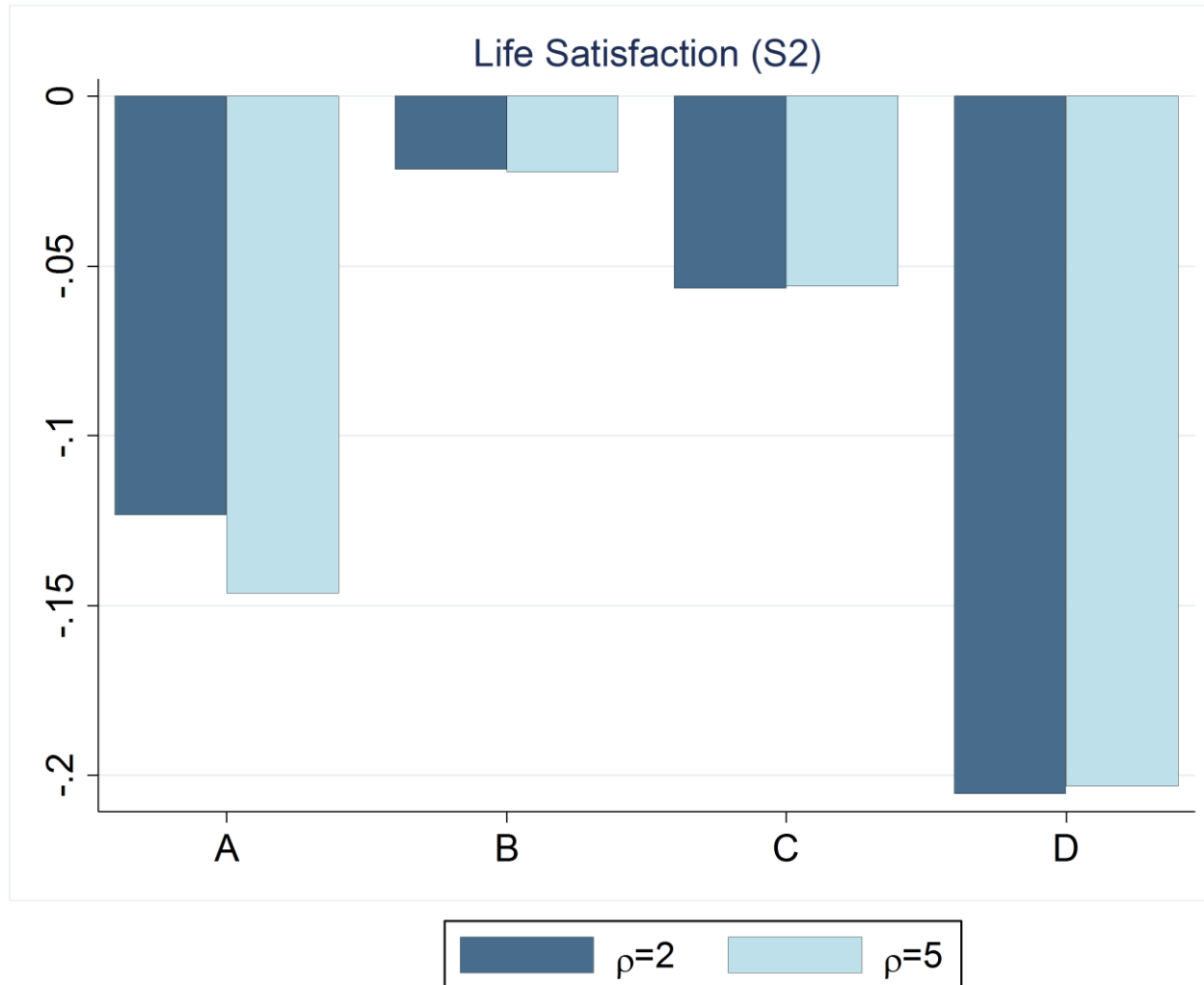
# Well-being inequality: disposable income

Percentage change in income inequality (generalised Gini)



# Well-being inequality: life satisfaction

Percentage change in satisfaction inequality (generalised Gini)



# Well-being inequality: equivalent income

Percentage change in equivalent income inequality (generalised Gini)



# Social Welfare

- Ultimately, we are interested in the ranking of policies in terms of social welfare
- We calculate social welfare as:

$$SW_{\rho} = A(1 - I_{\rho})$$

$A$  is average well-being

$I_{\rho}$  is the Generalised Gini for inequality aversion  $\rho$

- For  $\rho = 0$  we get  $I_{\rho} = 0$ , hence social welfare reduces to average well-being,  $A$ .

