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Combining Computable General Equilibrium Model with Microdata to Assess Poverty and Income Distribution Effects of Cohesion Policy

Abstract. *Poverty and inequality are among the most relevant societal issues in Romania, being at the centre of macro and microeconomic policies for over three decades. Improvements have been made, yet the problem persists and deepens for some categories of population. The cohesion policy implemented through the ESI funds targeted poverty directly through specific interventions, but also indirectly (through employment, education, competitiveness policies). Our study investigates the feasibility of combining a general equilibrium model with micro evaluation tools to capture the effects of a complex mix of macroeconomic policies on poverty and income distribution. This is a pioneering attempt for Romania, and besides certain limitations, such an approach proves to be a powerful instrument for exploring at micro level the impact of macro interventions. Our findings show that the cohesion policy was effective for poverty reduction, and the estimated effects are closely correlated with the amount of financing, the timeline, and the synchronisation of different interventions.*

Keywords: *Computable General Equilibrium Model, microsimulation, poverty, income distribution, impact assessment, cohesion policy.*

JEL Classification: C68, E16, E17, I32.

1. Introduction

Measuring the impact of macroeconomic policies on poverty is of utmost importance for countries with high poverty rates and needs a different approach compared to the micro policies directly targeted to support household income. Romania historically experiences the worst situation with regard to poverty and social exclusion in the European Union, with more than one third of the population being at risk (at risk of poverty or social exclusion of 34.4% in 2022, while the EU average was 21.6%, according to Eurostat data). The risk of poverty or social exclusion among children is even more severe, as 41.7% of children are exposed (Eurostat data, Social Pillar Rights indicators, 2021). Alongside children, other vulnerable groups can be identified, such as people leaving in rural areas, elderly, and people with disabilities. Their access to education, health, and labour market services is limited, thus widening the already existing disparities. In addition, income

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inequality is amongst the highest in the EU. By adopting the Sustainable Development Goals 2030, Romania has committed to reduce poverty by at least half the proportion of men, women and children of all ages living in poverty in all its dimensions, build resilience and reduce vulnerability of the poor, increase incomes of the poorest 40% of the population through significant mobilisation of resources and sound policy framework. In this context, the funding received from 2014 onwards through the European Structural and Investment Fund (ESIF), as part of the EU cohesion policy, should have been a major contributor to improving the life of vulnerable citizens. The funding has been substantial and has been targeted to relevant policy areas, such as employment, education and training, poverty reduction, research, development and innovation, energy, environment and climate change, and competitiveness.

The broad coverage of policies suggests the need for macroeconomic evaluation of their effects, on one hand, but poverty and income distribution indicators (i.e., at risk of poverty rate, income inequality) are calculated at microlevel, through household surveys, on the other hand. Therefore, a different approach should be taken into consideration which would be able to combine macroeconomic policies with microeconomic behaviour (Decaluwe et al., 1999). One of the first attempts for the evaluation of the effects of economic reforms on income distribution in such a framework dates back to 1979 and was accomplished by Adelman and Robinson (1979) who used a computable general equilibrium (CGE) modelling framework. Following their work, other authors such as Dervis et al. (1982), Thorbecke (1991), de Janvry et al. (1991), Chia et al. (1994), etc. have developed the analysis framework in its early stages by testing it to different countries. More recently, Mohamed and Karim (2017) used a CGE model with representative households to evaluate the effects of fiscal policy on the income and consumption of poor households in urban and rural areas of Morrocco. Vos et al. (2020) used a global CGE model linked with a microsimulation model to estimate that extreme poverty increases in developing countries. Abdelkhalek et al. (2022) have used a similar framework to evaluate the effects of the COVID-19 pandemic on child poverty. What all these approaches have in common is the combination between general equilibrium modelling and the use of more detailed micro data on household income and consumption behaviour.

