



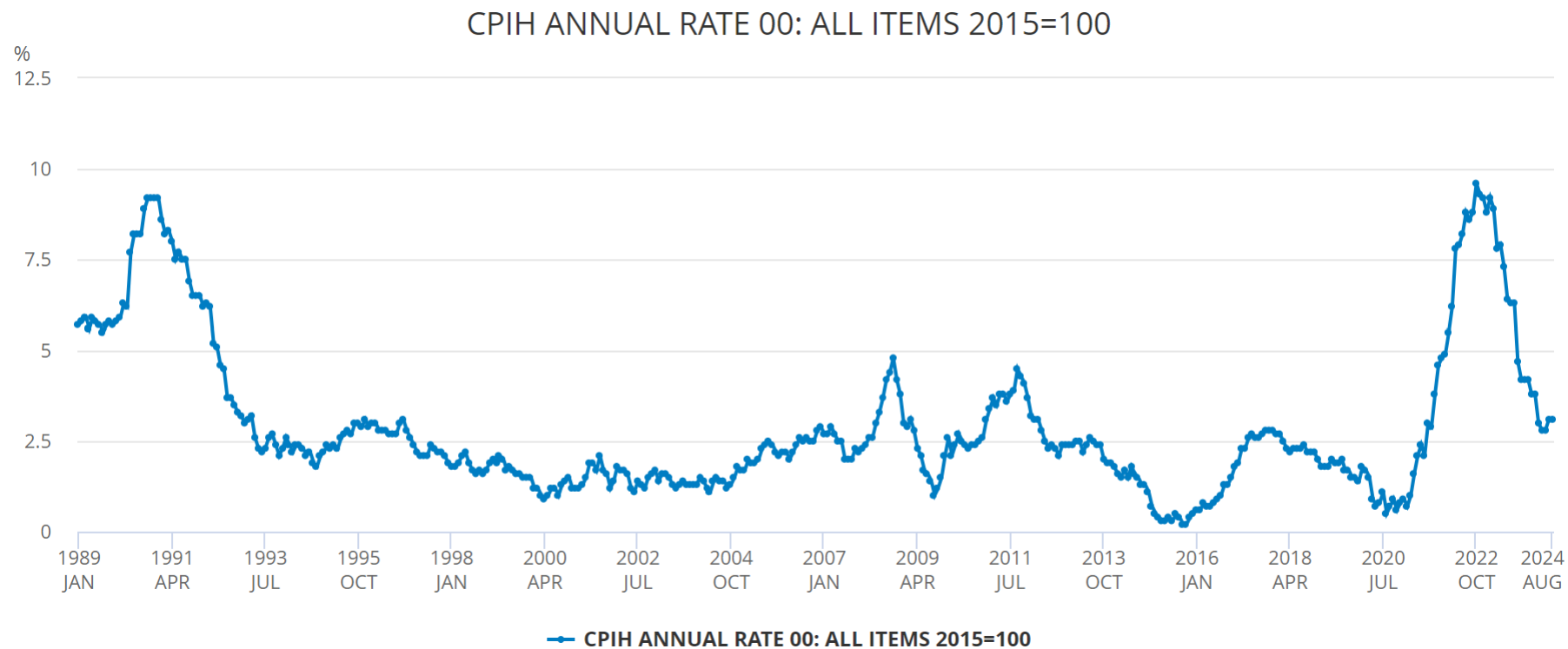
The public health implications of the cost-of-living crisis: Outlining mechanisms and modelling consequences

Philip Broadbent, Rachel Thomson, Daniel Kopasker,
Gerry McCartney, Petra Meier, **Matteo Richiardi**,
Martin McKee, Srinivasa Vittal Katikireddi

