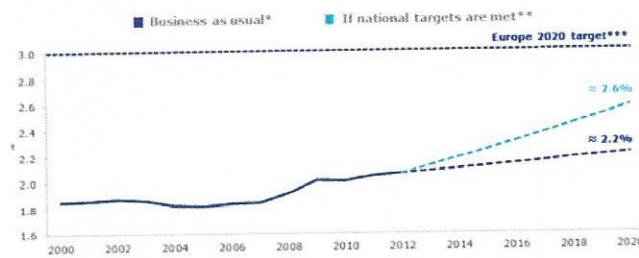
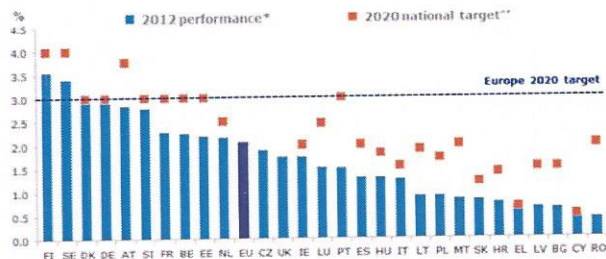


## Research & development



### Uitleg:

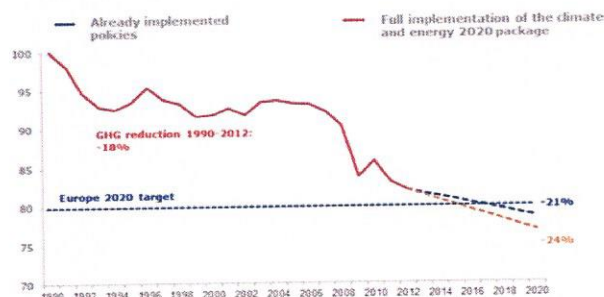
The dark blue bar show again business as usual, and the light blue bar shows what will happen if the national targets are met. If all the countries met the target, then the public and private investment in R&D will increase to 3% of the GDP.



### Uitleg:

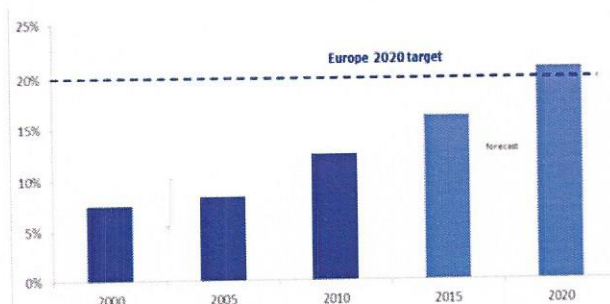
The orange dots are the targets for each country. The targets aren't the same for each country. The difference between the dots and the bars reflects the efforts that the countries still have to do to reach the goal of 3%.

## Climate and energy



### Uitleg:

Reducing greenhouse gas emissions by at least 20% compared by 1990 levels.



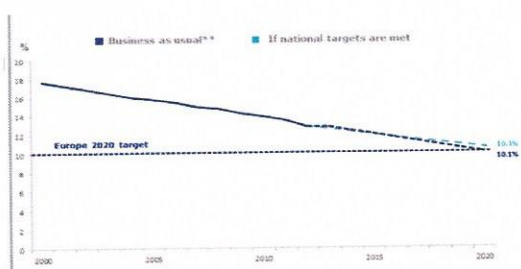
### Uitleg:

Increasing the share of renewable energy in final energy consumption to 20%.

Topic	Headline indicator	2008	2009	2010	2011	2012	2013	Target
Education	Early leavers from education and training, total (% of population aged 18-24)	14.7	14.2	13.9	13.4	12.7	12.0	< 10.0
	• Early leavers from education and training, females (% of population aged 18-24)	12.6	12.3	11.9	11.5	10.9	10.2	:
	• Early leavers from education and training, males (% of population aged 18-24)	16.6	16.1	15.8	15.3	14.4	13.6	:
	Tertiary educational attainment, total (% of population aged 30-34)	31.2	32.3	33.6	34.7	35.9	36.9	> 40.0
	• Tertiary educational attainment, females (% of population aged 30-34)	34.4	35.7	37.2	38.6	40.2	41.2	:
	• Tertiary educational attainment, males (% of population aged 30-34)	28.0	28.9	30.0	30.8	31.7	32.7	:
Poverty and social exclusion	People at risk of poverty or social exclusion (%) (million people)	116.6	114.5	117.0	120.4	123.1	121.4	96.6 (*)
	People at risk of poverty or social exclusion (%) (% of population)	23.8	23.3	23.7	24.3	24.8	24.4	:
	• People living in households with very low work intensity (%)	9.1	9.1	10.1	10.4	10.4	10.6	:
	• People at risk of poverty after social transfers (%) (% of population)	16.6	16.4	16.5	16.9	16.9	16.6	:
	• Severely materially deprived people (%) (% of population)	8.5	8.2	8.4	8.8	9.9	9.6	:

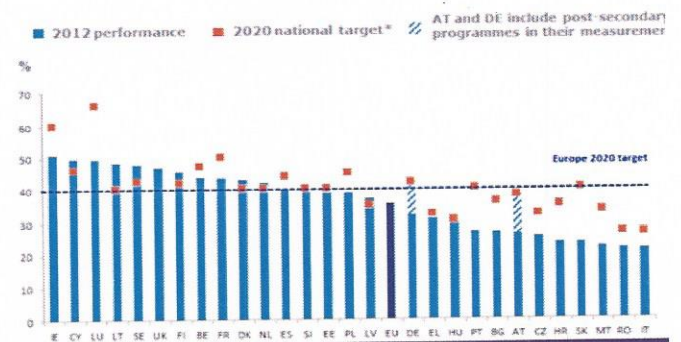
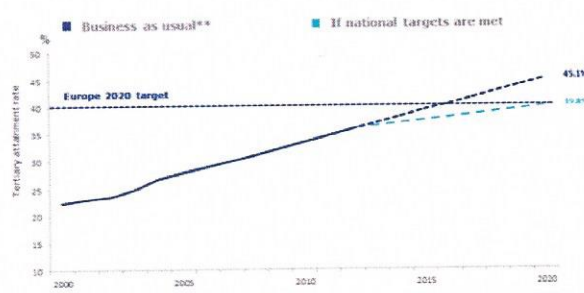
There's a positive evolution.

