Use of an econometric model for policy impact evaluation on wellbeing (BES) indicators

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The work of last years

The measurement of wellbeing project in the last fifteen years has characterized the activity of many universities and international research institutes

Purpose

It would be desirable that all the fruitful debate that has taken place in the definition of indicators is replicated to define what are the appropriate determinants of each indicator

From measurement to control

This phase of specification can be useful to shift the debate from measurement of local wellbeing to a phase of policy impact evaluation on wellbeing measures

The construction of a structural model on wellbeing and development indicators requires to address several theoretical difficulties listed below:

Several possible specifications

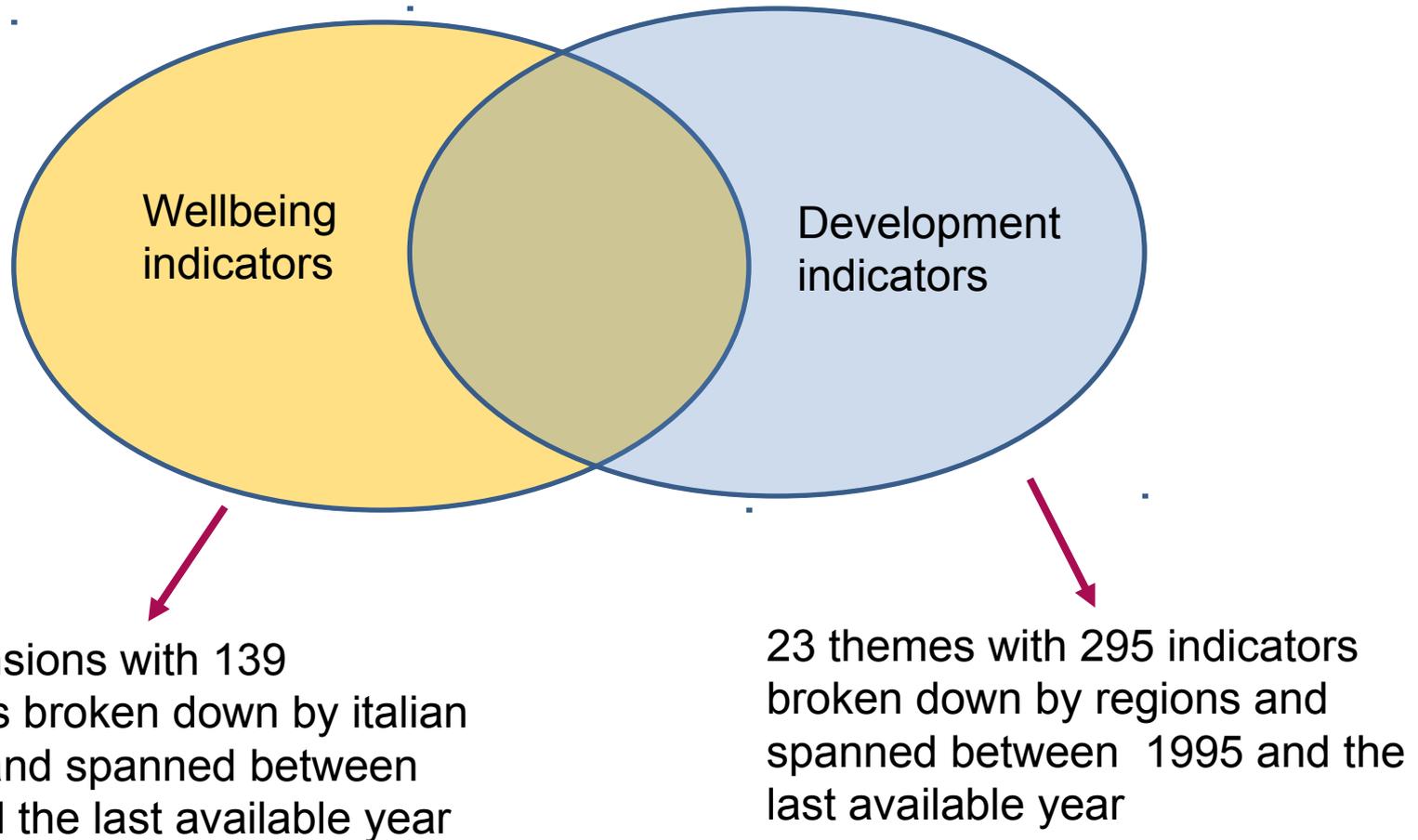**Appropriateness of wellbeing/development indicators**