EUROMOD Research workshop – Marseille 26-27 September 2024

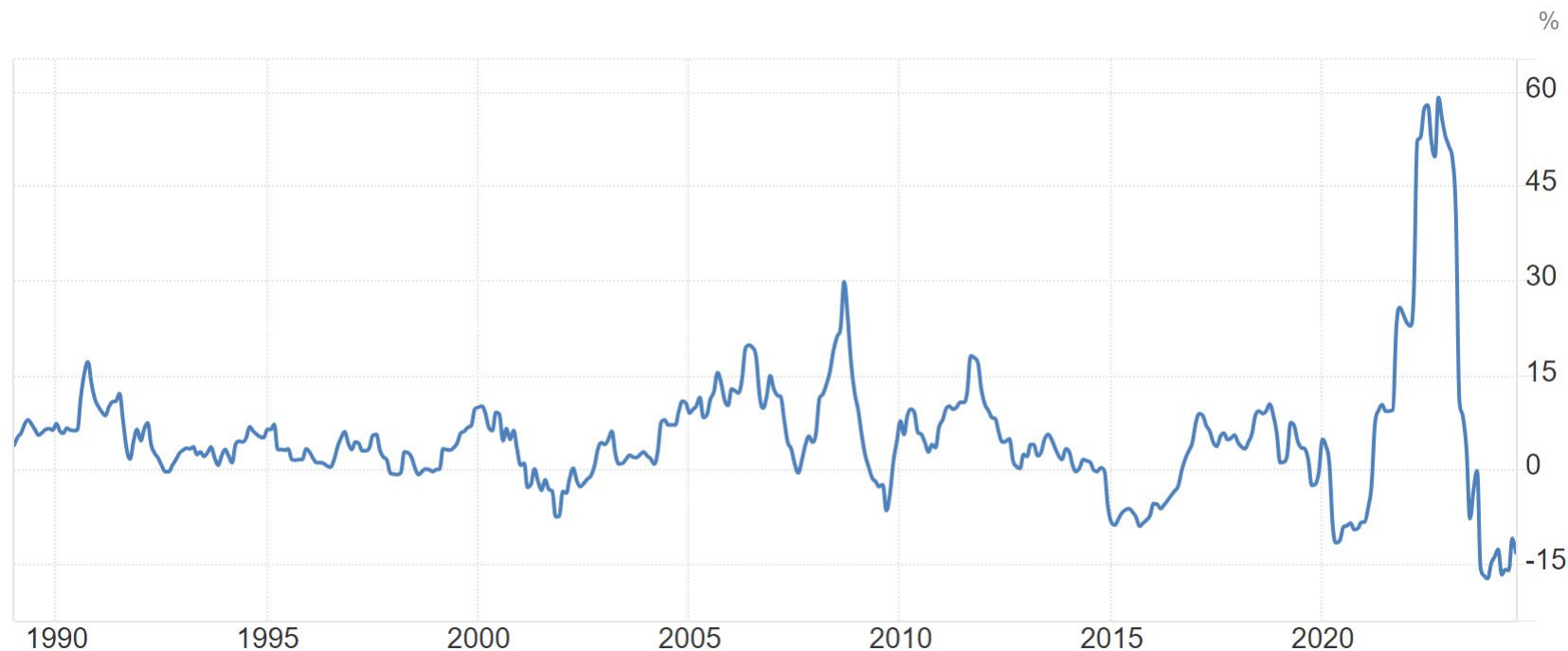


Cost of living crisis – CPI

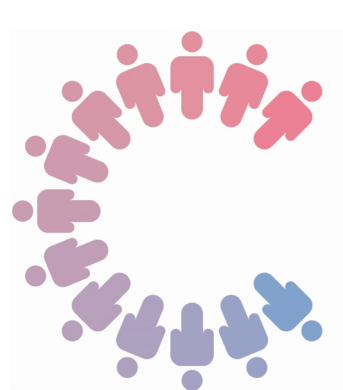




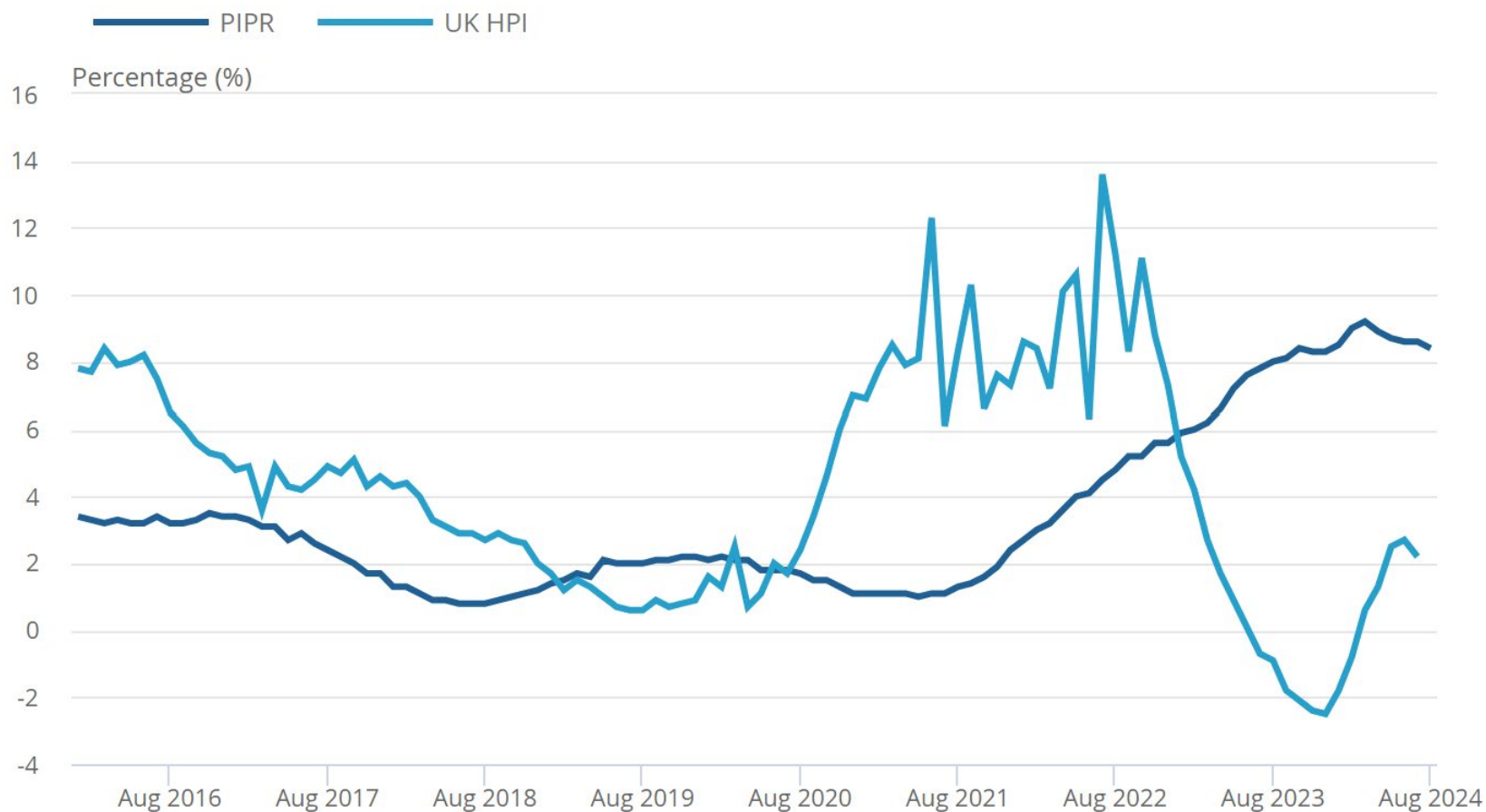
Cost of living crisis – energy prices



Around 40% of UK electricity is produced from gas compared to 15% in Germany and 6% in Denmark