There are many ways of putting CGE models and microdata together for poverty and income distribution analysis, and a long history started 40 years ago. CGE models are built on the structure of the Social Accounting Matrix (SAM) for a certain year and describe through a set of identity and behavioural equations the flow of income and the market-based transactions among economic agents (Robinson, 1989). The models include a specific account for households, with possible sub-accounts based on area of residence, income level, etc. So, one approach to account for the macroeconomic policies effects on income distribution is to include representative households in the SAM (poor/ nonpoor, based on income quintiles/deciles, etc.). The variation of household income for each household group is generated endogenously by the CGE model because of shocks and is fed into a household survey microdata, uniformly to all households in the group without considering within group variability which can be a limitation (micro-accounting method). One way to address this drawback is to assume that intra group household income follows a parametric probability distribution, the most appropriate functions being identified as the lognom, pareto or beta (Dervis et al., 1982; Janvry et al., 1991; Decaluwe et al., 1999), the results being influenced by the chosen functional form. Or, another alternative is to include all households from the survey in the CGE model (the integrated approach) (Cockburn, 2001; Cororaton, 2003; Boccanfuso and Savard, 2007, 2008), but this substantially increases data and computational efforts. However, there is one more solution to resolving within group heterogeneity, and this is through microsimulation, but involves estimating either behavioural equations for income generation (Bourguignon et al., 2001) or imposing random occupational changes for the individuals in the household sample through non-parametric microsimulation (Ganuza et al., 2002; Vos et al., 2006). In spite of their advantages in terms of capturing heterogeneity, the integration of microsimulation models with CGE models for poverty and income distribution estimates has been criticised towards the consistency between the two levels, namely on how the results from microsimulation are fed back in the macromodel and vice versa, in order to reach convergence (Colombo, 2010). Also, in the case of behavioural models, complexity is limiting their use, while for non-parametric microsimulation, the main drawback is the not taking into account individual/ household characteristics. To sum up, the range of possible approaches is wide and it depends on the research goal, data availability, the macromodel used, and time constraints.

In this framework, the aim of our paper is to provide an example of how the poverty effects of complex macroeconomic policies can be estimated by combining a CGE model with a micro accounting approach. This is according to our knowledge the first time that such a work is done in Romania; thus we consider it as being an important progress, setting the grounds for further research in this area.

The rest of the paper is organised as follows. The cohesion policy framework and impact evaluation strategies and results for other countries are presented in the next section. Then, in the third section, we describe the model, methodology, and data, while in the following section, we discuss the main results. We conclude with some general ideas on the analysis framework, findings, limitations, and strategies for future developments.

2. Cohesion policy and its socio-economic impact

The economic, social and territorial cohesion policy is the European Union's main investment policy supporting economic growth, job creation, economic competitiveness, sustainable development, and environmental protection. The EU will strengthen its economic, social, and territorial cohesion in order to promote harmonious development throughout its territory, while also aiming to reduce disparities between the levels of development of various regions.

Cohesion policy has an important role to play in determining improvements in key indicators (GDP, employment, environment, etc.) and supporting a better quality of life in beneficiary regions (Botha et al., 2020; Anghelache et al., 2019). However, cohesion policy has not always been effective in helping regions in their economic, social, and territorial transformation, sometimes exacerbating disparities between development regions, with positive effects not evenly distributed among regions across all Member States (Crescenzi and Giua, 2018).

According to the annual report of the Directorate-General Regional and Urban Policy (2021) funding from the European Regional Development Fund (ERDF), the Cohesion Fund (CF) and the European Union Solidarity Fund have played a central role in reducing the impact of the COVID-19 crisis and fostering convergence. Exceptional flexibility has been provided under the Coronavirus Response Investment Initiative Plus (CRII+), resulting in almost €20 billion mobilised to counter the crisis.