## Education



## Uitleg:

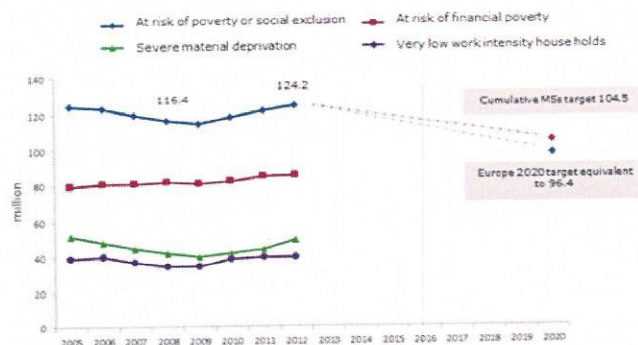
Reducing school drop-out rates to less than 10%.



## Uitleg:

Increasing the share of the population aged 30-34 having completed tertiary education to at least 40%.

## Poverty and social exclusion



### Uitleg:

Lifting at least 20 million people out of the risk of poverty and social exclusion

## Conclusion

- ❖ Employment: Difficult
- ❖ R&D: Very difficult
- ❖ Energy: Achievable
- ❖ Education: Achievable
- ❖ Poverty: Very difficult

### Has the Europe 2020 strategy worked?

#### 1) Targets

- ✓ **Quantitative:** Mixed progress
- ✓ **Qualitative:** More difficult. The Europe 2020 plays its role as policy anchors<sup>39</sup>. It's easy to monitor, but not ends in themselves. Complementary indicators, more specific analysis and qualitative information are important to interpret the targets and the actual situation in the Member States.

#### 2) Flagship Initiatives

- ✓ **Quantitative:** Too early to assess their follow-up and impact.
- ✓ **Qualitative:**
  - The Flagship Initiatives are a catalyst for action at EU level and a trigger for policy action at regional levels.
  - Mutual<sup>40</sup> learning and thematic knowledge at EU level.
  - Guide for the use of EU funding

<sup>39</sup> An anchor = Een anker

<sup>40</sup> Mutual = Wederzijds



### 3) The European semester

- ✓ **Quantitative:** Difficult to measure
- ✓ **Qualitative:** The European Semester provides a credible framework for policy implementation. It also provides integrated surveillance and helps to reconcile economic and budgetary priorities. It reinforces contracts between the EU and the national level. The immediacy of the crisis sometimes made it challenging to reconcile<sup>41</sup> short-term urgencies with longer-term needs.

## A micro- and welfare economic analysis

→ Paper: 'Beyond GDP' of Decancq K and Schokkaert E.

### Introduction

The point of the departure and the **objective** of the welfare policies are **the individual well-being**. But what is well-being? How to measure well-being? And how to evaluate individual well-being?

The paper 'Beyond'<sup>42</sup> GDP' of Decancq K and Schokkaert E is about the national (aggregated) welfare. If we talk about welfare, then we only look at the GDP. But welfare is **more than GDP**. There are other indicators like for example the **Human Development Index**. The Human Development Index takes in account income, education, health... We have to combine all the indicators and make a ranking. And we also have to look beyond countries, to individuals. We take **a micro-perspective** and use applied welfare economics.

So the measurement and evaluation of well-being and also societal progress requires that we look 'beyond GDP-growth'. This implies that we have to take in account **more and different dimensions**. Not only income, there are other things important too like education. We also have to take in account distributional issues<sup>43</sup> and thus data at individual level. We have to compare individuals and we need information for each individual. Beyond GDP has more implications. So we have to **look to individuals in different dimensions**.

The various dimensions and the interpersonal distribution has consequences. It creates challenges because we have to take in account more dimensions, but **which dimensions** and **how to weigh** these dimensions? And we have to take in account distributional issues, but **how to compare** different individuals?

We look 'beyond GDP-growth' to evaluate a social state or a policy. We use an **antropocentric** (individualistic) point of view. We look to individuals and households. Things like for example the environment aren't important. We only evaluate the consequences of a policy for the well-being of individuals. So we only look to the results of a policy (= **consequentialism**). We evaluate by comparing (2) social states or policies in terms of well-being. If we talk about evaluation, we compare the situation for the policy with the situation after the policy. We look at people in a narrow perspective.

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<sup>41</sup> To reconcile = Verzoenen

<sup>42</sup> Beyond = Verder dan

<sup>43</sup> Distributional issues = Verdelingsaspecten

The focus is more on **principles** and how to satisfy these principles with more technique and tools, like for example the 'equivalent income'. Focusing on principles implies focusing on **ethical, normative choices and implications**... and this is then essentially **a political issues**. So the focus is less on operationalisation and techniques and data.

## Dimensions of life

We have to use the individual well-being to evaluate social progress and policy. We have to use all the aspects of life that are important and relevant for the well-being of an individual citizen. Economic dimensions are important, like for example job, education, health, income... The focus is on the outcomes because it's directly relevant for the person. The focus isn't at the inputs because that's more relevant for the policy description.

There are 4 challenges:

### 1) Listing (principle 1)

They have to make a list of all the aspects of life who are important. But there's **a listing-problem**. Which aspects are important? How many dimensions? Up to which level of detail? There is **discussion** about the problem. On the one hand they<sup>44</sup> wonder<sup>45</sup> if it's possible to have an objective list for every country and culture (= **a perfectionist approach**)? Or does everyone has his own subjective list? And on the other hand they wonder who decides the list? And what is the role for public reasoning and democracy (= **a deliberative approach**).

We have the idea that we have to **decrease paternalism** in the end, because each individual has it's own list. We have to minimize the differences between all the individual lists and get one objective list.

### 2) Indexing (principle 2)

The listing problem is followed by **the indexing-issues**, aggregation or weighting. The importance (weight) of dimensions is different and is different for different people. The link between listing and indexing is that a dimension that's not listed implicitly gets a zero weight.