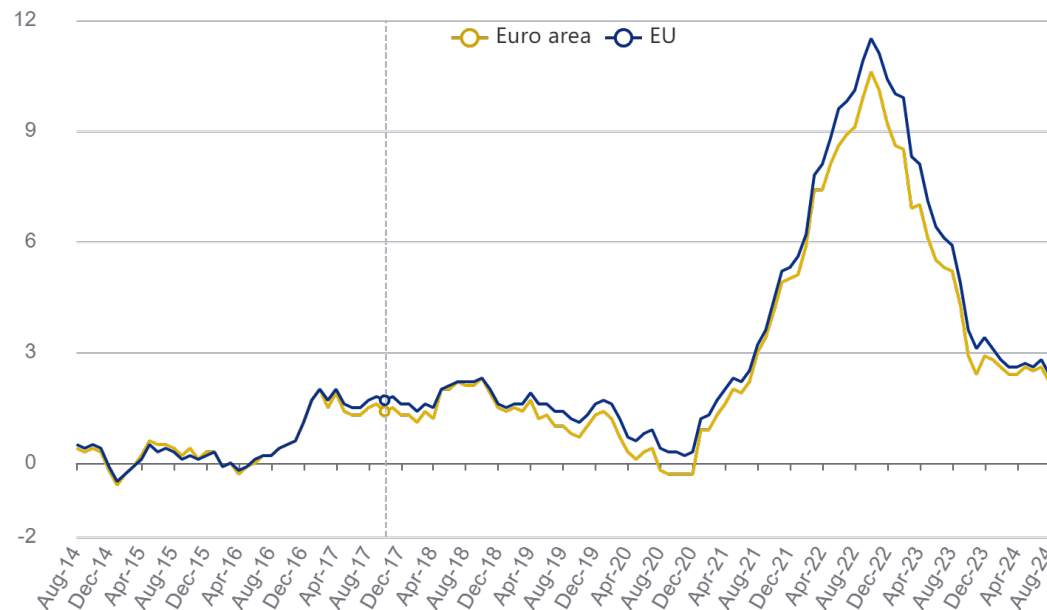
Cost of living crisis – private rents and house prices





Common trend in advanced economies

Annual inflation rates (%)



eurostat 

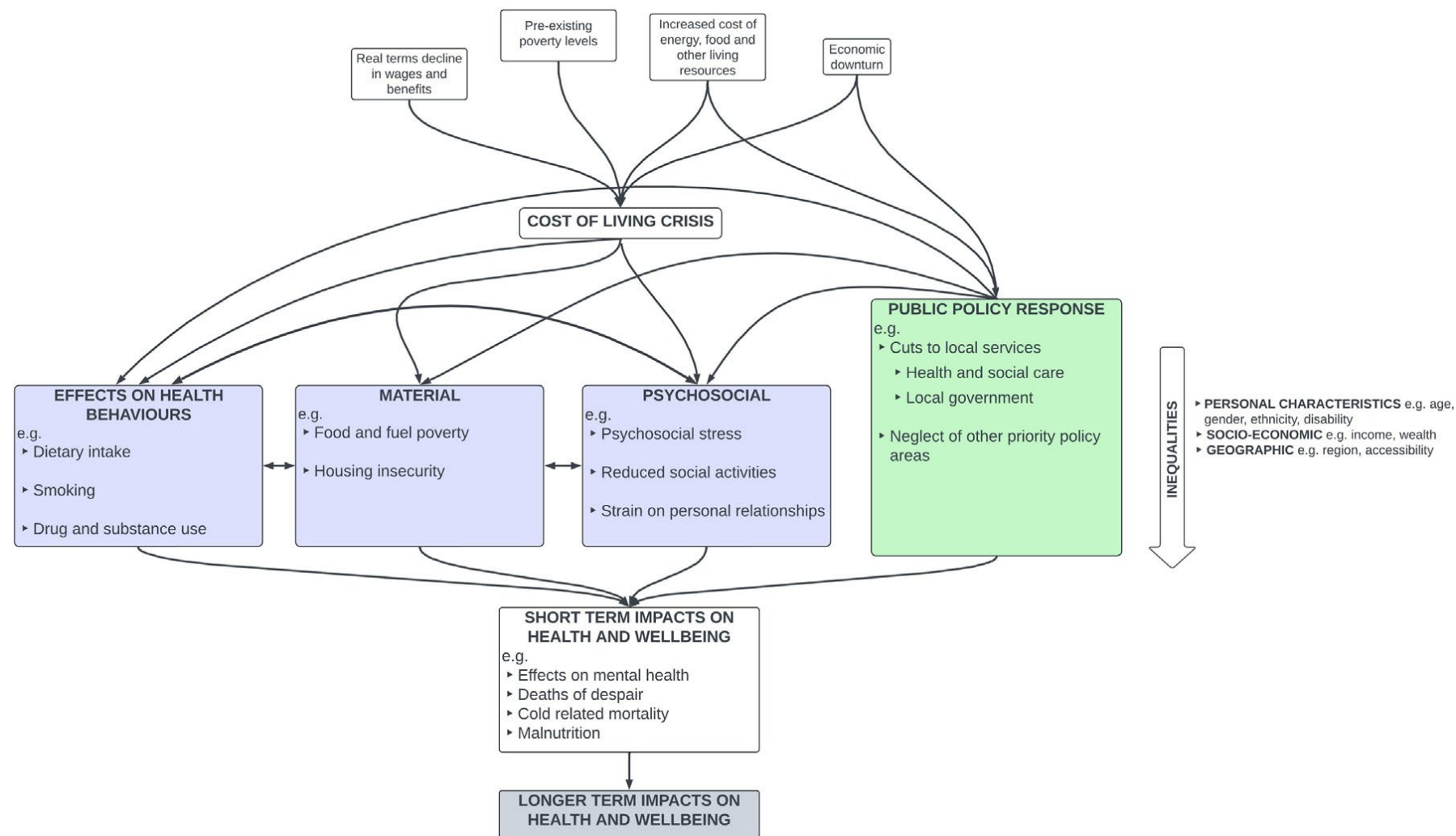
See the forthcoming special issue of the
International Journal of Microsimulation:

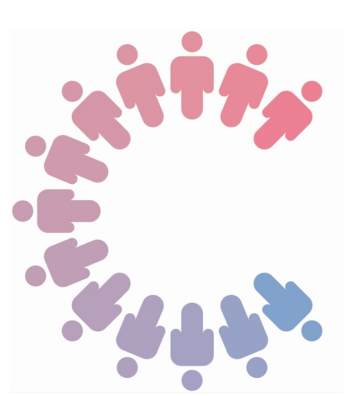
**"Tax and Benefit Microsimulation in an
Inflationary Environment: Applications and
Methodological Issues"**

Guest editors: Emanuele Dicarilo, Nicola
Curci, Marco Sevegnago and Antonella
Tomasì