Inability to measure some determinants

Different time horizon chosen to study this relation (the specifications of a short-run model will certainly be different from those long)

Assigning a "moral" judgment and a subjective weight of different indicators

Despite these difficulties, it is useful to estimate a causal relationship in order to plan short, medium and long-term government actions so as to steer the indicators towards progress and growth of the collective well-being

The econometric model is mainly based on two ISTAT datasets:

Wellbeing indicators

Development indicators

12 dimensions with 139 indicators broken down by italian regions and spanned between 1995 and the last available year

23 themes with 295 indicators broken down by regions and spanned between 1995 and the last available year

Dimensions belonging only to wellbeing dataset

- **Subjective wellbeing**
- **Quality of services**

Dimensions belonging to both datasets

- **Environment** (water, , waste, energy, air pollution)
- **Work**
- **Education and training**
- **Politics and institutions**
- **Health**
- **Security**
- **Research and innovation**
- **Landscape and cultural heritage**
- **Social relations and social capital**

Dimensions belonging only to the development dataset

- **Economic development** (competitivity, enterprises demography internationalization, sectoral econmy)
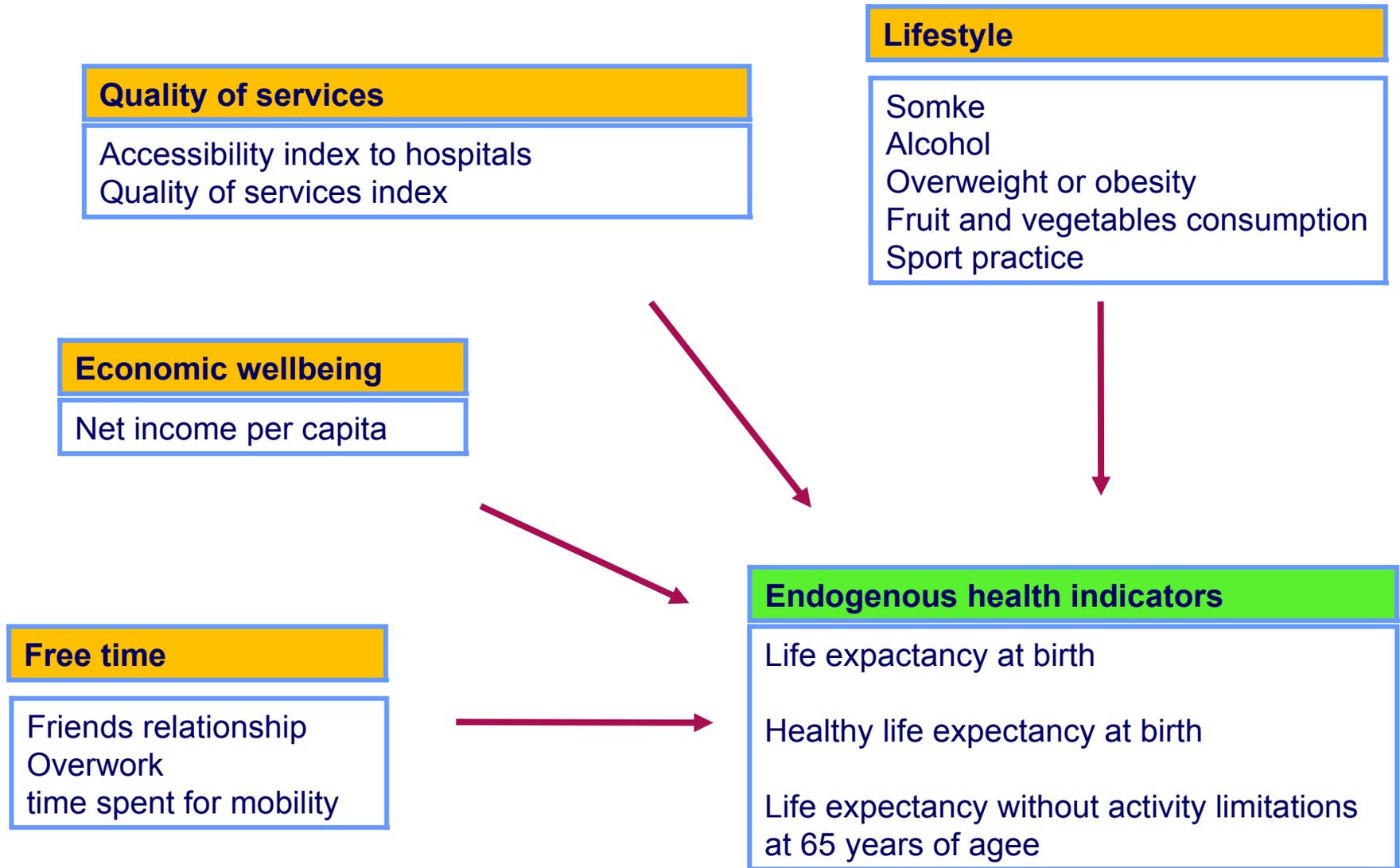- **Financial markets** (Capital markete and financial assets)
- **Tourism**
- **Social exclusion**
- **Information society**
- **Mobility and Trasports**