### 3) Effect on individual well-being (principle 3)

We focus on **the outcomes** and not on the input. We have to take in account the fact that different inputs have different effects on individuals' well-being. It depends on the individual preferences and characteristics. The government decides for example the budget for health. Some individuals have a bad health and have more needs to medicines. So the same budget has different effects for individuals. We have to take in account different people.

There are also **collective goods**, like for example the environment. The collective goods has an impact on well-being. They have a different effect or a distributional impact. But who pays and who benefits the collective goods?

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<sup>44</sup> They = Men

<sup>45</sup> To wonder = Zich afvragen



#### 4) Measurement (principle 4)

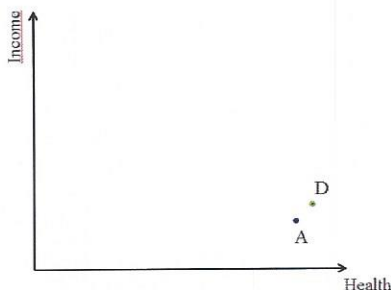
**How to measure the outcomes?** Sometimes it's necessary to make a difference between subjective and objective measurement. They mostly use a subjective evaluation of satisfaction with an objective situation, like for example 'Are you feel healthy?' "Are you satisfied with your health?'. The answers are different for different people. In most of the cases they ask citizens to fill in a questionnaire to give their satisfaction over an objective situation.

The same objective situation can be different depending on the (past of present) capabilities<sup>46</sup>. Some dimensions can be substitutes or complements for each other.

Most issues have to do with<sup>47</sup> **ethical choices and principles** (underlying policy). If we choose for a happiness-satisfaction, we accept adaptation-issues (never being satisfied, being ease to pleas...) and physical condition neglect... So happiness is in fact **too subjective** to use for a policy. The same situation has a different value for different individuals. If we only look at a situation as such, f.e. income, then the situation is **too objective**. If we choose for a metric of capabilities in life, which we know that's largely unobservable. We cannot escape questions about (individual) responsibility/

### Aggregation

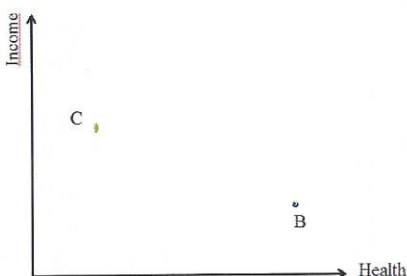
So there are different people and different dimension. To compare we use **aggregation** to compare different people in different situations. If we do that, then we can get an idea about what's the best and about who's best off.



Aggregation is **not necessary** when there is **dominance** (more is better).

x-axis: Health      y-axis: Income

We have to personosn (A en D). Person D is in the best situation, because he has a higher income and a better health than person A. Some Person D is dominant opposite person A.  $\rightarrow D > A$ .

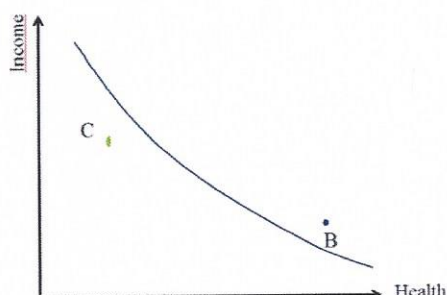


As mentioned, aggregation is not necessary when there's dominance. But **dominance** ( $D > A$ ) is very **exceptional**. Especially in the case of multiple dimensions it is difficult to reach dominance. The second graph show that it's difficult to choose between person B and C. Person B has a better health, but a lower income and person C has a higher income but a poorer health. There's here **no dominance**. So **aggregation** is **necessary** to know what the best situation is. Policy requires that we aggregatie because dominance is exceptional.

<sup>46</sup> Capability = Vermogen (geld)

<sup>47</sup> Has to do with = Heeft te maken met

So when there's no dominance, we need **an aggregated indicator** to compare individuals and to choose. Economists use **an indifference curve**. The indifference curve gives the trade of between the dimensions on the axes. If a point is on the indifference curve, then all the combinations are equally preferred. If point is of the indifference curve, then we say 'B is preferred to C', because B is right tot the indifference curve and C is left of it. The sharp of hte indifference curve gives complete information about the individual.



The steepness or the flatness of the curves tells something about the preferences. In this graph person B has a strong preference for health, because the indifference curve is steep. He will give up income to get a little bit more health (to be more healthy).

Aggregation is necessary for the evaluation of / the choice between multiple social states. But how do we have to aggregate? Dimension by dimension of individual by individual? Aggregation should be done individual by individual, because we are interested in the individual well-being. We will compare 'my situation' with the situation of 'my neighbour'. There are also 2 reasons why we choose for individual by individual.

- 1) We aggregate individual by individual because it are **individuals that decide** on the importance of dimensions (= indexing) and that make choices (challenge 4). So we have to respect the individuals's ideas about a good life. So an indifference curve is in fact the individuals indifference curve.
- 2) We aggregate individual by individual because social justice requires **accounting for cumulative deprivation**<sup>48</sup> and this requires an individual by individual approach (challenge 3).

a)

	income	health	"well-being"
individual 1	100	10	55
individual 2	10	100	55
average	55	55	
ratio	10/1	10/1	1/1

b)

	income	health	"well-being"
individual 1	100	100	100
individual 2	10	10	10
average	55	55	
ratio	10/1	10/1	10/1

We look at 2 individuals and compare 2 situations.

- Table a: Individual 1 as more income than individual 2. But individual 1 has a poorer health than individual 2.
- Table b: Individual 1 has more income and a better health than individual 2.

<sup>48</sup> Deprivation = Afwezigheid, gebrek, tekortkoming, gemis



The averages are in both tables the same. So based on the averages we will live in both situations. But if we look at the individuals, then we don't. In table 1 is individual 1 not healthy but rich. Individual 2 is healthy, but poor. In table 2 is there a lot inequality. Individual 1 has a high income and a good health.

The articles in the newspapers are always about the averages, but in fact they should look to the information at individual level. The average information is underneath to the information on individual information! Most of the information that's used is information by dimension, but that violates the principle of respect for individual choices and differences. The Human Development Index is for example an alternative for the GDP. It ranks countries in the world. It gives equal weights on the objective approaches.

