Microsimulation of Tax and Benefit Reforms

Analysis of the French Legislative Term 2017–2022

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Outline

▸ Appendix

How do evolutions in the tax-and-benefit system affect the redistribution of income?

- citizens vote for politicians to enact policies, but not always straight-forward to understand their effects
  - in particular in France, where the relevant legislation is quite complex
  - need for a relevant statistic: overall level of monetary redistribution operated by the socio-fiscal system for each individual
- how to measure a government's actions' impact on the level of redistribution?
  - relevant time frame might span more than one law or more than one year
  - measures depend on one another, potential feedback loops
- empirical and methodological challenges and choices
  - how sensitive is our relevant statistic to these choices?

How much does it matter?

3 years ago, somewhere in Paris:

3 months ago, in the French news:

(Challenges, 2018, Le Monde, 2022, Les Echos, 2022a, Les Echos, 2022b)

What we do

- **overall analysis** of **all tax and benefit reforms** over a political term (2017–2022)
- **static microsimulation** model of the French socio-fiscal system (TAXIPP)
  - effect of **(permanent) tax and social spending reforms** that have been decided
  - impact on **disposable income per unit of consumption**
    (= standard of living $\neq$ purchasing power)
- use it for **analysis of French budget** proposal and **benchmark with government figures**
  - link to latest publication provided at the end of the slides

Our contribution

- a different take on the French case:*
  - **multiple analyses** of the same thing may seem redundant at first, but **results do not always coincide**, despite having the same goal in mind
  - different data? different model? **different assumptions!**
  - replication exercise shows relative importance of choices made along the way
- we use (exhaustive) administrative data instead of survey data only, and obtain **granular results** along **multiple dimensions**
- we model a **vast set** of the tax and benefit **legislation**, using a versatile and flexible model that allows for (preliminary) results to be available in time for the parliamentary vote on the budget

*See DG Trésor (2021), Insee (2021), and Madec, Plane, and Sampognaro (2022).

A bird's eye view on TAXIPP

Input 1: Raw data bases

— statistically matched to get rich individual-level data

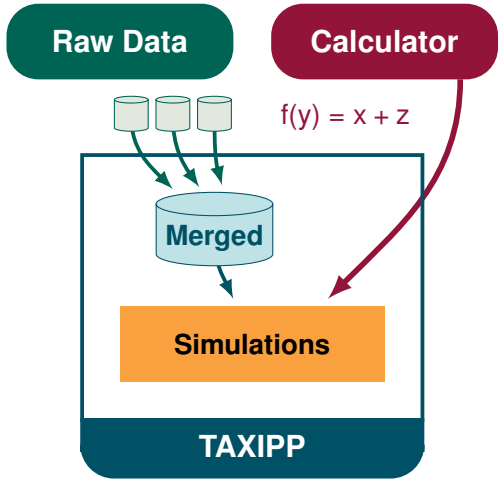
Input 2: Socio-fiscal calculator

— contains legislative parameters and formulas

TAXIPP: Combines the two inputs

— adapts and connects the data to the calculator (and not vice versa!)

— simulates two states of the world (. . . well, of France)



Data sources and merging

	Level	Sample	Content/Description
FIDELI	Individuals	Exhaustive	detailed data on housing and links, some income variable
FELIN	Tax Units	500K, Exh. top 1%	detailed income and tax data
DADS	Jobs	Exhaustive	detailed job data
BNS	Self-Employed	Exhaustive	detailed data on the self-employed
ERFS	Individuals Households	100K+ 50K+	main household survey

— combination of "hard" and statistical matching (categorical vs. continuous variables)

— create necessary variables and connections to identify families, households, and tax units

— final results computed on sample of 1 million households ($>$ 2 million individuals)

Socio-fiscal calculator: The OpenFisca project

- **collaborative** and **open-source** software project, modeling socio-fiscal legislation
- contains all relevant **parameters** such as tax rates and benefit amounts, as well as **formulas** for the relevant outcomes ▸ Examples
- we connect our admin data to it to do microsimulation
  - but it can take other data as input, too, and is used for much more
- currently implemented for France, US, UK, and other countries
- check out the project website at https://openfisca.org !