This is a macro structure of the model. The blue boxes represent dimensions not belonging to wellbeing archives

Lifestyle

Somke
Alcohol
Overweight or obesity
Fruit and vegetables consumption
Sport practice

Quality of services

Accessibility index to hospitals
Quality of services index

Economic wellbeing

Net income per capita

Endogenous health indicators

Life expactancy at birth

Healthy life expectancy at birth

Life expectancy without activity limitations at 65 years of agee

Free time

Friends relationship
Overwork
time spent for mobility

This specification and the relative parameter estimates are a work in progress (not definitive)

Variable	Units of measurement	Life expectancy at birth (female)	Life expectancy at birth (male)	Healthy life expectancy at birth (female)	Healthy life expectancy at birth (male)	Life expectancy without activity limitations at 65 years of age (female)	Life expectancy without activity limitations at 65 years of age (male)
Constant	years	73.996***	66.333***	55.950***	60.379***	12.614***	15.797***
Smokers aged 14 and over	%	-0.114***	-0.176***	-0.074**	-0.101**	-0.099***	-0.153***
Obese people aged 18 and over	%				-0.026*	-0.021*	-0.004*
alcohol consumers at risk aged 14 and over	%	-0.056***	-0.124***	-0.134***	-0.175***	-0.042***	-0.165***
adjusted average disposable income (per capita)	euros	0.001***	0.001***	0.001***	0.0003***		