According to Davies (2017), the main macroeconomic models used to assess ESIF impacts (QUEST, HERMIN, and RHOMOLO) indicated definite positive effects on beneficiary member states, both during program implementation and long-term effects. Thus, QUEST estimates indicated that ESIF funding of 1% of GDP generates an increase of 0.78% in GDP in the EU-27 (2015) and 2.74% by 2023. Moreover, the RHOMOLO model indicated that the strongest effects of cohesion policy were in the net beneficiary member states of the program, including regions in Hungary, Slovakia, Poland, and Lithuania.

The results of the simulations performed with the HERMIN model in the study by Bradley and Morgenroth (2014) indicated that the Czech Republic has the best long-term results (a multiplication coefficient of 2.8), followed by Slovenia and then Estonia. The countries with moderate effects (multiplication coefficients between 1.5 and 2) were Portugal, Latvia, Romania, Spain, and Hungary. The results obtained for Romania were, however, the least robust, in the sense that it is very difficult to obtain robust econometric / calibration parameters from the publicly available database (covering the period 1990-1999).

The latest studies indicate that some of the countries that have benefited the most from EU cohesion policy are among those where poverty is particularly high (Bulgaria, Romania, but also Italy), and that these aspects are also maintained at the level of social progress, which is rather inversely proportional to the eligibility status of the cohesion policy of those regions (Graziano and Polverari, 2020).

The sometimes-limited impact of ESF-funded projects may also be due to a lack of involvement and reduced capacity of local governments to attract and manage funds effectively. Thus, the main paradox regarding the failure of policies aimed at increasing convergence is that many of the instruments to address this problem remain in the hands of various national political factors.

The results of ESIF studies depended on the methods used, the schemes evaluated, and the datasets used. Many studies have concluded that ESIF has a significant positive effect on convergence, other analyses have not found a significant impact, or have observed that the impact depends on exogenous factors such as national institutions or macroeconomic policies.

However, the way poverty has been affected by EU cohesion policy has not been explicitly analysed, leaving a gap to be addressed. The evaluation of the contribution of the European Structural and Investment Funds 2014-2020 to economic, social, and territorial cohesion in Romania has been part of a project commissioned by the Ministry of Investments and European Projects (MIEP). The goal of the project was to examine the evolution of economic growth and the national Europe 2020 Strategy indicators and estimate the net contribution of the ESIF to the progress observed. A rich set of methods, models, and tools, both quantitative and qualitative, were used. Among them, a general equilibrium macroeconomic model for Romania was developed, adding value to the findings, representing a first and very important exercise at the national level. The model allowed for the estimation of the effects of ESIF on economic growth, employment, poverty, expenditure for research, development and innovation, and greenhouse gas emissions (MIEP, *Implementation of the Partnership Agreement Evaluation Plan - Phase 2, Lot 1: Evaluation of the contribution to economic, social and territorial cohesion - Theme A*, Evaluation Reports, available at https://www.evaluare-structurale.ro/). The results showed a positive impact of ESIF in all areas, mainly relevant for economic growth, employment, and poverty. In our paper, we focus on presenting the estimation of poverty effects by using the tools developed in the above-mentioned project.

3. Methodology, model and data

The Computable General Equilibrium Model (CGEM) presented in this paper was built with the specific goal of investigating the contribution of the ESIF to the progress of national economic growth and Europe 2020 indicators. The model has been developed in the specialised software GAMS, an advanced tool for mathematical programming and optimisation through systems of equations, able to solve a wide range of linear and non-linear problems. This model is a simplified CGEM, built following Dervis, de Melo and Robinson (1982; 1989) and Devarajan et al. (1997) and was calibrated on the basis of the SAM using data for the year 2013, which was considered the reference year preceding the ESIF implementation period. The way the matrix was constructed also conditions the relationships between agents/institutions and their behaviour.

The dataset that forms the foundation of the CGEM model is represented by the SAM, which incorporates the flows of all economic transactions that take place in the economy in a single year. The social accounting matrix uses the principle of two-entry accounting, in which the expenditure of one agent is the income of another agent. Each matrix cell indicates the expenditure of an agent in column (*j*) corresponding to another agent's income in row (*i*). The matrix is a balanced square table, which means that column totals must be equal to row totals. For example, household income equals household expenses plus savings.

