Economic insecurity:
A microsimulation approach

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"Life course analysis: data and methodological challenges"
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Economic insecurity: "I know it when I see it"

I shall not today attempt further to define [obscenity], and perhaps I could never succeed in intelligibly doing so. But I know it when I see it [...].

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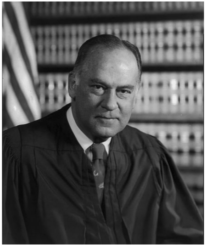
describing his threshold test for obscenity in Jacobellis v. Ohio case (1964).



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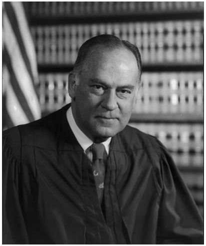

Although there is not yet consensus on the definition, many would agree in identifying economic insecurity as the risk of not having resources to support an adequate standard of living now and in the foreseeable future (Berton et al. 2012).

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$\Rightarrow$ A lifecourse perspective as the right analytical approach

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Our solution: Extend survey data forward by means of microsimulation

Microsimulation as a modelling approach that:

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- Allows integration of multiple life domains;
- Considers inter-temporal decision making and the role of expectations;
- Avoids over-simplification / allows for a rich enough institutional setting.

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- How has the distribution of vulnerability changed with Covid-19?
- What do the "recovery curves" from negative shocks, including Covid-19, look like for different individual characteristics and different regions?

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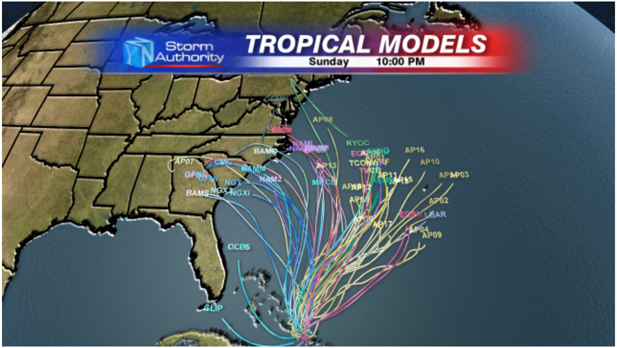
- What can we learn in terms of policy (re-)design and optimization after the pandemic, also taking into account the need for fiscal consolidation?

Considering hypothetical life course trajectories



A dynamic framework /1

Economic security as a *normative evaluation* of the expected stream of resources available to any individual over the course of his or her residual lifetime, appropriately discounted for family composition and time:

$$S_{i,t} = \frac{\int_{\tau=t}^{\infty} \int_{z} W(z) \delta^{t} f_{i,\tau}(z) p_{i,\tau} \, dz d\tau}{\int_{\tau=t}^{\infty} \delta^{\tau} p_{i,\tau} \, d\tau}$$

where

- $W(z)$ is the welfare associated to the resources available to individual i at time τ, with $W' > 0$ and $W'' < 0$,
- δ is the discount factor,
- $f_{i,\tau}(z)$ is the density at which resources are available at time τ, and
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The measure is then normalised by some reference aggregate level of security:

$$s_{i,t} = \frac{S_{i,t}}{\bar{S}_0}$$

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- Health risks: poor health reduces income and increases needs (which affect the equivalence scale)
- Role of social protection: market incomes are transformed into household disposable income by a tax-benefit calculator

Properties /1

(see Richiardi and He, 2020b)

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3. Stochastic dominance. If one distribution of resources at a future time t stochastically dominates another, it is associated to a higher level of security.
4. Pigou-Dalton (transfer) principle. Other things being equal (in particular, the probability of being alive), a transfer of resources in any possible future state of nature from a more secure to a less secure individual leads to an increase in the overall level of security in the population, as long as it does not leave the first individual less secure than the second.

Further concepts

From security...

$$S_{i,t}(X_t, P)$$

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From security...

$$S_{i,t}(X_t, P)$$

... to resilience

$$S_{i,t}(X_t, m^{\star}, P)$$

where $m^{\star}$ modifies the initial conditions as follows:

- $m1 =$ job loss (if employed)
- $m2 =$ financial loss of given entity
- $m3 =$ partnership breakdown (if partnered)
- $m4 =$ extra child
- $m5 =$ deterioration of physical health
- $m6 =$ deterioration of mental health
- $m7 =$ acute condition (labour supply is impaired)
- ...

