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Micro-simulating the Impact of Public Policies on Households: Some Lessons from France

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Introduction

Micro-simulation models for public policy makers serve two main purposes

- Evaluate the (re)distributive impact of public policies
- Measure their budgetary impact

Three micro-simulation models of the redistributive system in France

- **Ines** (INSEE + DREES + CNAF), also operated by OFCE
- **Saphir** (Treasury)
- **Taxipp** (IPP)

Redistributive assessments sometimes yield different results: risk of confusion.

Objectives and Structure of Micro-Simulation Models (1/2)

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Objective: evaluate impact of one or multiple reforms

- Budgetary and redistributive impacts (e.g. across full distribution of income)

Advantages of micro-simulation

- Granular measurement of effects of a reform across individuals
- Integrates to measurement of aggregate effects
- *Ex ante* and *ex post* evaluation

→ Essential tool for public policy transparency

Disadvantages

- Partial equilibrium analysis (macroeconomic feedback loop typically missing)
- "Static" models with very limited dynamics

Objectives and Structure of Micro-Simulation Models (2/2)

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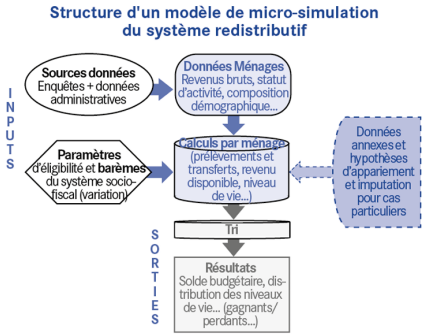

Source : Auteurs.

Potential sources of divergence between models:
Data source, scope of measures studied, use of supplementary data and/or assumptions..

Micro-simulation in France (1/4)

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Four institutions regularly publish work

- **Treasury**: results on redistributive impact published in RESF (forward-looking results for year N published in autumn of year N–1)
- **IPP**: conference on the PLF and PLFSS (forward-looking results for year N in November of year N–1), then publication of results for year N in the first quarter of year N based on voted budgets
- **OFCE**: results on redistributive impact for year N published in the first quarter of year N
- **INSEE/DREES**: *a posteriori* redistributive assessment: published in autumn of year N+1 for year N

Micro-simulation in France (2/4)

Main source for Ines and Saphir: tax and social income survey (ERFS)

- About 50,000 households (130,000 individuals) representative of metropolitan France, excluding non-ordinary households

IPP model sources

- comprehensive FIDELI file, matched with FELIN, DADS (employees) and BNS (self-employed)

Each institution "ages" the data to reach the year under study With a significantly

larger database, the IPP can provide much more detailed results

- Representation by percentile, whereas others use deciles or quintiles

Micro-simulation in France (3/4)

Scope of measures studied: each institution has its own logic

- **IPP**: legislative measures decided by the current government (whether implemented immediately or at a later date), and measures taken by social partners
- **OFCE**: measures impacting public accounts for the year in question, regardless of who made the decision
- **Treasury**: similar to OFCE but includes measures not yet voted (PLF and PLFSS), and generally excludes measures taken by social partners
- **INSEE**: *a posteriori* and focused on monetary redistribution (which excludes, for example, measures on replacement income)
  - Secondary analyses exist for indirect taxation or capital income taxation
  - Full-year evaluation, regardless of implementation calendar

Micro-simulation in France (4/4)

Behavioral responses? Some measures aim to change behavior...

- Example: tobacco taxation, energy tax...

To integrate behavioral responses: it is necessary to rely on assumptions, which always include an element of arbitrariness

Issue of non-take-up of benefits: ability to anticipate the effects of a measure on take-up rates?