The data that populates the SAM consists of a certain number of sub-matrices, depending on the disaggregation of each cell. The construction of the SAM relied on a variety of data sources, each of different nature and purposes, and each contributing to the reconstruction of the basic structure of the economy. This includes all relevant macroeconomic data, with disaggregation for specific types of households and inputs based on microdata collected from nationally representative surveys. The data source is the National Institute of Statistics. Such a system required a very intensive data collection and processing effort to ensure a very close reflection of the real structure of the economy through the model.

Table 1. Data used in the Computable General Equilibrium Model

The structure of the model	Data sets
Commodities/ Economic activities	National accounts Supply and use tables Greenhouse gases (GHG) and non-GHG emissions data Data on pollution reduction expenditure
Households	National accounts Supply and use tables Family Budgets Survey
Production factors	National accounts Supply and use tables Family Budgets Survey Household labor force survey Structure of earnings survey
Firms	National accounts Supply and use tables
Savings and investments	Supply and use tables National accounts Resource and use tables
Government	National accounts Supply and use tables

Source: authors' own contribution.

The structure of the proposed model is consistent with the neoclassical theory. The economy is open, with risk-neutral agents who consume all their disposable income, maximising their production function or utility function, with the restrictions of limited available resources. The model is static, disaggregated, multi-input and output and multi-sectoral. The economy has 19 economic activities or sectors, and, for simplification, we assume that each economic activity produces only one good.

The workforce is disaggregated by education levels (low, medium, and high education level), the remuneration of employees is detailed by sector and education levels. Households were broken down according to disposable income deciles (per adult equivalent, using the modified OECD scale). Such disaggregation was necessary to be able to estimate the effects of ESIF on some of the Europe 2020 indicators (such employment or poverty rate).

The model fully reflects the structure of the SAM and formalises through a set of linear and non-linear equations the behaviour of each type of economic agent on the markets where they earn income and spend it. The equilibrium in both the production factor market and the goods and services market is ensured by the equilibrium between the supply and demand and the conditions imposed for model closure. Through closing rules, the model allows for flexible savings and production factors mobility, keeping the exchange rate and budget deficit fixed. There are some limitations though, in reflecting the whole picture, such as transportation costs are not considered. Monetary and financial markets are also not included in the model, while monetary market equilibrium is achieved following the equilibrium on the commodities market. Due to the lack of borrowing costs, firms can access financial resources without associated risks.

Foreign trade is based on the Armington (1969) assumption that domestic production is distributed between domestic demand and exports on the basis of a Constant Elasticity of Transformation (CET) function, and domestic demand is satisfied by domestic production and imports on the basis of a Constant Elasticity of Substitution (CES) function. The optimal relative quantities of imports to domestic production and exports to domestic demand are determined by imposing first-order conditions based on relative prices. We made the "*small country assumption*" according to which both imports and exports of the country represent a very small share on the international market; therefore, a complete elimination of them will not produce effects on the global market and will not affect the global price.

Taxes are applied as rates on output or consumption, and direct taxes are formalised as shares of income, with equal marginal and average tax rates. Taxation rates can be fixed or variable depending on the closure rules adopted. As regards the closure of the government account, the model was constructed in such a way that several alternatives were possible to allow the variation of consumption, income, or budget deficit/surplus. The trade balance is defined as the difference between the values of exports and imports, converted into the national currency based on the exchange rate. The prices used in the model are relative prices, normalised at basic prices, with homogeneous linear relationships between prices.

The model was calibrated for the pre-intervention year 2013. The policy shocks have been introduced into the model through the demand and supply channels, according to the objectives of the interventions and expenditure categories. A new equilibrium has been reached and the impact of the shock has been estimated by comparing the post-intervention with the pre-intervention state.