If respect for individual choices is **crucial**, is there then a case for a subjective approach (happiness economics)?

## Subjective aggregation

**Previously:** An objective approach with equal weights for all the dimensions clearly violates with respect for people's preferences.

**Now:** It's very tempting<sup>49</sup> to think that information on satisfaction with life or happiness is compatible with respect for individual choices. On the contrary, happiness is **not compatible** with respect for preferences. Happiness isn't always a good indicator.  
→ What's wrong with being happy?

Happiness is a **booming business**. There are a lot of organizations who are promoting happiness. In the past psychology was used to help people. Nowadays there are new applications of psychology. It can make everybody function better.

**Applied Positive Psychology** research has shown that happy people:

- ❖ Live longer and are more healthy.
- ❖ Are more productive.
- ❖ Have more friends.
- ❖ Are more creative.
- ❖ Have more confidence<sup>50</sup>

So being happy has **positive consequences**. People will for example work better if they have a good job. So happiness is relevant and very popular, **but** the question is: 'Is it also a good indicator of individuals' well-being?'.



<sup>49</sup> Tempting = Verleidelijk, aanlokkelijk

<sup>50</sup> Confidence = Vertrouwen



### Which country do you prefer?

Characteristic	Country A	Country B
Years of schooling of adults > 15 year	9.3	4.9
GDP capita in ppp 2009	36 200 \$	9 400 \$
% of population having 1 \$ a day or less	< 2 %	6 - 20 %
	Country A	Country B
Life expectancy at birth (2010)	79	74
% of population older than 25 years with a higher educational degree	27	1
% of population "struggling or suffering"	44	91
Mortality rate among children per 1000 births	4.38	16.51
Children that don't reach the age of 5 (per 1000)	5	21

Characteristic	Belgium	Brazil
Years of schooling of adults > 15 year	9.3	4.9
GDP capita in ppp 2009	36 200 \$	9 400 \$
% of population having 1 \$ a day or less	< 2 %	6 - 20 %
Daily happiness experience (Galup) (./10)	7.3	7.5
	Belgium	China
Life expectancy at birth (2010)	79	74
% of population older than 25 years with a higher educational degree	27	1
% of population "struggling or suffering"	44	91
Mortality rate among children per 1000 births	4.38	16.51
Children that don't reach the age of 5 (per 1000)	5	21
Daily happiness experience (Galup) (./10)	7.3	7.6

### Uitleg:

Country A is better than country B. It's a dominant country. Someone should be stupid if he/she should not choose for this country. But Galup measures the daily happiness experience (red figures). If we consider that, we see the country A is a country where everything is better, but that the country is less happier. Brazil is there for example less GDP per capita and is there a bigger percentage of the population who have only 1\$ a day, but they are happier.

So initially we prefer living in country A (Belgium) instead of country B (Brazil or China), because in country A the living conditions are better. The respect for the preferences goes together with respect for the dominance principle (in fact simply, because 'more is better'). But...happiness is lower in country A (Belgium). In Brazil and China, there's a situation of more misery, but there are aspirations and high hope for the future.

**Happiness information doesn't imply respect for preferences.** Everyone prefers Belgium to China (even a Chinese would do so), although<sup>51</sup> happiness is lower.

	Belgium	Sierra Leone
% of population (>15y) able to read and write	99%	35%
Expected years of schooling	16 year	7 year
HDI (and ranking)	0.87 (18)	0.32 (158)
Satisfaction with life as a whole	7.25	3.55

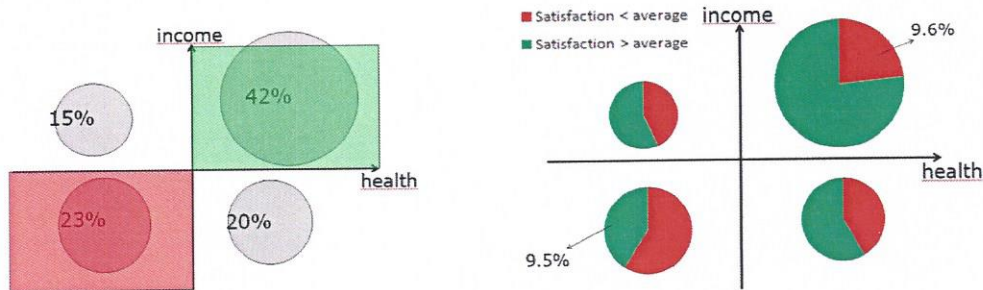
But happiness is not always wrong. This table shows that you would not like to live in Sierra Leone. And you're right, also looking at the satisfaction with life data.

Subjective satisfaction suffers from what is called **physical condition neglect**. As a consequence of adaptation, aspirations... Sometimes we are for example neglecting the fact that we are sick. "A person who is ill-fed, undernourished, unsheltered and ill can be high up in the scale of happiness or desire-fulfilment if he or she has learned to have realistic desires and to take pleasure in small mercies". It's a quote from India. It shows that the Indian population has learned to be happy and that they have to be satisfied with their situation.

<sup>51</sup> Although = Hoewel

### From macro to micro level

The previous example was constructed and on a macro level (countries). But now: "Do the happiness reports of individuals *in Flanders* satisfy the dominance principle?" We will verify if rich people in Flanders are more happy.



The graphs above use representative data for Flanders. The data are from 2011. A survey asked people if their income is sufficient to have a good life (om rond te komen)?

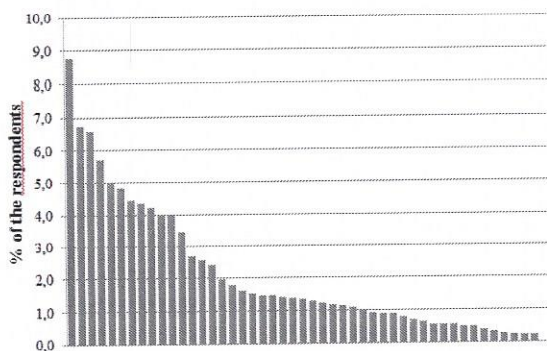
The x-axis: Less health → More health  
The y-axis: Less income ↑ More income

Green part: Someone is more satisfied than the average  
Red part: Someone is less satisfied than the average.  
→ Someone below the zero point is under the average.

