

Stress Testing Guaranteed Minimum Income Schemes: A Counterfactual Microsimulation Framework Using EU-SILC

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This paper develops a counterfactual microsimulation framework for evaluating the fiscal consequences of Guaranteed Minimum Income (GMI) schemes under adverse labour supply responses. The framework combines a theoretical cost-effectiveness measure based on the Lorenz curve and the Gini coefficient with an empirical implementation using EU-SILC microdata in Stata. It enables a systematic comparison of alternative GMI architectures while quantifying their fiscal implications under identical behavioural assumptions.

The analysis considers an extreme counterfactual scenario in which all households eligible for GMI—defined as those with disposable incomes below 60% of the relevant median disposable income—withdraw completely from the labour market. The scenario is intended as a fiscal stress test rather than a behavioural forecast. Two institutional arrangements are compared: (i) decentralized national GMI schemes, where eligibility is defined relative to national median income, and (ii) a centralized EU-wide GMI system, where eligibility is defined relative to the EU-wide median income.

The proposed framework is implemented in Stata through a reproducible computational workflow that automates the identification of eligible households, construction of counterfactual income distributions, computation of population-weighted cost-effectiveness indicators, and decomposition of the cost-effectiveness ratio into contributions stemming from between-country and within-country redistributive effects. The implementation provides a flexible computational environment for evaluating alternative GMI designs under different eligibility thresholds and behavioural assumptions and can be readily adapted to other comparative redistribution analyses based on EU-SILC microdata.

The empirical application shows that complete labour market withdrawal increases total GMI expenditures by 89% under national schemes and by 104% under a centralized EU-wide scheme relative to baseline estimates. Although beneficiary coverage remains unchanged and the redistributive impact of both systems is preserved, fiscal efficiency deteriorates substantially. The proposed framework illustrates how Stata can be used to integrate theoretical distributional analysis with large-scale EU-SILC microsimulation, providing a transparent and reproducible approach for stress-testing alternative social protection policies.

Keywords: Stata; EU-SILC; Microsimulation; Computational Workflow; Fiscal Sustainability; Guaranteed Minimum Income.

JEL Classification: H53; I38; C15; D31; J22

This study uses Eurostat microdata from the EU-SILC (RPP 44/2022-EU-SILC). Responsibility for all results and conclusions rests solely with the author.