# Social Welfare

## Ranking of policies according to Social Welfare

disposable income			life satisfaction (S2)			equivalent income (EI2)		
$\rho = 0$	$\rho = 2$	$\rho = 5$	$\rho = 0$	$\rho = 2$	$\rho = 5$	$\rho = 0$	$\rho = 2$	$\rho = 5$
C	C	A	D	D	D	base	B	D
A	A	C	A	A	A	C	A	B
base	B	B	C	C	C	A	base	A
B	base	base	B	B	B	B	C	C
D	D	D	base	base	base	D	D	base



# Conclusion

- We illustrate a simple way to perform ex-ante policy evaluation on well-being measures which account for other life dimensions than income
  - Interesting for evaluation of non-monetary policy reforms
- Analysis beyond disposable income and subjective well-being is important
  - The equivalent income poor are more deprived in some dimensions than the income and satisfaction poor
- Hypothetical reform simulations confirm that the choice of well-being measure matters for the welfare ranking of policies



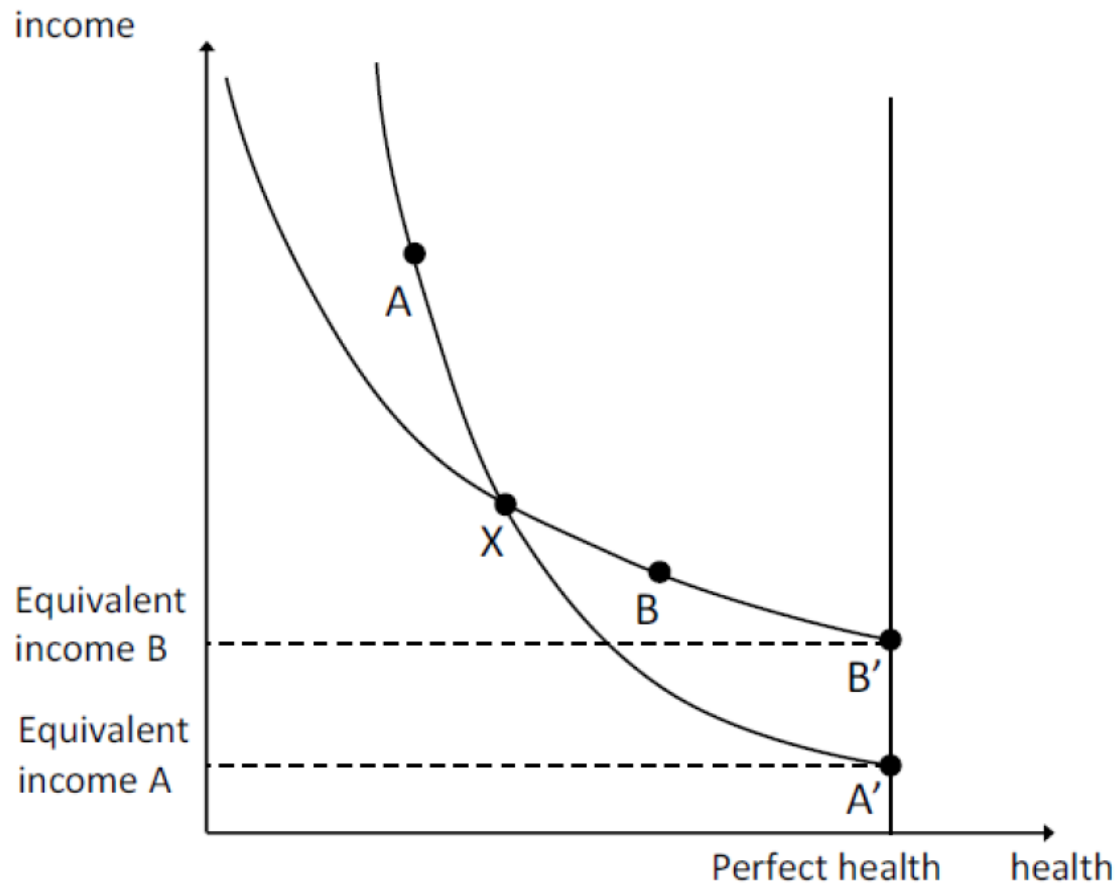
# Thank you!

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- EUROMOD is made generally available for academic and not-for-profit use. Contact [euromod@essex.ac.uk](mailto:euromod@essex.ac.uk)
- For more information see [www.iser.essex.ac.uk/euromod](http://www.iser.essex.ac.uk/euromod)

# Measures of individual well-being: **equivalent income**

Figure 1: Equivalent income







## Portrait of the deprived

- We assess whether our three well-being measures identify the same population as the most deprived.
- We consider as satisfaction poor 383 individuals reporting life satisfaction equal to 5 or less in the 0 to 10 scale.
- We select the 383 individuals with the lowest disposable income and equivalent income
- Is there an overlap? What are the characteristics of the most deprived?

## Portrait of the deprived

	Income	Satisfaction	Eq. Income
Income poor	1.00	.	.
Satisfaction poor	0.16	1.00	.
Eq. income poor	0.18	0.32	1.00
Income (SEK/month)	7,692	16,396	16,336
Satisfaction	7.55	4.25	6.59
Health	4.06	3.26	2.66
Unemployment	0.16	0.13	0.23
Housing (1,000 SEK)	4.17	4.61	4.17