- Example: the prime d'activité (in-work benefit)

Behavioral effects related to labor supply: even more complex since it then requires modeling the entire labor market (demand, wages)

Micro-simulators on 4 Key Simulations

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To test the properties of the models and methods: simulation exercise on four recent measures

- Additional reduction of 30% to 65% of the housing tax (TH) in 2019
- Income tax reform in 2020, notably with the lowering of the rate of the first bracket
- Exceptional revaluation and extension of eligibility for the in-work benefit (prime d'activité) in 2019
- Implementation of the flat tax (prélèvement forfaitaire unique, PFU) on capital income in 2018

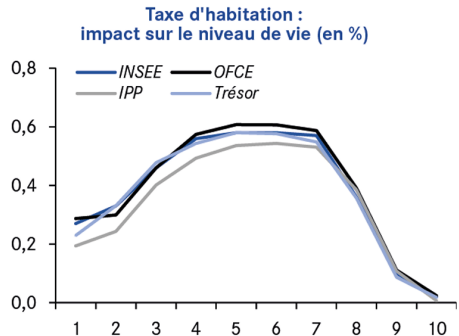
Direct comparison of results with

- Same choices for presentation of results
- Same measures being simulated

Housing Tax Cut in 2019

Similar results across the four institutions

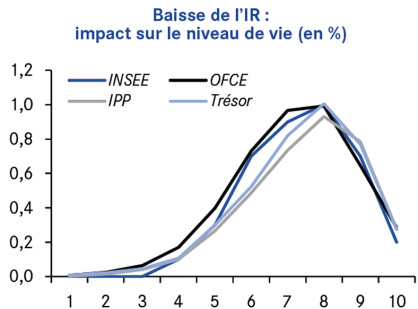
- Effect on standard of living slightly lower for IPP, likely due to a broader population with more households not subject to the housing tax (TH)



Sources : INSEE, OFCE, Trésor, IPP et calculs des auteurs.

Income Tax Cut in 2020

The results are still quite similar, but there are non-negligible differences for the intermediate deciles.

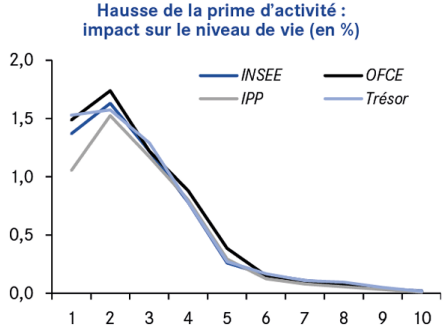


Sources : INSEE, OFCE, Trésor, IPP et calculs des auteurs.

Reform of In-Work Benefit (prime d'activité) in 2019

A more complex measure to simulate due to the increase in take-up rate

- Results are sensitive to the assumptions made for simulating the increase in take-up: several iterations are needed for results to converge
- Lower impact on the first decile in IPP's results compared to other institutions



Sources : INSEE, OFCE, Trésor, IPP et calculs des auteurs.

Flat Tax on K Income (PFU – Prélèvement Forfaitaire Unique)

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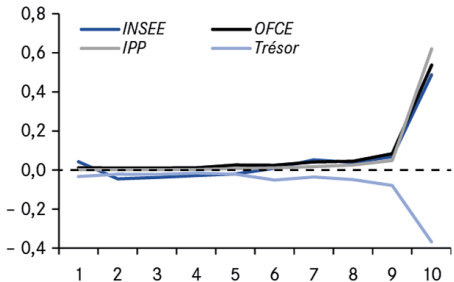
Several assumptions are necessary for this simulation

- Whether or not households optimize (PFU or subject to income tax)
- Whether or not behavioral changes are taken into account: increase in dividends paid as a result of lighter taxation
- The Treasury stands out by incorporating the dividend effect on tax burden (but not on standard of living)

Prélèvement forfaitaire unique : impact sur le niveau de vie (en %)



Assessment and Future Perspectives

The current state of microsimulation in France is somewhat satisfactory

- Quality of models
- Convergence of results
- Progress made (notably via growing access to administrative data)

But sources of divergence exist

- Databases and use of supplementary data
- Scope of simulated measures
- Taking into account behavioral responses
- Presentation of results

And several avenues for improvement are emerging

- 4 principles and 4 recommendations

Avenues for Improvement: The Diversity Principle

Model diversity principle

- Emulation among modelers and sharing of efforts (data)
- Robustness of estimates (magnitude of differences between model results)
- Credibility of independent estimates with the public
- Externalities due to diversity in extension/improvement work

Recommendation 1. Institutionalize exchanges between modelers, users, and data producers through an annual seminar.