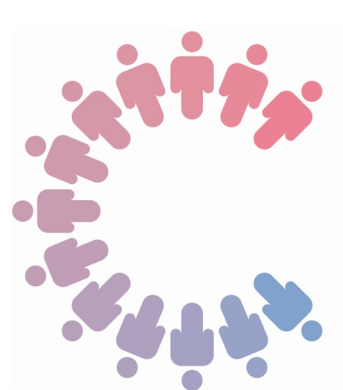
Potential pathways to health outcomes



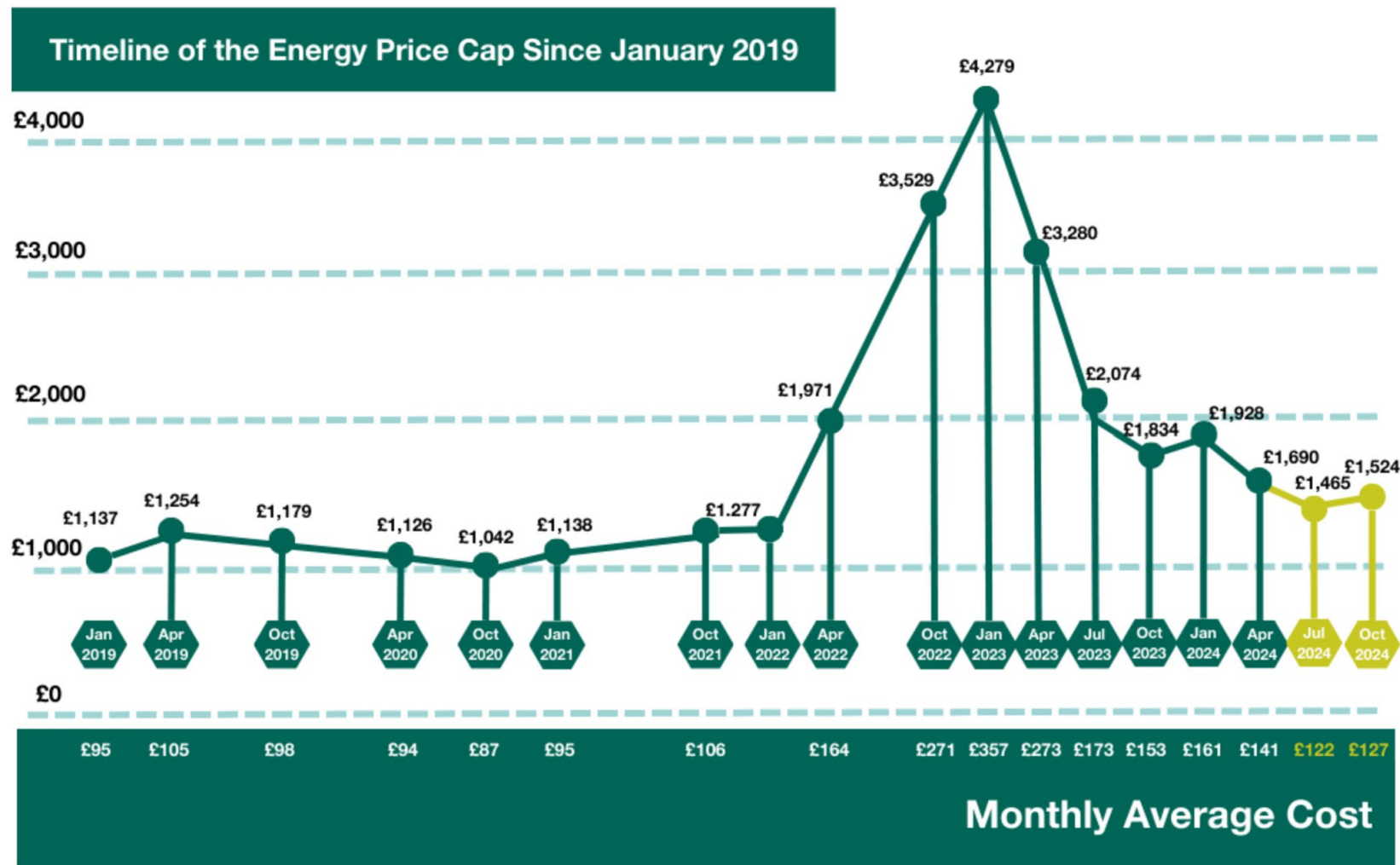


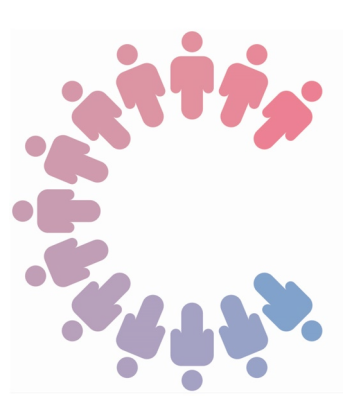
Case study: Domestic energy

- Gas heats 85% of UK homes compared to less than 50% in France and Germany
- The average UK household was estimated to have lost 8.3% of its total spending power (the most in all of western Europe) due to rising energy bills (Source: IMF)



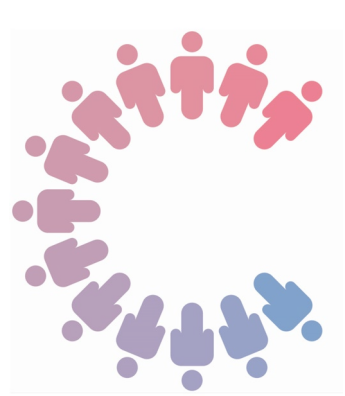
Energy price cap





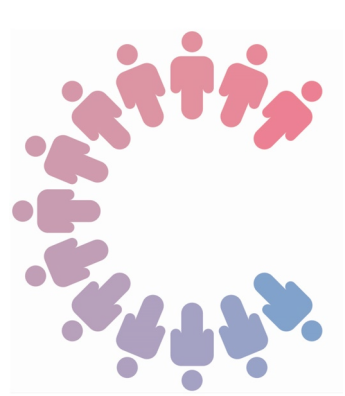
Government response

- Feb 2022: Energy Bills Rebate, giving to 28 million households a £200 discount off their energy bills, which they would have to repay over five years from 2023. An additional £150 rebate was granted to households in council tax bands A-D.
- May 2022. Replaced with a universal **£400** cost-of-living payment, a **£650** cost-of-living payment to those on means-tested benefits, a **£300** addition to the pensioner winter fuel payment, and a **£150** disability cost-of-living payment
- Oct 2022: A **£2500 price guarantee ceiling**