People aged 14 and over who declare themselves very satisfied with the friendly relations	%	0.038***	0.064***	0.083***	0.053***		
Persons aged 3 and over who consume at least four daily servings of fruits and vegetables	%					-0.008*	0.012*
People aged 15-64 who play more than 60 hours per week of paid work and / or family	%	-0.019*	-0.019*	-0.106***	-0.065***	-0.001*	-0.013*
Accessibility index to hospitals	%			0.030*	0.094*		
people aged 14 and over who do not practice any physical activity	%	-0.023**	-0.016**	-0.039**	-0.047**	-0.024**	-0.050**
Average of dependent variable		83.26	77.64	55.24	57.64	8.48	8.79
R-squared		0.89	0.85	0.92	0.92	0.86	0.71
Number of observations		360	360	380	380	320	320
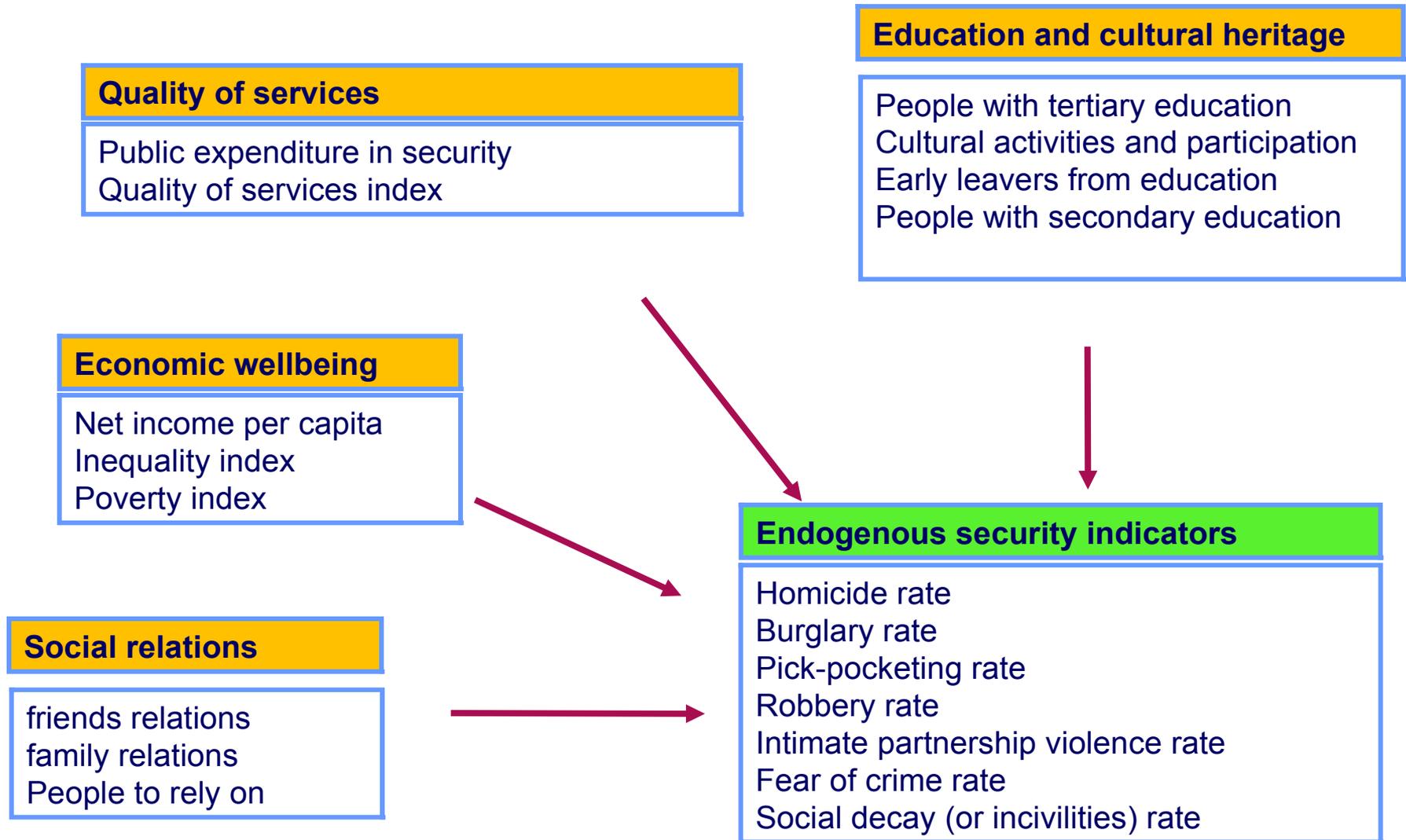
Quality of services

Public expenditure in security
Quality of services index

Education and cultural heritage

People with tertiary education
Cultural activities and participation
Early leavers from education
People with secondary education

Economic wellbeing

Net income per capita
Inequality index
Poverty index

Social relations

friends relations
family relations
People to rely on

Endogenous security indicators

Homicide rate
Burglary rate
Pick-pocketing rate
Robbery rate
Intimate partnership violence rate
Fear of crime rate
Social decay (or incivilities) rate