Diversity and transparency principle

- Diversity can only be effective if full comparability of models and their results is ensured (example: IPP-DGT)

Note: Ensuring Comparability Without Losing Diversity

There is a need for a shared framework for interpreting results across models

- "Incidence curves" by decile/twentieth/percentile of living standards

However, rigor also requires proposing alternative presentations

- Household/adult disposable income (“equal split”)
- By socio-demographic type of households/individuals (location, gender, migration status, children...)

A shared framework for interpreting results, including an annex (online) with alternative frameworks, possibly differing by modeler

Avenues for Improvement: The Granularity Principle

Micro-level granularity as a core principle of micro-simulation

- Evolution of data sources: from a few typical cases to taxpayer samples, to representative samples of the whole population... to exhaustive data
- Granularity concerns not only the population covered but also the available individual information, including all types of income (DINA approach)
- The principle of transparency is poorly compatible with groupings that mask extreme individual economic conditions

Recommendation 2. Explore the use of exhaustive or nearly exhaustive administrative data in both income and demographic/socio-professional dimensions of households, and facilitate access to them.

Avenues for Improvement: The Simplicity Principle

Transparency of the purely accounting approach to micro-simulation

- No hidden assumptions, no "typical cases": rules and tax scales are applied to real data
- Accounting variation in real income due to a reform = "monetary metric of well-being variation" (comparable across individuals)

As a first approximation, behavioral responses can be ignored (except for specific cases like non-take-up) to assess the distributive impact of a reform...

... but should be taken into account for its budgetary impact

Recommendation 3. Maintain a strict separation between, on the one hand, mechanical micro-simulation without behavioral changes (except in cases of non-take-up or tax avoidance), and on the other hand, micro-simulation with behavioral response.

Avenues for Improvement: Extension Principles

Every economic policy measure has distributive effects
→ Extension of micro-simulation scope?

- Possible candidates: corporate taxation, education spending, healthcare...
- DINA-type experimentation

Major challenge: determining how these policies affect households (purchasing power, employment, primary income)

- Accounting for behavioral responses and macroeconomic feedback effects
  → substantial margin of imprecision
- Need for flexibility in modeling techniques

A possible path to advance the frontier of micro-simulation: launch research calls to enrich impact evaluation work on the redistributive effects of reforms (example: pensions)

Recommendation 4. Launch research calls to assess the redistributive impact of measures beyond the traditional scope of static socio-fiscal micro-simulation.

Appendix

Micro-simulation of Redistribution in Advanced Economies (1/2)

Netherlands: a single actor in micro-simulation, the independent institute CPB (*Netherlands Bureau for Economic Policy Analysis*)

- Analyzes the impacts of electoral platforms

United Kingdom: micro-simulation models exist within the administration and two leading research institutes: *Institute for Fiscal Studies* and University of Essex

- The administration can "commission" studies: IFS for specific topics and Essex for regional studies

Germany: three main actors. Two research institutes (DIW Berlin and Ifo) and Ministry of Finance

- A working group meets annually to compare micro-simulation results

United States: three "institutional" bodies (*Office of Tax Analysis* (OTA) of Treasury, *Joint Committee on Taxation* (JCT) and *Congressional Budget Office* (CBO)) and one independent research center *Tax Policy Center* (TPC)

- Fairly rich dialogue between OTA, JCT and CBO

Micro-simulation of Redistribution in Advanced Economies (2/2)

Several modelers include behavioral reactions in their simulations

- Ifo and DIW Berlin in Germany: second-round effects (labor supply), then third-round effects (wages and employment); Ifo also includes reactions on consumption and savings
- IFS: specific models for incentive analysis
- CPB in Netherlands: structural labor supply model
- OTA, JCT, CBO and TPC all integrate behavioral responses based on existing empirical work

Distinction between budgetary impact and redistributive impact evaluations

- By convention, American TPC only considers "static" impacts to evaluate redistributive impact (same as Treasury)
- Consistent with the economic theory of welfare: assumes no behavioral change

incidence assumptions in the United States

- All payroll taxes are assumed to be borne by employees
- A portion of corporate income tax (20% to 25%) is assumed to be borne by workers