Scenarios

1. The projected energy price cap rise with **no policy response**
2. As Scenario 1 plus **targeted support** announced prior to 05/09/2022
3. As Scenario 2 plus £2500 '**energy price guarantee**' announced 08/09/2022






Data and analysis

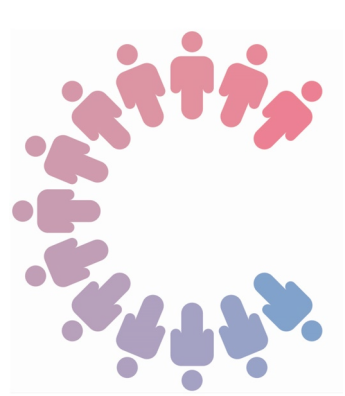
- Estimate **population prevalence of common mental disorders** (CMDs) for under 18s, 18–64 year olds and over 65s. Data: Wave 9 of UKHLS (2019-19).
- Use published **effect estimates of experiencing poverty** on the likelihood of developing CMD in adults (odds ratio: 1.2) and children (odds ratio: 2.3).
- Consider **typical level of energy expenditure**:

Household energy use	Household size and composition
Low	1-2 adults with no children
Medium	2-3 people, with or without children
High	4 or more people, with or without children

- Compute **poverty levels** after deducting housing and energy costs from disposable income.

Results

	Population	Baseline Poverty ^c '000s (%) [95%CI]	Additional Poverty ^c '000s (% point change) [95%CI]	Baseline Common Mental Disorders '000s (%) [95%CI]	Additional/fewer Common Mental Disorders '000s (% of population) [95%CI]	Relative change Common Mental Disorders compared to baseline (%) [95%CI]
Scenario 1: Energy price cap rise ^a No policy response 	All	13,322 [13,120, 13,524] (20.3%) [20.0%, 20.6%]	4745 [4615, 4875] (7.2%) [7.0%, 7.4%]	14,077 [13,871, 14,283] (21.4%) [21.1%, 21.7%]	584 [537, 631] (0.9%) [0.8%, 1.0%]	4.1% [3.9%, 4.3%]
	Elderly	2223 [2140, 2306] (18.6%) [17.9%, 19.3%]	1148 [1085, 1211] (9.6%) [9.1%, 10.1%]	1526 [1455, 1597] (12.8%) [12.2%, 13.4%]	31 [21, 41] (0.3%) [0.2%, 0.4%]	2.0% [1.7%, 2.3%]
	Working age	7165 [7015, 7315] (18.0%) [17.6%, 18.4%]	2421 [2328, 2514] (6.1%) [5.9%, 6.3%]	8531 [8371, 8691] (21.4%) [21.0%, 21.8%]	109 [89, 1429] (0.3%) [0.2%, 0.4%]	1.3% [1.2%, 1.4%]
	Children	3934 [3830, 4038] (28.4%) [27.6%, 29.2%]	1176 [1112, 1240] (8.5%) [8.0%, 9.0%]	4020 [3915, 4125] (29.0%) [28.2%, 29.8%]	443 [402, 484] (3.2%) [2.9%, 3.5%]	11.0% [10.5%, 11.5%]
Scenario 2: Energy price cap rise ^a + Targeted support ^b 	All	13,322 [13,120, 13,524] (20.3%) [20.0%, 20.6%]	2839 [2737, 3941] (4.3%) [4.2%, 4.5%]	14,077 [13,871, 14,283] (21.4%) [21.1%, 21.7%]	362 [326, 198] (0.6%) [0.5%, 0.7%]	2.6% [2.5%, 2.7%]
	Elderly	2223 [2140, 2306] (18.6%) [17.9%, 19.3%]	574 [528, 620] (4.8%) [4.4%, 5.2%]	1526 [1455, 1597] (12.8%) [12.2%, 13.4%]	15 [6, 24] (0.1%) [0.0%, 0.2%]	1.0% [0.8%, 1.2%]
	Working age	7165 [7015, 7315] (18.0%) [17.6%, 18.4%]	1528 [1453, 1603] (3.8%) [3.6%, 4.0%]	8531 [8371, 8691] (21.4%) [21.0%, 21.8%]	69 [54, 84] (0.2%) [0.2%, 0.2%]	0.8% [0.7%, 0.9%]
	Children	3934 [3830, 4038] (28.4%) [27.6%, 29.2%]	736 [684, 788] (5.3%) [4.9%, 5.7%]	4020 [3915, 4125] (29.0%) [28.2%, 29.8%]	278 [246, 310] (2.0%) [1.8%, 2.2%]	6.9% [6.5%, 7.3%]
Scenario 3: Energy price cap rise ^a + Targeted support ^b + £2500 maximum price guarantee ^d 	All	13,322 [13,120, 13,524] (20.3%) [20.0%, 20.6%]	584 [537, 632] (0.9%) [0.8%, 1.0%]	14,077 [13,871, 14,283] (21.4%) [21.1%, 21.7%]	92 [70–114] (0.1%) [0.1%, 0.1%]	0.7% [0.6%, 0.8%]
	Elderly	2223 [2140, 2306] (18.6%) [17.9%, 19.3%]	-22 [-31, -13] (-0.2%) [-0.3%, -0.1%]	1526 [1455, 1597] (12.8%) [12.2%, 13.4%]	-1 [-1, -1] (0.0%)	0.0% [0%, 0%]
	Working age	7165 [7015, 7315] (18.0%) [17.6%, 18.4%]	409 [370, 448] (1.0%) [0.9%, 1.1%]	8531 [8371, 8691] (21.4%) [21.0%, 21.8%]	18 [18, 18] (0.0%)	0.2% [0.2%, 0.2%]
	Children	3934 [3830, 4038] (28.4%) [27.6%, 29.2%]	197 [170, 224] (1.4%) [1.21%, 1.59%]	4020 [3915, 4125] (29.0%) [28.2%, 29.8%]	74 [57, 91] (0.5%) [0.4%, 0.6%]	1.8% [1.6%, 2.0%]



Caveats

- Effect estimates for the impact of poverty on mental health are derived from data on income changes from **any source/cause**, rather than specifically inflation-induced income changes.
- **No behavioural changes** considered