This specification and the relative parameter estimates are a work in progress (not definitive)

Variable	Units of measurement	homicide rate	burglary rate	Pick pocketing rate	robbery rate	Concrete fear rate	Social decay (or incivilities) rate
Constant		2.28529***	6.78762*	3.40485*	-0.06687	4.48300*	9.71216***
Disposable income inequality	%	0.08639**	0.15834*	0.12942*		0.19102	0.65895***
Social participation	%	-0.00237					
Generalized trust	%	-0.01283***	-0.02945**	-0.00232			
People to rely on	%				-0.03730***	0.12064*	
People with tertiary education	%	0.01318	-0.41868	-0.06221			
Cultural participation	%	0.01986*		-0.03581	-0.03889***		0.03377*
No profit organizations	%	0.00453	-0.04032***	-0.02482***	-0.00036	0.00829	0.00958**
Association funding	%	-0.003	0.02723	0.00793	0.00165	-0.04886***	0.00067*
Per capita adjusted disposable income	euros	-0.00005**	-0.00036*	-0.00020*	-0.00009*	-0.00044*	
Early leavers from education and training	%						
People at risk of poverty	%		0.41329***		0.03478***	0.06224*	-0.18492*
Quality of service index	%					0.00945*	-0.00038*
Average of dependent variable		1.08	9.79	4.54	1.40	9.80	13.94
R-squared		0.25	0.66	0.49	0.52	0.43	0.41
Number of observations		320	340	340	320	340	340

On Decembre 7th was voted the italan financial act for 2017 that has several type of reforms and policies

CORPARATE TAXES RATE FROM 27.4% TO 24%
ELIMINATION OF EQUITALIA
REFORM OF SECTOR STUDIES
TAXES FOR SMALL BUSINESSES AT 24% ON PROFIT REINVESTED
PACKAGE FOR BUSINESS COMPETITIVENESS AND R&S
INVESTMENT TO IMPROVE EXPORT OF MADE IN ITALY
GUARANTEE FUND FOR SMEs
VOLONTARY DISCOLSURE CAPITAL RETURN FROM ABROAD AND SAFEGUARD TERM
CHANGES TO PENSION SYSTEM
REPAIR EARTHQUAKE DAMAGES
SUBSIDIES FOR MIGRANTS
FEE RAI FROM 100 TO 90 EURO
AID FOR FAMILIES WITH ISEE BELOW 3000 EURO
BUNOUS BABY AND DISCOUNTS ON INFANT PRODUCTS AND NURESRIES FEES
BONUS FOR 18 YEARS OLD YOUTH TO SPENT FOR ACTIVITIES 'CULTURAL SCHOLARSHIPS
ECOBONUS FOR HOUSE FURNITURE AND RENOVATIONS
REFORMS FOR PUBLIC ADMINISTRATIONS AND BANKS
2 BILLION TO HEALTH SYSTEM
3 BILLION TO LOCAL AUTHORITIES

Poverty subsidies (SIA=Sostegno Inclusione Attiva) for families below the absolute poverty line (ISEE under 3000 euro).

Active inclusion in working population for adults (presence of unemployed) and active schooling inclusion for children (one member with less than 18 years old). Subsidy from 960 euro per year for families of one component to 4800 € families with more than 4 components

Obligation to follow a path of integration by actively seeking employment and then re-entering the world of work for adults and school performance for children in compulsory education and health protection of children and babies.

Direct effect on some exogenous indicators (in Italy)

Inequality index of net income decrease of 1.4% (from 5.78 to 5.71)
% of people under absolute poverty line decrease of 2.9% (from 6.80 to 6.60)
Financial vulnerability decrease of 0.4% (form 4.80 to 4.78)
% of families with a serius material deprivation decrease of 1.7% (11.6 to 11.43)