The Households block of the CGEM

Households are introduced in the model through a separate block. They consist of all natural persons having the status of consumers. They maximise their utility based on preferences represented by a Stone-Geary function (Geary, 1950) - linear system of expenditure, within the budget constraint.

Households were divided into ten categories according to disposable income deciles (calculated per adult equivalent, using the modified OECD scale). The utility function for a typical household belonging to a h decile and consuming commodities *c* has the following form:

$$U_h\big(q(c,h)\big) = \prod_c (q(c,h) - \gamma(c,h))^{\beta(c,h)} \quad (1)$$

where $U_h\big(q(c,h)\big)$ is the utility function of household h by consuming the combination of goods *c, q(c,h)* represents the quantities of goods *c* consumed by the household h, $\gamma(c,h)$ is the subsistence consumption of the household h, while $\beta(c,h)$ is the shares of household marginal expenditure *h* of each commodity *c.*

According to this approach, household consumption involves a subsistence level, meaning that certain goods will be consumed in certain quantities regardless of the price of goods and household income. Households have a disposable income available for consumption, which is obtained from production factors and after payment of direct income taxes (income tax) and after setting a saving rate as a proportion of disposable income. We assume that households do not spend their entire income, having specific saving rates according to household category by income decile. Household income is mostly derived from the primary factor market, remuneration for work, and capital ownership. Other sources of income for households are transfers from other institutional sectors: government in the form of social transfers, external sector in the form of remittances, other households as inter-household transfers. In the baseline scenario, these incomes are considered as fixed rates applied to total household income. These relationships are expressed within the model in the following way:

$$YH(h) = \Sigma\big(f, hfsh(h,f) \times YF(f)\big) + \Sigma\big(e, hesh(h,e) \times YE(e)\big) + THG(h) + YHROW(h) \quad (2)$$

$$HEXP(h) = YH(h) \times \big(1 - TYH(h)\big) \times \big(1 - SYH(h)\big) \quad (3)$$

where *YH(h)* is the income earned by the household *h*, *hfsh(f,h)* represents the share of income received from *f* factors by household *h, YF(f)* is the income from factor f, *hesh(h,e)* is the share of income received by household *h* from enterprise *e*, *YE(e)* is the income of enterprise *e*, *THG(h)* are the transfers received by household h from the government, *YHROW(h)* is the income received from the rest of the world (remittances), *HEXP(h)* represents the consumption expenditure of the household *h,* $TYH(h)$ is the effective tax rate on household income *h*, while *SYH(h)* is the saving rate of households *h*.

The quantities of each actually consumed good by households are obtained by imposing the first-order condition for maximising the household's utility within the disposable income used for consumption, as shown in equation below:

$$PAC(c) \times QCH(c,h) = PAC(c) \times \gamma(c,h) + \beta(c,h) \times \big(HEXP(h) - \Sigma(cp, PAC(cp) \times \gamma(c,h))\big) \quad (4)$$

where *PAC(c)* is the consumer price of commodity c, *QCH(c,h)* is the quantity of commodity *c* consumed by household *h*, *γ(c,h)* is the subsistence consumption of commodity *c* for household *h*, *β(c,h)* is the consumption share allocated by household *h* to commodity *c*.

Regarding the consumption function of households, all exogenous parameters feeding into the model were estimated using national data from the Household Budget Survey (HBS) for 2013: marginal income utility elasticity by income (Frisch parameter) and consumption elasticity by income (Dervish, de Melo and Robinson, 1982) for each of the ten categories of households (constructed by income deciles) and for each category of goods. The estimates were made on the basis of a linear consumption function LES, in which the propensity for consumption is conditioned by the income level and the existence of the subsistence consumption, following the methodology described by Nganou (2005) and Gharibnavaz and Verikios (2018).