Comparing two states of the world

- a **simulation with all the reforms** that have come to pass
  - apply tax and benefit system post-reform to data
  - in this sense, it mirrors reality
- a **counterfactual simulation**, omitting the reforms in question
  - except "hard-coded" amounts that are adjusted for inflation if this is usual
  - but do take into account over- and under-compensations as deliberate reforms

▸ Show Graph

Challenges and decisions

- **Which reforms to include?**
  - reforms pertaining to monetary measures (no in-kind benefits for instance)
  - reforms pertaining to households only (separate analysis of reforms for firms)
  - decided vs. implemented ▸ Timing of reforms
  - permanent reforms only or one-off policies too †
- **Behavioral reactions** generally not modeled, except for
  - indirect taxation
  - non take-up of benefits
  - optimization between income tax schedule and "flat tax"

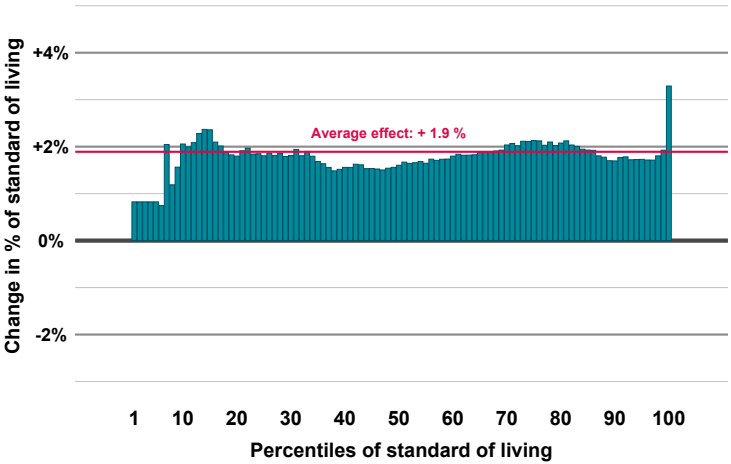
† but included in analysis of a single year's budget

What we find

- **overall positive effect** for each percentile
  - from around +1% for the bottom percentiles
  - to up to +3% for the top percentile
  - average effect for the entire population of +1.9%, but **not** budget-neutral in total!

- **heterogeneity within percentiles**
  - percentiles affected by different measures dependent on position
  - share of winners increases with living standard
  - also depends on "activity status" of household (active $>$ retired $>$ unemployed)

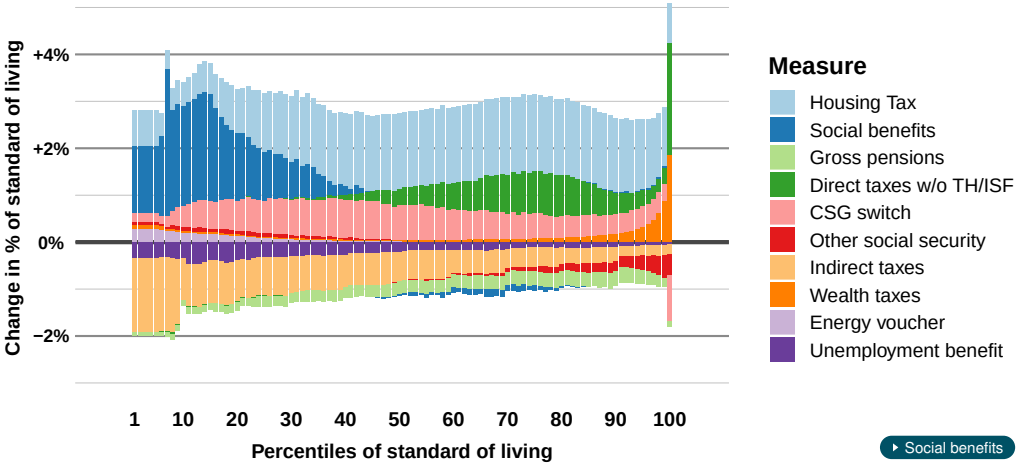
Total effect by percentile



Percentile	Initial average living standard per month
1st to 5th	620 €
10th	969 €
20th	1,241 €
30th	1,466 €
40th	1,669 €
50th	1,872 €
60th	2,090 €
70th	2,345 €
80th	2,696 €
90th	3,338 €
95th	4,060 €
99th	6,123 €
100th	11,385 €