%variation of some endogenous wellbeing indicators

Indicator	Value
Social decay (or incivilities) rate	-0.0743%
Fear of crime rate	-0.1614%
Pick-pocketing rate	-0.2089%
Share of temporary jobs for at least 5 years	-0.0110%
Share of household work time carried out by women	-0.0319%
Share of over-qualified employed persons	-0.0452%
Share of employees with low level earnings	-0.0875%
Share of NEET	-0.2790%
Early leavers from education and training	-0.4003%
Life expectancy at 65 years of age (male)	0.1058%
Life expectancy at 65 years of age (female)	0.0668%
Life expectancy at birth (male)	0.0132%
Life expectancy at birth (female)	0.0097%

x-axis: -0.5000%, -0.4000%, -0.3000%, -0.2000%, -0.1000%, 0.0000%, 0.1000%, 0.2000%

About 550000 young people of 18 year old will receive 500 € each one
to use for expenditures in cultural services

Allows young and older, who meet the requirements, they can buy online tickets for
museums, concerts, exhibitions, live shows, cinema, books, e-books, etc.

Scholarships to help deserving students who, because of low income problems, they
could opt to study, for the redevelopment of the suburbs

2 per thousand to cultural associations.

Direct effect on some exogenous indicators (in Italy)

Association funding: increase of 1.38% (from 14.5 to 14.7)
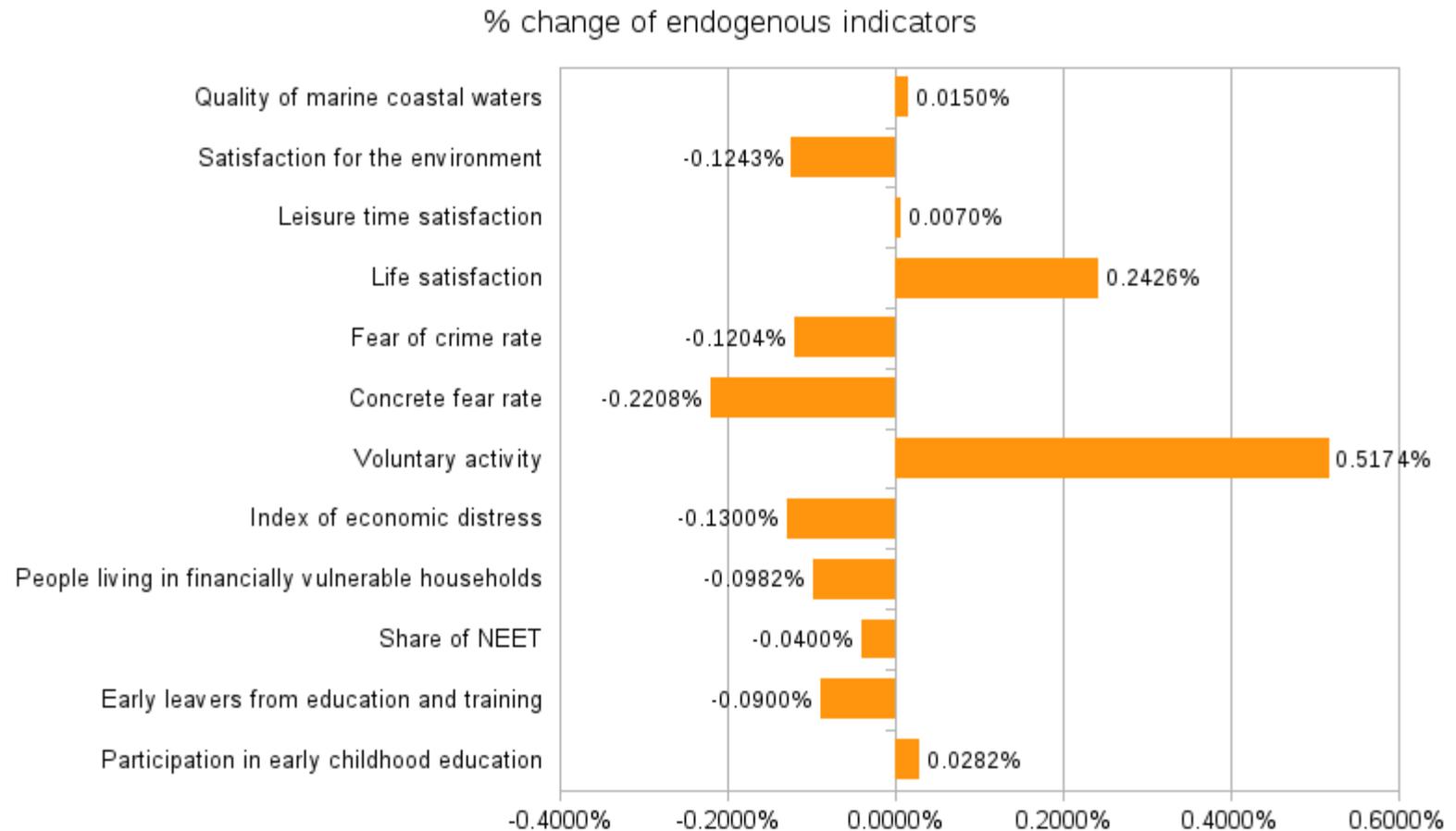**No profit organizations: increase of 2.76% (from 50.7 to 52.1)**
Municipal expenditure for cultural heritage: increase of 1.98.% (form 10.1 to 10.3)
Cultural participation: increase of 0.75% (26.7 to 26.9)
Enrollment rate at university: increase of 1.83% (from 49.2 to 50.1)