Following the described approach, household income by income source and household category is determined in the reference or pre-intervention scenario and then re-estimated after the infusion of funds in the economy. To evaluate the change in poverty, as anticipated in the introductory part, a traditional representative household micro accounting approach has been used to link macromodel results with household data. Therefore, we adopted a traditional method which has been widely employed in addressing the impact of macro policies on poverty and income distribution following the below steps (Estrades, 2013):

1. Identify in the microdata (HBS) the households by the same typology used in the CGEM (by income deciles, 10 groups);
2. Calculation of household equivalent disposable income for each household in the microdata and check income homogeneity;
3. Calculation of at risk of poverty rate following the EU standard methodology based on the relative line at 60% of median equivalent disposable income;
4. Estimate endogenously the income change of each household group as result of ESIF interventions, by running the CGEM;
5. Impute the percentage income changes from the CGEM for each household, by group and income source;
6. Recalculation of the new poverty rates after income changes.

The policy effect is estimated as the difference between poverty rates in the two scenarios (reference and post-intervention). We use an anchored poverty line, meaning that the poverty threshold is fixed at the pre-intervention period. The anchored poverty line is somehow a relative and absolute threshold at the same time. The strategy is more appropriate when comparing the change of relative poverty rates over time, keeping the indirect effect of the evolution in living standards constant (OECD, 2013). We must mention that the main assumption in the approach we applied is that there are no intra-group changes in the income distribution. Although we checked the homogeneity of the within group distribution before interventions, there is no certainty about the preservation of these conditions after the policy shock.

4. Main results

Based on the CGEM, the ESIF contribution to a set of indicators targeted by the Europe 2020 Strategy was estimated in several scenarios regarding funds absorption:

(1) all the contracted funds will be spent, and all projects will be finalised, 100% absorption (around 49 billion euros);

(2) only funds spent in finalised projects (around 19 billion euros);

(3) the amounts paid annually for the period 2016-2022 to those who implemented the projects.

The allocation of funds by strategic areas is presented in Figure 1. The greatest part of funds is invested in energy, environment protection, and climate change, and almost one quarter of funds is subscribed to the enhancing competitiveness goal. Around 16% of the investments are directed toward poverty reduction and social inclusion. Less amounts are concentrated on employment, education and training and RDI.

Expenditures in projects follow the pattern of initial allocations, while the annual payments are more or less compliant, being influenced by the programs launching and projects implementation timelines. In the first two years of ESIF implementation, only 1% of the total payments was realised, over 50% of all payments being accomplished starting from 2021.

The funds were broken down on fields of intervention and economic activities of beneficiaries. The economic impact of the ESIF funds was estimated by comparing the economy before and after the infusion of funds. It assumes that the economy starts from a stable or equilibrium position, and with the infusion of ESI funds, the economy converges to a new equilibrium, governed by the economic relationships described in the model's system of equations. The model obtains a solution by finding a new set of prices and the allocation of commodities and factors, so that the economy is again in equilibrium.

The impact of ESIF was estimated on a range of the relevant macroeconomic indicators, but we focus in this paper on the poverty indicator. Thus, the ESIF contribution was evaluated from the perspective of the at risk of relative poverty rate indicator, calculated as the share of people who have an equivalent disposable income below the anchored poverty threshold, which represents 60% of the median in the reference scenario (pre-intervention).