Operationalisation

$$S_{i,t} = \frac{\int_{\tau=t}^{\infty} \int_z W(z) \delta^t f_{i,\tau}(z) p_{i,\tau} \, dz d\tau}{\int_{\tau=t}^{\infty} \delta^\tau p_{i,\tau} \, d\tau}$$

$$S_{i,t} = \frac{1}{R} \sum_{r=1}^{R} \left(\frac{\sum_{\tau=t}^{T_r} c_{i,\tau,r}^{1/\alpha} \delta^\tau}{\sum_{\tau=0}^{T_r} \delta^\tau} \right)$$

where

- c is equivalised real disposable household consumption,
- $\alpha > 1$ is a risk-aversion parameter,
- R is the number of different runs of the model,
- T_r is the residual lifetime of individual i in the r trajectory (which is itself simulated), and
- $\delta \in (0, 1]$ is the constant discount factor.

This is nothing else than a weighted average of the welfare associated to future possible income/consumption streams, with weights equal, in every period, to δ^τ.

Three smoothing effects

1. Considering a concave welfare function

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2. Considering multiple years

Three smoothing effects

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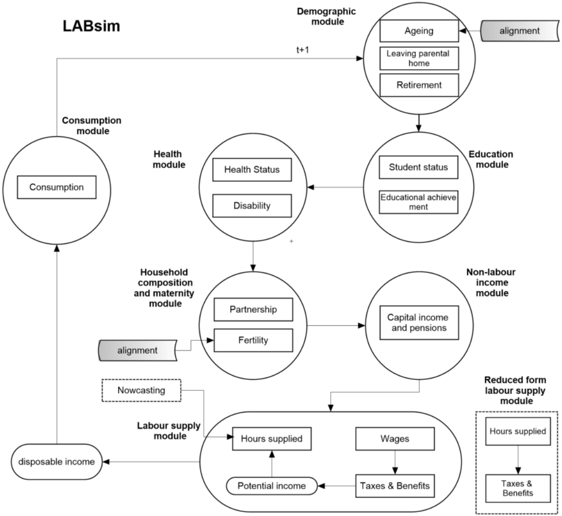
2. Considering multiple years
3. Considering net incomes (post taxes & benefits)

The LABsim modelling framework

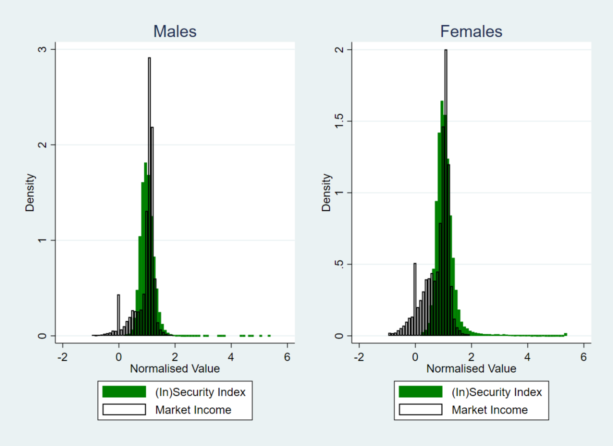


Preliminary results (Italy)

Overall

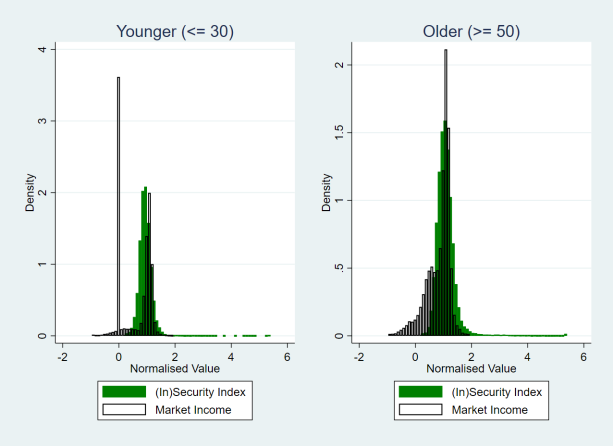
Density
0
.5
1
1.5
2
2.5
-2
0
2
4
6
Normalised Value
Security Index
Market Income