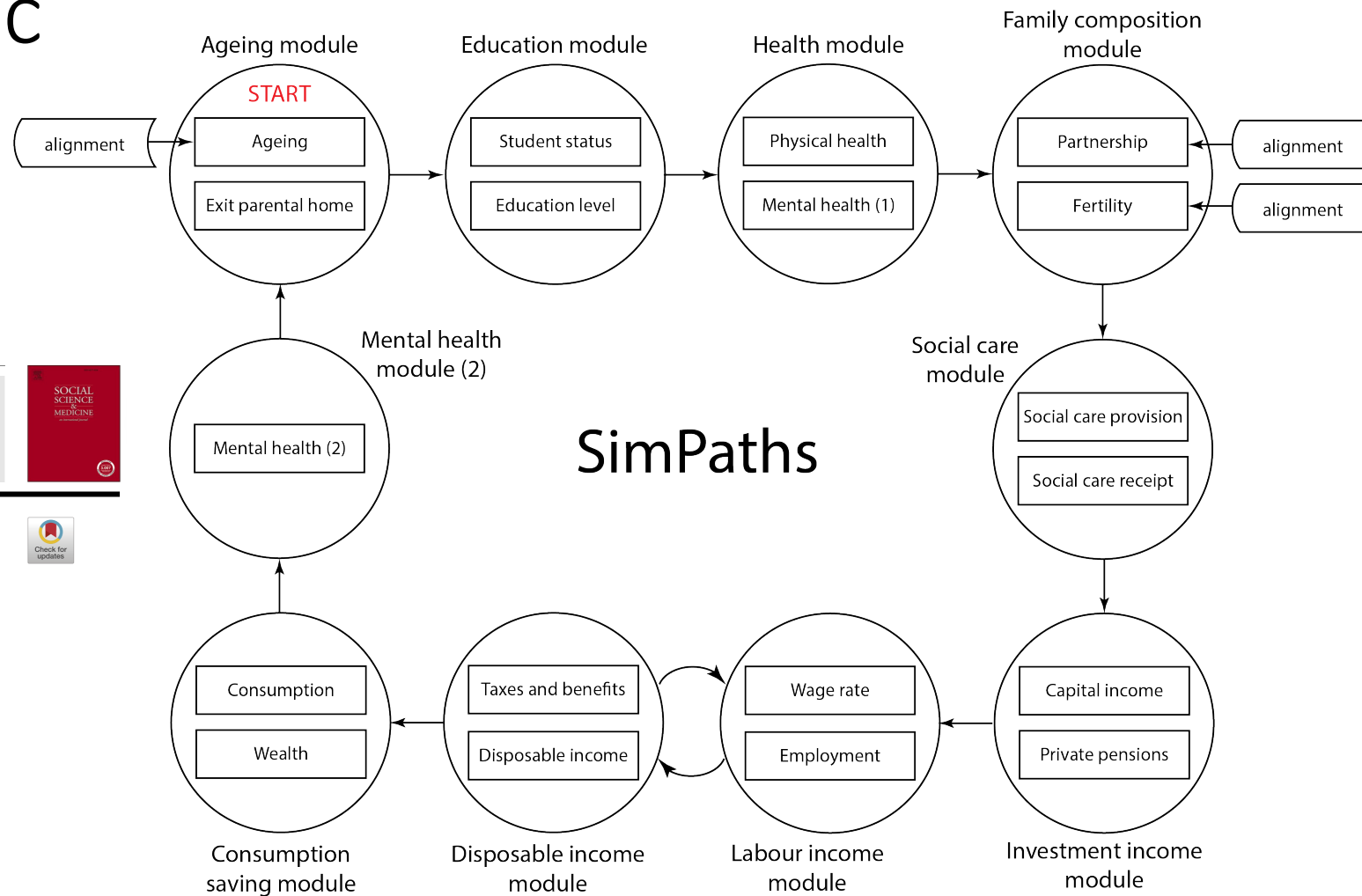


Going dynamic

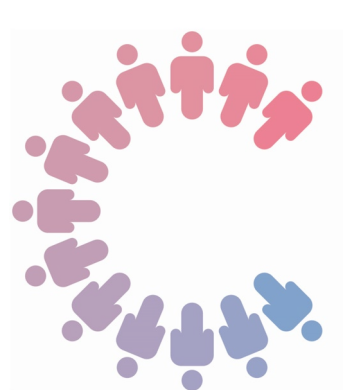


Evaluating the influence of taxation and social security policies on psychological distress: A microsimulation study of the UK during the COVID-19 economic crisis

Daniel Kopasker^{a,*}, Patryk Bronka^b, Rachel M. Thomson^a, Vladimir Khodygo^a, Theocharis Kromydas^a, Petra Meier^a, Alison Heppenstall^{a,e}, Clare Bamba^c, Nik Lomax^d, Peter Craig^a, Matteo Richiardi^b, Srinivasa Vittal Katikireddi^a

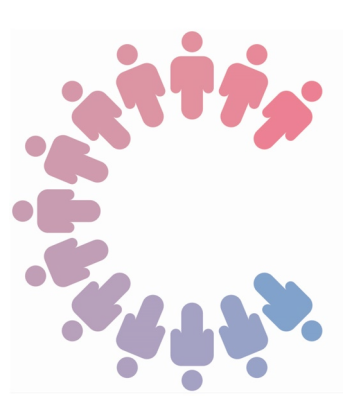


SimPaths



Combining static and dynamic models

- Database approach
 - Use static model to generate a **reference database**
 - Use **matching methods** to identify observations from the database, which allows the database to be used as a look-up table
 - **Imputation** of tax and benefit payments
- Matching method: **coarsened-exact** matching followed by **weighted nearest neighbour** matching
 - Coarsened-exact matching:
demographic characteristics: age, number of family members in under 5 years old, 5 to 9, 10 to 17, 18+ age categories, hours worked per week by responsible individual / couple in the benefit unit, disability status of adults in the benefit unit
Weighted nearest neighbour matching with respect to a number of continuous variables (original income, second income, childcare costs) (using Mahalanobis distance).