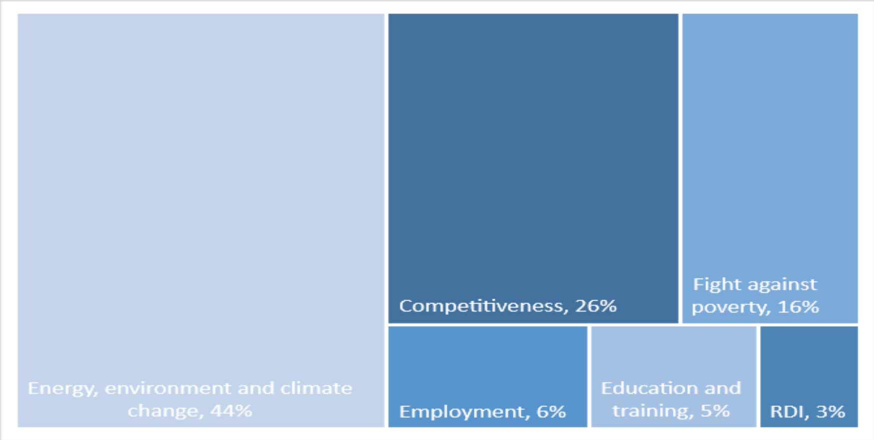

Figure 1. ESIF allocation, breakdown by areas of Europe 2020 Strategy
Source: authors computation based on administrative data on ESIF allocation, MIEP.

The results are presented below for the three different scenarios discussed. If all contracted funds are spent, the contribution of cohesion policy to poverty reduction is estimated to be around 8.3 percentage points compared to the reference year 2013, showing thus an important contribution of ESIF to poverty reduction. Policies influence all incomes, not only poor households, as labour income increases, a consequence of employment improvements and wage increases. Although, part of earnings is taxed away, households' disposable income will increase, and, on that account, the income distribution will change (both mean and median income will shift to the right). In scenario 2, when we consider only finalised projects as producing effects on poverty, the contribution of ESIF decreases to approximately 2.4 percentage points compared to the reference year 2013**.**

Table 2. The ESIF contribution to poverty reduction

	Scenario 1	**Scenario 2**
Relative poverty rate (At-risk-of-poverty rate)	-8.3 percentage points	-2.4 percentage points

Source: authors own computation based on the CGEM, HBS microdata and administrative data on ESIF allocation from the MIEP.

The evaluation of the ESIF's annual contribution based on the total payments to beneficiaries highlights positive effects on poverty reduction on the horizon 2017-2022, but especially towards the end of the period when payments made through Human Capital Operational Program and Operational Program Helping Deprived People were significant. Also, the stronger economic growth induced by ESIF in 2021 and 2022 is in favour of the poor, as there is a higher relative increase in the income of poor people compared to other categories of the population (3-6 income deciles). The annual effects range between 0.3 and 1.3 percentage points compared to year 2013, emphasising an important effect of ESIF on poverty reduction.

Table 3. The ESIF contribution to poverty reduction, annual estimations

	Contribution of total payments					
Relative poverty rate (At-risk-of-poverty rate)	2017	2018	2019	2020	2021	2022
	-0.4pp	-0.3pp	-0.3pp	-0.6pp	-0.8pp	-1.3pp

Source: authors own computation based on the CGEM, HBS microdata and administrative data on ESIF allocation from the MIEP.