%variation of some endogenous wellbeing indicators

% change of endogenous indicators

Indicator	Value
Quality of marine coastal waters	0.0150%
Satisfaction for the environment	-0.1243%
Leisure time satisfaction	0.0070%
Life satisfaction	0.2426%
Fear of crime rate	-0.1204%
Concrete fear rate	-0.2208%
Voluntary activity	0.5174%
Index of economic distress	-0.1300%
People living in financially vulnerable households	-0.0982%
Share of NEET	-0.0400%
Early leavers from education and training	-0.0900%
Participation in early childhood education	0.0282%

Let it be A a positive composite indicator, aggregation of a set of *H* outcome indicators *h₁*, *h₂*, *h₃*…

$$\Delta A = \sum_{i=1}^{H} \alpha_i \cdot \Delta h_i$$

$$\Delta h_i = \sum_{j=1}^{E_i} \beta_{ij} \cdot \Delta e_{ij}$$

Suppose we know the equation *i* that relate each *h_i* outcome with a set of exogenous indicators *e_{i1}*, *e_{i2}*, *e_{i3}*….

Suppose we know the public expenditure c_{i1}, c_{i2}, c_{i3} to change of 1% each one of the exogenous indicators e_{i1}, e_{i2}, e_{i3}, etc.

$$cost_{ij} = c_{ij} \cdot \Delta e_{ij}$$

$$\left\{ \begin{array}{c} \max_{\Delta e} \Delta A = \left[\sum_{i=1}^{H} \alpha_i \cdot \Delta h_i \right] = \left[\sum_{i=1}^{H} \alpha_i \cdot \left(\sum_{j=1}^{E_i} \beta_{ij} \Delta e_{ij} \right) \right] \\ s.t. \\ \left[\sum_{i=1}^{H} \left(\sum_{j=1}^{E_i} c_{ij} \Delta e_{ij} \right) \right] \le p\% \, gdp \end{array} \right.$$

Then for each percentage *p* of the gdp we can find the ammount of variations of each exogenous indicator that maximize the change of A under the constraint that the overall expenditure of the policy was less to the percentage *p* of gdp

This project is a work in progress: all the specification and estimates of the model are not definitive, they depend on the change of indicators that generally are updated every year (type of indicators, time span, values and missing values).

Perhaps this project will not be never definitive not only because indicators change but also because they represent a measurement framework of an ever-changing society.

The main purpose of the project is to stimulate the debate on the use of indicators not only as a static measurement of the wellbeing but also as a decision support system for policy makers.

Econometric models are an appropriate and mature statistical tool to make forecasts, counterfactual analisys and policy impact evaluation. In this context the econometric model used to evaluate the impact of the policies on wellbeing can be used as a discussion framework on what imply each wellbeing indicator.