In the first graph, 42% feels good, 23% feels bad. If we go over to the second graph, then we see that of the 42% who is feeling good, only 9.6% is less satisfied with their income. Of the 23% of the people who are feeling bad, only 9.5% is satisfied with his income. If government should help, they would help those who are unhappy. But they don't do it, because they have a good life. So we can conclude that ***happiness isn't a good indicator*** and isn't compatible with the dominance-requirement. Some countries with worse living conditions have a higher happiness score than a country dominated on all living conditions. If we use individual satisfaction as well-being indicator in Flanders, almost 20% does not fulfill the basis requirements of dominance.

### Aggregation individuals

(Dis)agreement on the relative importance of 4 dimensions of well-being



#### Uitleg:

The figure shows the ranking of 4 dimensions of well-being in life, namely income, health, education and social life. There are many different possibilities. People have different ideas. Only 8% of the people have the same opinion. That's a problem. A policy maker will aggregate and will have one indicator. If we give everyone the same weight, then there's paternalism. We try to measure the importance of paternalism.



So composite indicators using common weights introduce paternalism in the analysis as some individuals may be evaluated according to a perspective on the good life which is not (at all) their own. We measure the extent<sup>52</sup> of this **paternalism** for various popular weighting schemes used in composite indicators of well-being and search for a minimal paternalistic ranking of the dimensions. We use data for Flanders.

#### The outcomes:

Outcomes on dimensions of well-being	p10	p50	p90
I consider myself in good health	6	8	9
I consider myself as well educated	5	7	9
My (household) income is sufficient to live well	5	8	9
I have a satisfying social life (friend, associations, ...)	6	8	9

p10 = 10% lowest  
P50 = The average  
P90 = 10% highest

The table gives information about **the outcomes**. It gives an idea about how people score on the 4 dimensions in Flanders on a scale from 0 'completely disagree' to 10 'completely agree'. In Flanders people consider themselves good. So there are in general good scores in Flanders.

#### The opinions:

Opinions on importance for well-being	p10	p50	p90
My health	6	8	10
Education or training followed or following	3	7	8
My income/wealth	5	7	9
My social life (friend, associations, ...)	6	8	9

The table gives information about **the opinions** of the following question: "Your well-being in general is being influenced (and this can be positively as well negatively) by several factors. Give for each factor a score between 1 'no influence at all' and 10 'very strong influence'." It gives an idea how important the 4 dimensions are for the people in Flanders. Most of the people in Flanders find all the dimensions important.

#### There are different weighting systems

##### 1) Data-driven approaches

Data-driven approaches are based on **the outcomes**.

- ❖ **Frequency based weights** are based on the number of deprived individuals. In fact it looks at the number of people who are in a bad situation (deprived). The more deprivation, the lower the weight. If there are more people with low income, then it will get a lower score.
- ❖ The **principal component weights** use the factor loadings as relative weights. It's a statistical method. They look to the outcomes and look how they join together. They give the data a weight.

<sup>52</sup> An extent = De omvang

## 2) Normative approaches

Normative approaches are based on the opinions

- ❖ Equal weights. They consider all the dimensions as equal important. That's an opinion.
- ❖ Expert opinions. They use the Human Development Index. They only consider income, health and education. It's used when they want to measure social ~~society~~ <sup>security</sup>.
- ❖ Budget allocation weights is based on the average budget given by the respondents to each of the dimensions. So there's a budget divided over the different dimensions. It gives an idea about the importance.

## 3) Hybrid approaches

Hybrid approaches are based on **the outcomes and on the opinions**. Is a mix. The hybrid approaches a regression based approach. They choose an aggregator, perform a regression and use the coefficients as relative weights. There are **2 aggregators**:

- General satisfaction with life: "How is your satisfaction with life in general?"
- Self-reported measurement of capabilities in general: "How do you consider your possibilities and opportunities in life in general?"

Both questions are asked on a scale from 0 'very unsatisfied' respectively 'total insufficient' to 10 'very satisfied' respectively 'excellent'.

The hybrid approaches are most used. The coefficients are used as the weights. It's also used on opinions, because we have to choose a dependent value

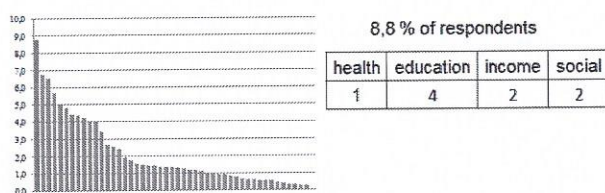
## Weighting schemes

	health	education	income	social
Frequency based	3	1	2	4
Principal component	3	1	2	4
Equal	2	2	2	2
Expert (UNDP)	2	2	2	4
Budget allocation	1	4	2	3
Satisfaction regression	2	4	3	1
Capabilities regression	3	4	2	1

The scheme above give an ordering of the dimensions according to the different weighting systems. 1 refers to 'highest weight', 4 to 'lowest weight'. Education gets the highest weight, then social life. The scheme is very different for the different systems.



### Ordering of dimensions: respondents



#### Uitleg:

Only 8.8% of the respondents have the same opinion. This means that 91.8% of the respondents prefer another ordering. They want to order the dimensions in another way. This is paternalism. There's paternalism of 92.8. Although 72.8% of the respondents agree that health is more important than education. How to measure the distance between a certain weighting scheme and the respondents' opinions?

- 1) We can look at the distance between the importance ordering of one single individual and the ordering induced the weights.  
→ We use Kemeny and Spearman metric.

#### Kemeny distance

	Individual 1	Individual 2	Weighting system
Most important	Health	Education	Health
	Income	Health	Income
	Social	Social	Education
Least important	Education	Income	Social

	Individual 1	Individual 2
health & income	0	0
health & education	0	1
health & social	0	0
income & education	0	1
income & social	0	1
education & social	1	0
Kemeny distance	1	3

#### **Kemeny distance:**

$$\begin{aligned} \text{Paternalism} \\ &= 4/12 \\ &= 0.33 \end{aligned}$$

#### Uitleg:

In the weighting scheme system is health more important than education. Individual 1 thinks that too, so the distance between it = 0. Individual 2 doesn't agree, so the distance = 1. Of the 12 combinations is there 4 times a disagree and a distance of 1. So we can calculate the paternalism:  $\frac{4}{12} = 0.33$ .