Institut des politiques publiques, 2022

Decomposition, measure by measure



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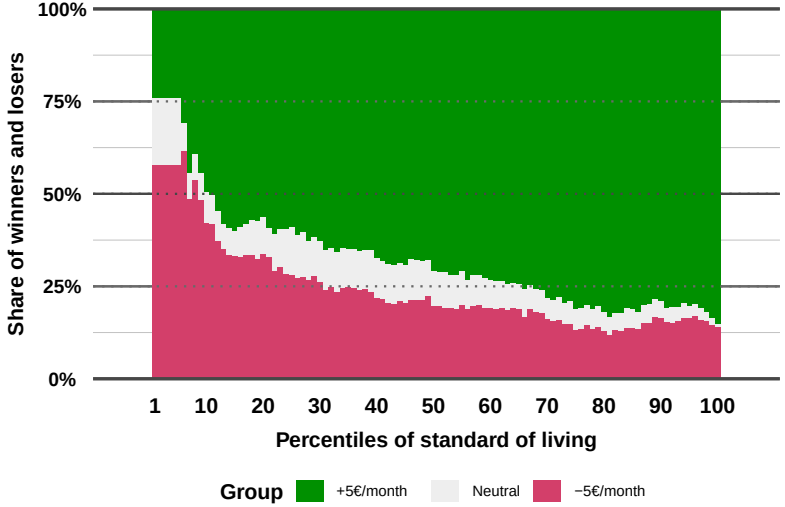
▸ Social benefits

Not everyone was better off



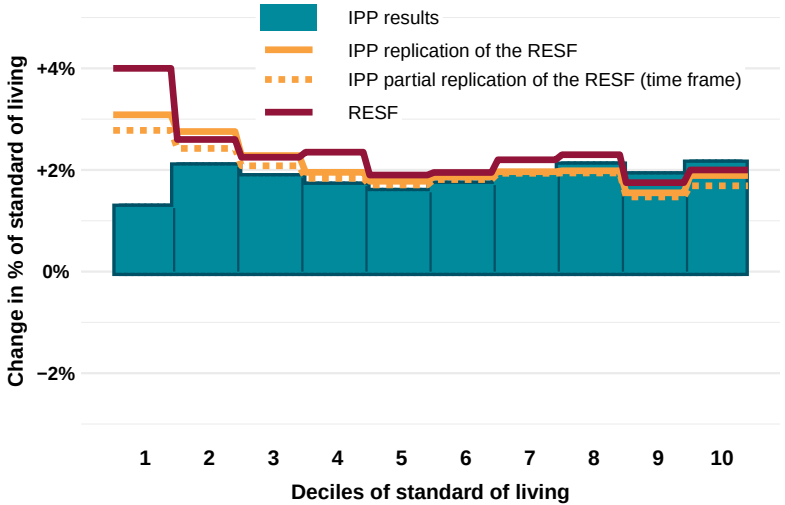
▸ By status

Institut des politiques publiques, 2022

Comparison with government results

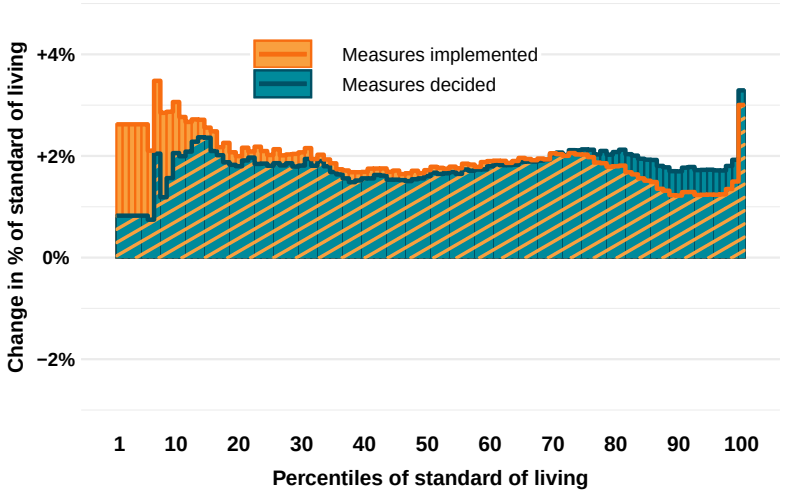
- goal: **comparison** of our results **with government figures** published by the French treasury (RESF, DG Trésor)
- at first glance, results seemed very off for bottom of the distribution
- but not exactly the same analysis, different **assumptions**
  - notably timing of the results, decided vs. implemented
  - these different assumptions explain large share of difference in results
- also: **granularity matters** a lot
  - government analysis in deciles
  - not fine-grained enough to capture the (very different) top 1%