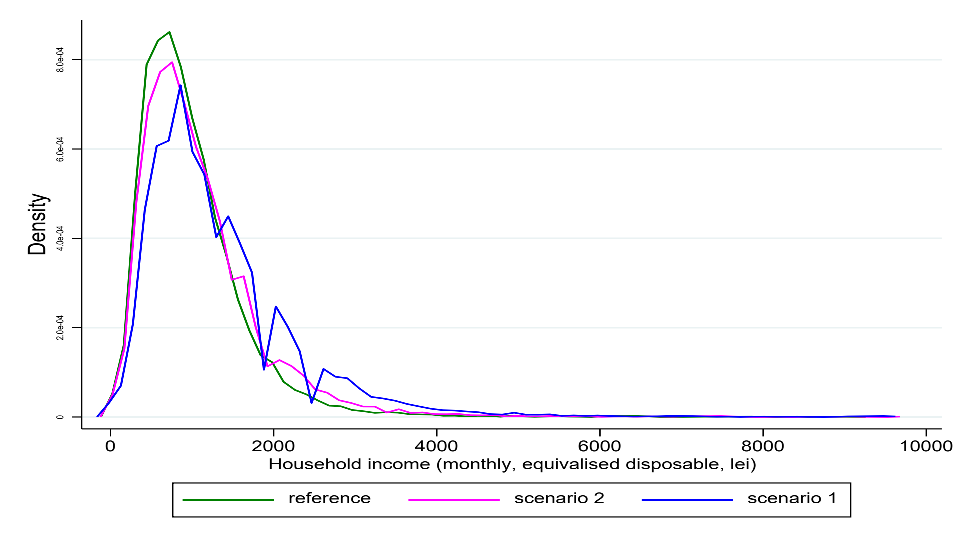

Figure 2. Income distribution effects of ESIF 2014-2020 using scenario 1 and 2
Source: authors own computation based on the CGEM, HBS microdata and administrative data on ESIF allocation from the MIEP.

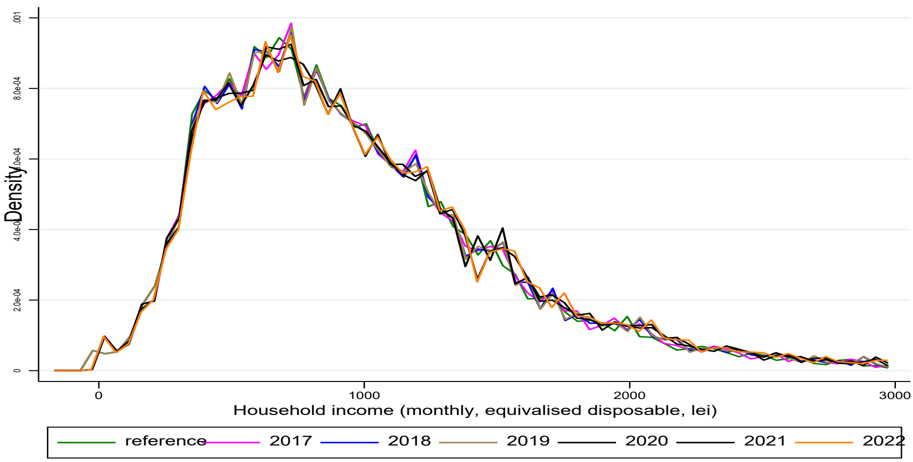

Figure 3. Income distribution effects of ESIF 2014-2020 using scenario 3
Source: authors own computation based on the CGEM, HBS microdata and administrative data on ESIF allocation from the MIEP.

5. Conclusions

In this exercise, we aimed to apply a combination between a CGE model and micro evaluation to capture the effects of a complex mix of macroeconomic policies on poverty and income distribution in Romania. Integration of micro and macro tools for poverty impact evaluations has become a powerful instrument for investigating at the micro level the effect generated by a macro level intervention. It is a first attempt for Romania and, hence, we chose the traditional approach of linking the CGE with a micro accounting method using representative households grouped by deciles of income. The heterogeneity among households in the same group is disregarded, this being the main drawback of the method. Still, it has as advantages the simpler and straightforward framework compared to other more complex methods such as the integrated or microsimulation approaches. Other limitations are given by the general equilibrium framework used, the equations, and the closure rules defined.

Poverty and income inequality are very relevant for Romania, being at the centre of all macroeconomic policies for more than thirty years. However, in spite of progress made, there are population categories, such as children, elderly, people from rural areas, which still suffer from material deprivation. Thereby, the economic, social, and territorial cohesion policy implemented through the ESI funds between 2014-2020 (and up to 2023, the n+3 mechanism) which amounted for 2-4% of annual GDP between 2014 and 2023 were specifically target to fight against poverty, but also comprised other instruments which indirectly would have contribute to poverty reduction (such as in the fields of employment, education and training, and competitiveness). Our findings show that cohesion policy instruments were effective for poverty reduction, and the estimated effects are closely correlated with the amount of financing and the timeline and synchronisation of certain types of interventions.

As for the methodology applied, it opened a new path for policy impact evaluations in Romania. Future developments must also focus on using other techniques and build on the robustness of estimations.

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