### Spearman distance

	Individual1	Individual2	Weighting system
Most important	Health	Education	Health
	Income	Health	Income
	Social	Social	Education
Least important	Education	Income	Social

	Individual1	Individual2
health	0	1
income	0	2
education	1	2
social	1	1
Spearman distance	2	6

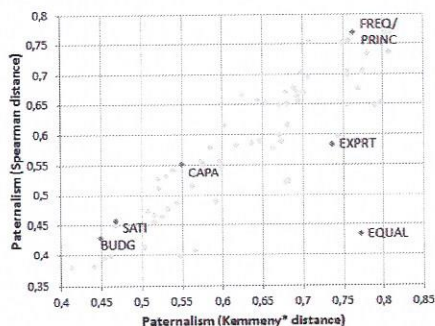
### **Spearman distance:**

$$\begin{aligned} \text{Paternalism} &= 8/16 \\ &= 0.5 \end{aligned}$$

### Utleg:

The weighting scheme sets education on the 3<sup>th</sup> place. Individual 1 finds education less important than the 3<sup>th</sup> place. Because of that, there's a distance = 1. Individual 2 finds education the most important dimension and put it on the first place. So there's a distance = 2. We can do that for all the dimensions. We always have to compare the weights of the individuals with the weight of the weighting system. If we do that, then we get paternalism =  $\frac{8}{16} = 0.5$ . 16, because there are for each dimension 4 options to classify, so  $4 \cdot 4 = 16$ .

### Paternalism



health	education	income	social
1	4	3	2

The question is of the Kemmeny distance or the Spearman distance is the best to avoid paternalism. We have to choose and we will choose the one with the lowest paternalism, because we want low paternalism. We get an ordering. An exact weighting scheme is undetermined. Weights consistent with ranking can range from extremely unequal to weighting schemes that come close to equal weights. In the paper did the writers a robustness analysis using all minimal paternalistic weights and investigate who a policy maker would identify as worst-off.

- 2) We can aggregate these distances across all individuals to obtain a measure of paternalism at the societal level.



## Equivalent income: Principles

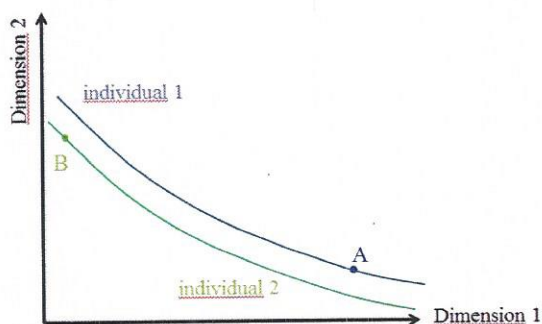
### Criteria:

- 1) **Dominance:** 'more is better'
- 2) When there is no dominance, then we must have **respect for the preferences** (= shape of the indifference curve). We have to take individuals seriously and avoid paternalism. God is not playing God. So **individualism** is the opposite of paternalism. We must have respect for each individual's opinion of the 4 dimensions. There is only one system who does that, namely the indifference curve. In fact we use the individual opinions in the indifference curves.

We may **not use the satisfactions score** (happiness score), but we have to use the shape of the indifference curves, because it shows the marginal rate of substitution.

### There are 2 options:

- 1) **Equal perception of what is good in life**  
→ = Equality of shape of the indifference curve (MRS). That's no problem, dominance and respect are compatible.



### Uitleg:

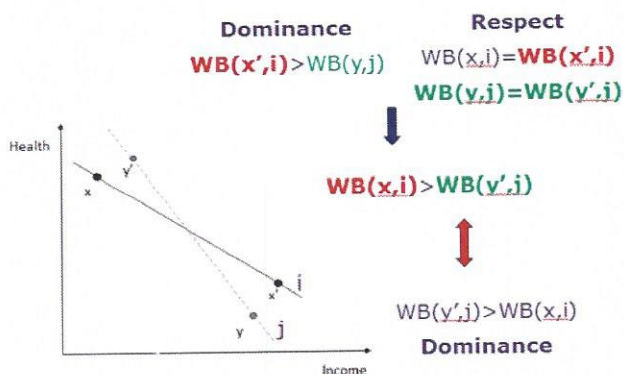
If there is equal perception about what is good in life, then all the people have the same opinion about the dimensions. All the people have the same indifference curve. It means that the preferences are equal. In this graph, the 2 individuals agree on what is good in life. They have the same indifference curve. The 2 indifference curves also have the same shape. It makes a comparison between the 2 individuals possible.

Position (person) A is better than position (person) B, because person A has more well-being on a higher indifference curve. It means that the well-being of person A is higher than the well-being of person B. But it can be that person B is more happy than person A, because of adaptation of person B (who is easy to please) or because of wrong aspirations by person B (who always wants more).

This graph is **an exceptional situation**. It's almost impossible to have equal perception of what is good in life in a society. There are differences.

## 2) *Diffrent* perception of what is good life

→ = Diffrent shape of the indifference curve (MRS). That's a problem, dominance and respect are not compatibel, because the indifference curves intersect.



### Uitleg:

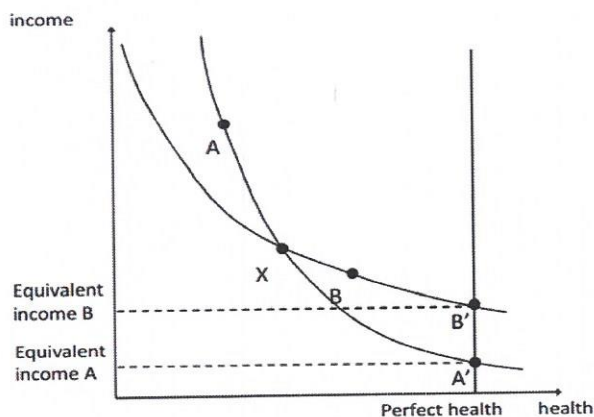
In reality people disagree about what's important in life. Two individuals disagree on what is good in life. They have a diffrent indifference curve, the curves aren't parrallel. They will (inevitably) intersect. That's the consequence of the diffrent opinons and perceptions. We use a lineair graph to make it easy.