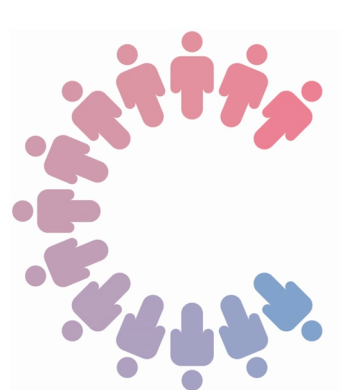
Combining static and dynamic models

- Imputations generally based on average effective tax rates

$$net_{sim} = \frac{net_{db}}{gross_{db}} \cdot gross_{sim}$$

- At low incomes, imputations based on observed payments

van de Ven, J., Bronka, P., Richiardi, M. (2022), “**Dynamic simulation of taxes and welfare benefits by database imputation**”, CeMPA Working Paper 3/22.



Effects of economic transition on mental health

Notes: Standard error in parentheses.

Individuals are considered to be at risk of work unless they are students, retired, or long-term sick or disabled.

Employed includes the self-employed.

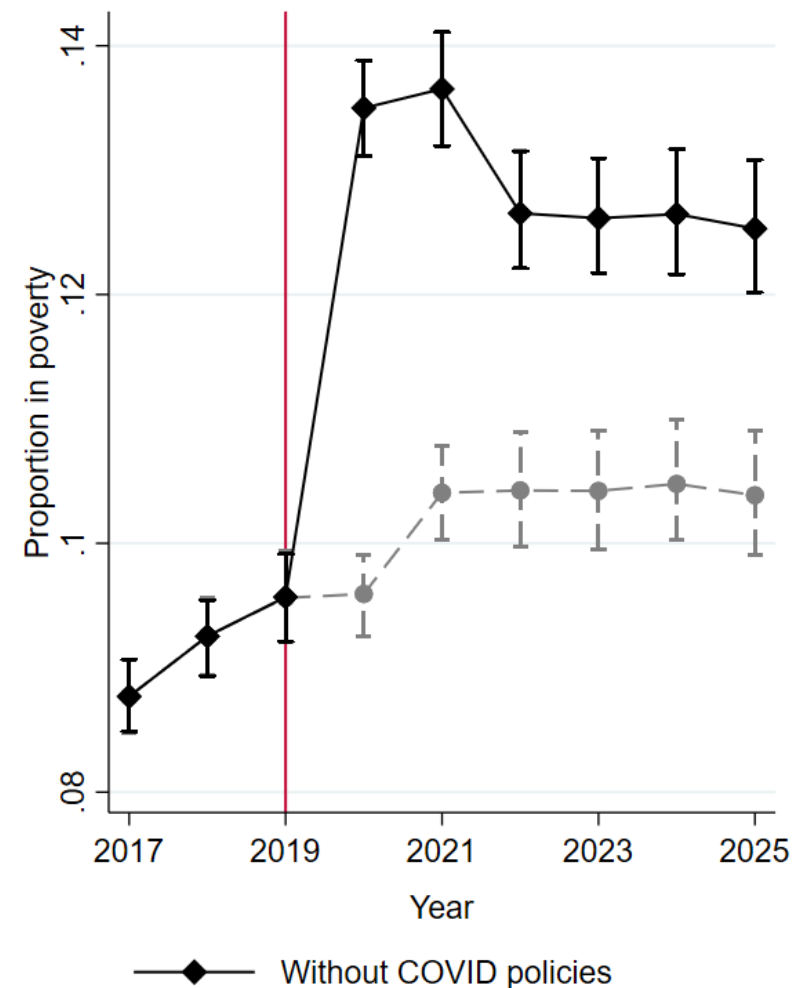
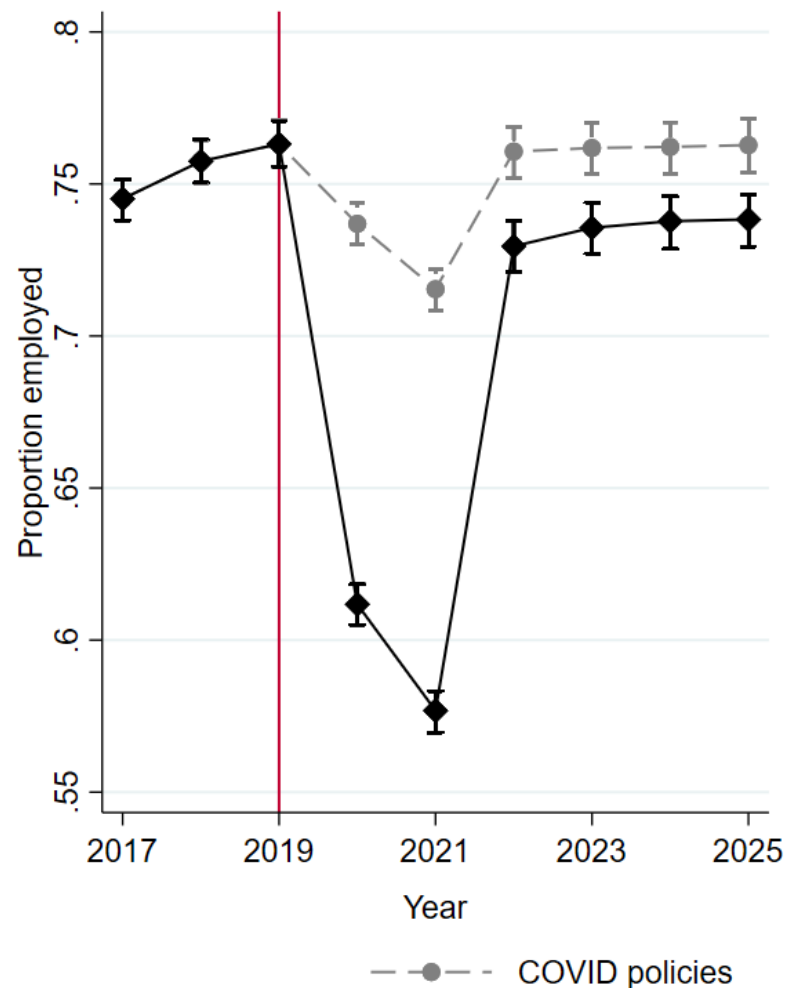
Psychological distress measured by the 12-item General Health Questionnaire. Likert score ranges from zero to 36 with higher values indicating greater psychological distress.

Caseness is a binary variable indicating potentially clinically significant common mental disorders.