By gender



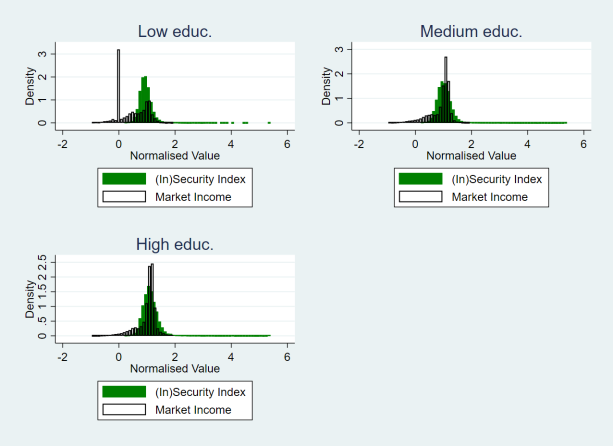
Males
Females
Density
Normalised Value
(In)Security Index
Market Income

By age

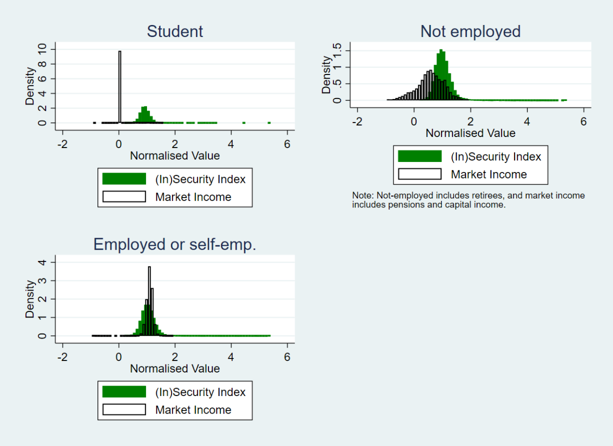


Younger (<= 30)
Older (>= 50)
Density
0
1
2
3
4
.5
1.5
-2
0
2
4
6
Normalised Value
(In)Security Index
Market Income

By education

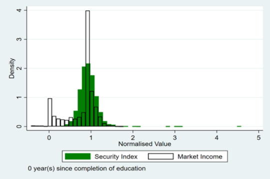


By activity



Student
Density
0 2 4 6 8 10
-2 0 2 4 6
Normalised Value
(In)Security Index
Market Income
Not employed
Density
0 .5 1 1.5
-2 0 2 4 6
Normalised Value
(In)Security Index
Market Income
Note: Not-employed includes retirees, and market income includes pensions and capital income.
Employed or self-emp.
Density
0 1 2 3 4
-2 0 2 4 6
Normalised Value
(In)Security Index
Market Income

Focus: students /1



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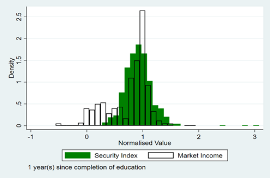
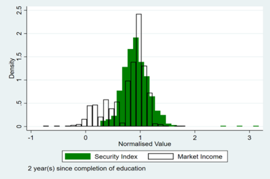
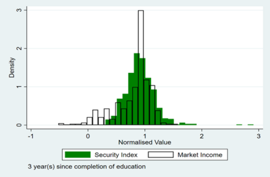


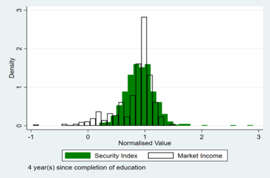
corr=0.033



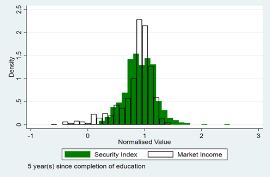
corr=0.038



corr=0.114



corr=0.155



corr=0.128

Focus: students /2

Normalised security index, students leaving education

Group	Mean	CV
All	0.93	24.19
Gender		
Female	0.94	22.54
Male	0.93	25.66
Region		
ITC North West	0.95	22.95
ITH North East	0.95	23.07
ITI Centre	0.93	23.51
ITF South	0.89	29.93
ITG Insular Italy	0.92	19.63

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`Thank you.`