The graph shows that income is more important for i is than for j, and that health is more important for j than for i. That's the reason why both indifference curves intersect.

→ Zie ook slides en deel in paper!

If individuals have similar preferences, then the respect for preferences is compatible with domiance. If individuals have diffrent preferences, then respect for preferences is not compatible with dominance. So we have to restrict to subset dominance. In the equivlant income approach this subset will result from the choice of a reference value for all non-income dimensions.

### Equivalent income<sup>53</sup>



<sup>53</sup> Zie figuur 4 in paper!



### Uitleg:

This graph makes everything more clear. There are 2 individuals (A en B) and 2 dimensions (health and income). B has less income than A, but has a better health than A. So they have each a different situation. But they also have a different opinion, because the indifference curves intersect.

So person A and B have different ideas about what is a good life, they have different preferences. Health is relatively more important for person A than for person B. Because of that, the indifference curve of person A is steeper. Person A is willing to give up more income to improve her health situation. So if we compare, we can simply say that A is richer and B is healthier. There's mutual envy. Person A would prefer the situation of person B, and person B would prefer the situation of person A. That can be seen when shifting the indifference curves of person A and B = applying the dominance criterion.

If we give perfect health to person A and to person B, while keeping well-being constant. This is moving along the indifference curve to A' and B'. The different importance given to health becomes now irrelevant. The one with the highest (equivalent) income is better off, namely B'. In situation x (equal income, equal health) does person A suffer more of being not healthy (her indifference curve is lower).

In other words, person A reaches the same level of well-being in situation A and in A' and person B reaches the same level of well-being in situation B and B'. A' and B' can be ranked on the basis of income only, namely the equivalent income. These equivalent incomes measure the well-being of both individuals. In this case, the equivalent income of B' is higher than A'. Person A is richer than person B, but less healthy. And since person A cares more for health than person B equivalent income of A is lower. Starting from the same situation, the equivalent income of A is lower, because she cares more for health. So in this case, it turns out that person A is worse off in A than person B in B, despite the fact that person A is richer. The explanation is clear. In situation A, has person A a lower level of health and health is relatively important for her. Equivalent income crucially depends on the individuals' ideal about what is good in life.

**Equivalent income** of an individual is the hypothetical income that, if combined with the best possible value on all non-income dimensions, would place the individual in a situation that she/he finds equally good as her/his initial situation.

$$\rightarrow Y_i^* = (Y_i, X_i) I_i (Y_i, X^r)$$

We have to make a choice for the reference values of the (non-income) dimensions  $X^r$ .

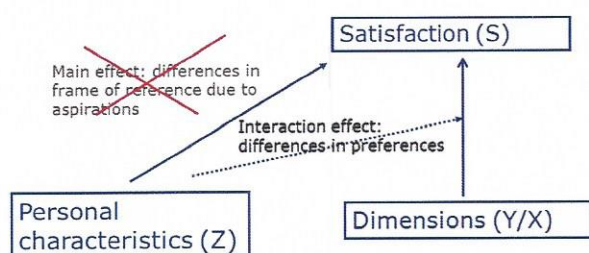
The equivalence approach satisfies respect for preferences (but does not depend on aspirations) and satisfies subset dominance.

The equivalent income = willingness to pay. The difference between income and equivalent income depends the willingness to pay<sup>54</sup> (for health in this example). The monetary measurement is an advantage, but isn't crucial. What's crucial is the willingness to pay, because it allows to compare dimensions and construct an aggregated indicator at individual level.

There is information required to compute<sup>55</sup> equivalent income. We need information about the position, **situation** of individuals on relevant life dimensions and information about individual **preferences**. That's about the weights of the dimensions. We can use life **satisfaction information** to know more about the marginal role of substitution between life domains!

So the basic idea is that we can use satisfaction information in a sensible way, because an optimistic person can be faster satisfied than a critical and pessimistic person. . We don't use the happiness scores, but only the ordinal preference information it contains. All points on an indifference curve are equally well for a person, and society respects this preferences. An indifference curve gives information about the trade off between dimensions, not about happiness. The equivalent income approach combines respect for preferences with (subset) dominance.

#### The technique:



#### Uitleg:

There are 2 impacts on satisfaction. Personal characteristics (Z) are the main effect. People with different characteristics have different preferences. It's important to take that in account. For example, women prefer social life, men prefer income. We exclude the main effect, but we make an interaction effect, namely the differences in preferences.

#### 1) Step 1: Estimate general satisfaction

$$S_i = \beta_0 + \beta_1 Y_i + \beta_2 X_i + \beta_3 Z_i + \beta_4 Z_i Y_i + \beta_5 Z_i X_i + \varepsilon_i \quad (1)$$

- with
- S: Subjective satisfaction
  - Y: Income
  - X: Non-income dimensions
  - Z: Personal characteristics that describe the individual, but that aren't relevant dimensions, e.g. gender and age.

<sup>54</sup> WTP

<sup>55</sup> To compute = uitwerken



The estimated coefficients give the relative importance (= the weight) of the dimensions (income and non-income dimensions). A higher coefficient implies that the dimensions are more important. It depends from X, Y and Z.