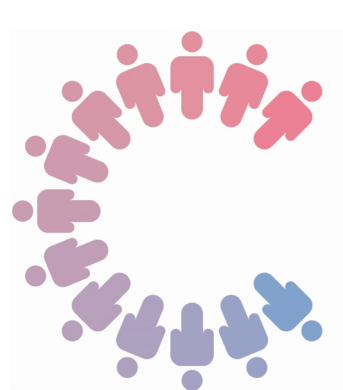
	Males Likert	Females Likert	Males Caseness	Females Caseness
Employed to not-employed (at risk of work)	2.74 (0.18)	1.67 (0.14)	1.46 (0.10)	0.76 (0.07)
Not-employed (at risk of work) to employed	-2.74 (0.19)	-2.12 (0.15)	-1.26 (0.12)	-0.93 (0.08)
Not-employed (at risk of work) to long-term not-employed (at risk of work)	-0.32 (0.22)	-0.73 (0.14)	-0.16 (0.12)	-0.43 (0.08)
Non-poverty to poverty	0.29 (0.10)	0.29 (0.09)	0.03 (0.08)	0.16 (0.06)
Poverty to non-poverty	-0.33 (0.15)	-0.12 (0.13)	-0.10 (0.11)	0.01 (0.08)
Poverty to long-term poverty	0.07 (0.16)	0.07 (0.14)	0.04 (0.11)	0.02 (0.09)
Change in growth rate of household income	-0.01 (0.04)	-0.12 (0.05)	-0.05 (0.03)	-0.08 (0.03)
Household income decrease	0.10 (0.04)	0.07 (0.04)	0.06 (0.03)	0.01 (0.03)
Pandemic 2020 non-economic effect	0.83 (0.08)	1.41 (0.08)	0.63 (0.08)	0.83 (0.05)
Pandemic 2021 non-economic effect	0.50 (0.08)	0.37 (0.08)	0.08 (0.08)	-0.04 (0.05)



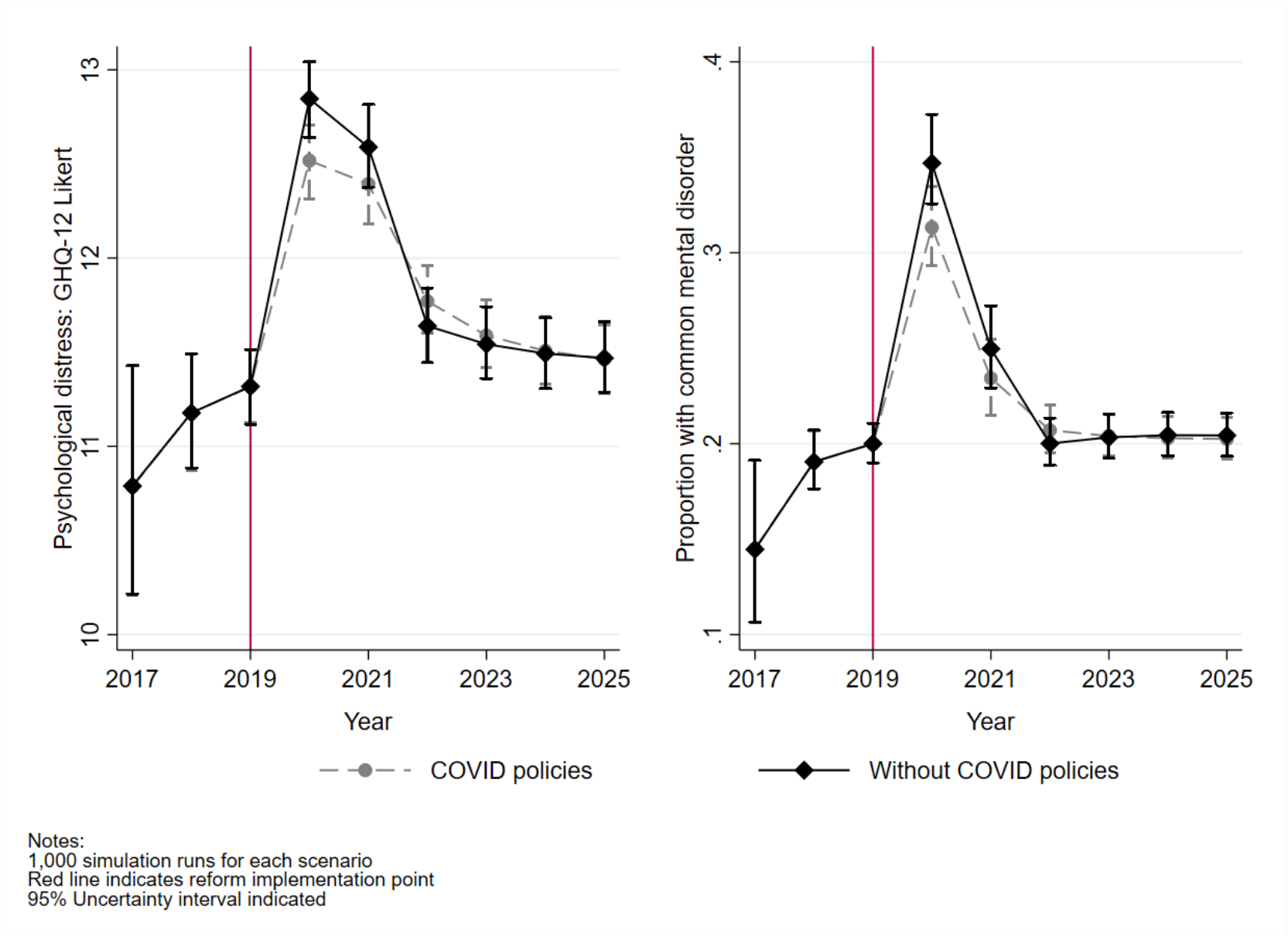
Effects on employment and poverty

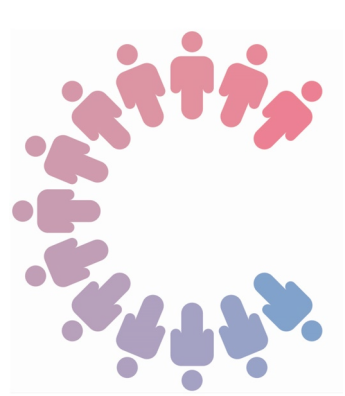


Notes:
 1,000 simulation runs for each scenario
 Red line indicates reform implementation point
 95% Uncertainty interval indicated



Effects on mental health





Thanks!

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