2) Step 2: Define equivalent income

Equivalent income ( $Y^*$ ) is the income that makes you indifferent between your own situation (1) and a situation with reference levels for the dimensions (2). Reference levels for dimensions are indicated by  $\bar{X}$ .

$$S_i = \beta_0 + \beta_1 Y_i^* + \beta_2 \bar{X} + \beta_3 Z_i + \beta_4 Z_i Y_i^* + \beta_5 Z_i \bar{X} + \varepsilon_i \quad (2)$$

3) Step 3: Calculate equivalent income

$$S_i = \beta_0 + \beta_1 Y_i + \beta_2 X_i + \beta_3 Z_i + \beta_4 Z_i Y_i + \beta_5 Z_i X_i + \varepsilon_i \quad (1)$$

$$S_i = \beta_0 + \beta_1 Y_i^* + \beta_2 \bar{X} + \beta_3 Z_i + \beta_4 Z_i Y_i^* + \beta_5 Z_i \bar{X} + \varepsilon_i \quad (2)$$

$$(1) = (2)$$

$$\Leftrightarrow \beta_0 + \beta_1 Y_i + \beta_2 X_i + \beta_3 Z_i + \beta_4 Z_i Y_i + \beta_5 Z_i X_i + \varepsilon_i = \beta_0 + \beta_1 Y_i^* + \beta_2 \bar{X} + \beta_3 Z_i + \beta_4 Z_i Y_i^* + \beta_5 Z_i \bar{X} + \varepsilon_i$$

$$\Leftrightarrow \beta_1 Y_i + \beta_2 X_i + \beta_4 Z_i Y_i + \beta_5 Z_i X_i = \beta_1 Y_i^* + \beta_2 \bar{X} + \beta_4 Z_i Y_i^* + \beta_5 Z_i \bar{X}$$

$$\Leftrightarrow \beta_1 Y_i + \beta_2 X_i + \beta_4 Z_i Y_i + \beta_5 Z_i X_i = \beta_1 Y_i^* + \beta_2 \bar{X} + \beta_4 Z_i Y_i^* + \beta_5 Z_i \bar{X}$$

$$\Leftrightarrow (\beta_1 + \beta_4 Z_i) Y_i + (\beta_2 + \beta_5 Z_i) X_i = (\beta_1 + \beta_4 Z_i) Y_i^* + (\beta_2 + \beta_5 Z_i) \bar{X}$$

$$\Leftrightarrow (\beta_1 + \beta_4 Z_i) Y_i^* = (\beta_1 + \beta_4 Z_i) Y_i + (\beta_2 + \beta_5 Z_i) (X_i - \bar{X})$$

$$\Leftrightarrow Y_i^* = Y_i + \frac{(\beta_2 + \beta_5 Z_i) (X_i - \bar{X})}{(\beta_1 + \beta_4 Z_i)}$$

## Equivalent income: application (illustration)

### Job quality

'More and better jobs'. It's easy to create more jobs, the aspect 'better' is difficult to achieve. How to measure job quality? The objective indicators are too objective and the subjective indicators are too subjective. Is there a solution in between these 2 extremes?

There was a survey about transition from school to work (SONAR) with 3000 Flemish 23-year olds born in 1978. The survey was about job satisfaction in the first job on a scale from 1 to 5. There were some **job characteristics**:

- ❖ Net monthly wage
- ❖ Shift work, contract type, part-time work, private or public sector, company size, formal training, learning new skills
- ❖ Demanding work concerning mental effort and time pressure, creative, responsible and varied job, physically demanding work and autonomy.



There were also some *personality variables*:

- ❖ Gender, educational level, educational level of the mother, number of children, nationality of the grandmother
- ❖ Pollster's impression of the respondent, motivation to work, locus of control, number of offers, search behaviour

#### Calculation of the indicators:

- Subjective indicator  $Q^S$ : Reported job satisfaction
- Objective indicator  $Q^{O,EW}$ : Equal weighting of dimensions
- Equivalent income indicator  $Q^{EI,r}$ : Reference values for Dr are the values of a perfect job. Men and women prefer f.e. other things.

	$Q^S$	$Q^{O,EW}$	$Q^{EI,r}$
$Q^S$	1		
$Q^{O,EW}$	0,563	1	
$Q^{EI,r}$	0,656	0,832	1

The table shows the correlation and also shows how strong the correlation is. The highest correlation is between the objective indicator and the equivalent income indicator (0.832). They take in account all the dimensions.

#### Job characteristics

	$Q^S$	$Q^{O,EW}$	$Q^{EI,r}$
Net monthly wage in FTE: low	-0,099	<b>-0,483</b>	<b>-0,28</b>
Net monthly wage in FTE: high	0,183	<b>0,507</b>	<b>0,374</b>
Physically demanding, dangerous, dirty job: low	0,105	<b>0,411</b>	<b>0,223</b>
Physically demanding, dangerous, dirty job: high	-0,404	<b>-0,732</b>	<b>-0,512</b>
Job with a lot of autonomy to decide: low	-0,566	<b>-0,845</b>	<b>-0,753</b>
Job with a lot of autonomy to decide: high	0,512	<b>0,92</b>	<b>0,858</b>
Permanent contract	0,061	<b>0,112</b>	0,077
Temporary contract	-0,093	-0,095	-0,064
Learning new skills during the first job: no	-0,538	<b>-0,981</b>	<b>-0,717</b>
Learning new skills during the first job: yes	0,187	<b>0,349</b>	<b>0,252</b>

#### Uitleg:

There's agreement between all the factors. In some cases is there a negative correlation. The differences are higher if use the objective indicators, because it takes the dimensions into account. The subjective indicators are the lowest, because it doesn't take the dimensions in account.

#### Background characteristics

	$Q^S$	$Q^{O,EW}$	$Q^{EI,r}$
Men	-0,018	-0,006	-0,038
Women	0,018	0,006	0,038
Education mother: primary or lower secondary	-0,065	<b>-0,18</b>	<b>-0,014</b>
Education mother: higher secondary	0,05	0,073	-0,017
Education mother: tertiary	0,073	<b>0,27</b>	<b>0,137</b>
Successful school years: max 5	-0,043	<b>-0,518</b>	<b>-0,261</b>
Successful school years: min 10	0,073	<b>0,445</b>	<b>0,246</b>

#### Uitleg:

On educational level isn't there a significant difference in job satisfaction. The jobs of better educated people are better but the satisfaction level is equal. That has to do with the expectations. School leavers have expectations. It happens that their expectations doesn't fit and as result of that that they aren't satisfied. But the revers is possible too.

## Conclusion

Measuring and evaluation well-being:

- ❖ What matters (first) are the **principles** (respect, preferences, dominance...)
- ❖ There have to be made very important choices.
- ❖ Disagreement is possible!
- ❖ Search for a **technique** to satisfy the principles
- ❖ The indifference curves get a long way in combining principles and techniques
- ❖ Do you agree?
- ❖ Is it possible to communicate?
- ❖ We need data