Comparison with government results: Deciles



Timing

Comparison with government results: Percentiles



Timing

Recap

- TAXIPP combines rich administrative micro data and a socio-fiscal calculator
- microsimulation to evaluate French public policy
- allows fine-grained decomposition of the policies' effects, contributes to public debate
- investigate differences between analyses
  - can to a large extent be explained by assumptions and modeling choices
  - reassuring from a methodological point of view!
- and there is much left to do...

Work in progress and future challenges

- **Currently working on several projects to extend TAXIPP**
  - better capture the living conditions of young individuals
  - long-term (income inequality) analyses with TAXIPP on survey data
  - behavioral reactions to the French in-work tax credit

- **But challenges remain:**
  - effects beyond the "first round" etc.
  - **inflation** and **purchasing power gap**, redistributive effect unclear
  - etc.

Finally, some advertisement

- More details on the French budget:
  IPP Policy Brief n° 81 [English] [French]
- TAXIPP will soon be **open-source!**
  Ships with detailed documentation.
- Any further questions or comments?
  Feel free to reach out to me here or by mail:

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. . . and visit our website

ipp.eu

to see more of our work!

Appendix

Main ToC

References

Challenges (Dec. 12, 2018). *La question des femmes est au coeur des revendications des gilets jaunes*. Link: https://www.challenges.fr/france/les-femmes-sont-au-coeur-du-mouvement-des-gilets-jaunes_631423 (visited on 07/01/2022).

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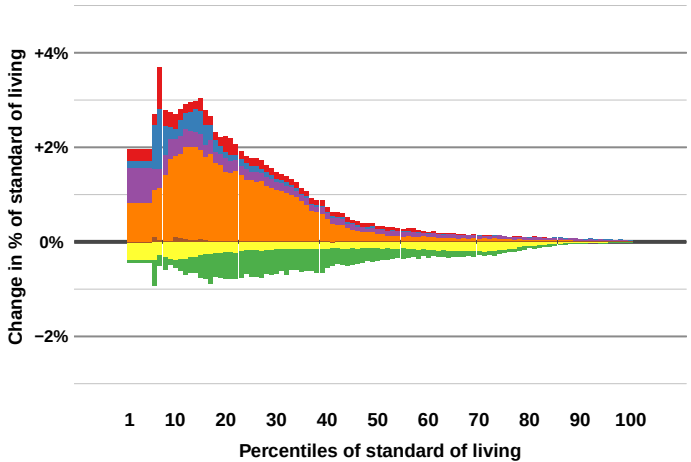
— (Jan. 5, 2022b). *Sondage exclusif présidentielle 2022 : le pouvoir d'achat reste la priorité numéro un des Français*. Link: https://www.lesechos.fr/elections/sondages/sondage-exclusif-presidentielle-2022-le-pouvoir-dachat-reste-la-priorite-numero-un-des-francais-1376927 (visited on 07/01/2022).

Madec, Pierre, Mathieu Plane, and Raul Sampognaro (Mar. 17, 2022). *Une analyse macro et microéconomique du pouvoir d'achat des ménages en France*. OFCE Policy Brief 104. SciencesPo, OFCE. Link: https://www.ofce.sciences-po.fr/pdf/pbrief/2022/OFCEpbrief104.pdf (visited on 07/15/2022).

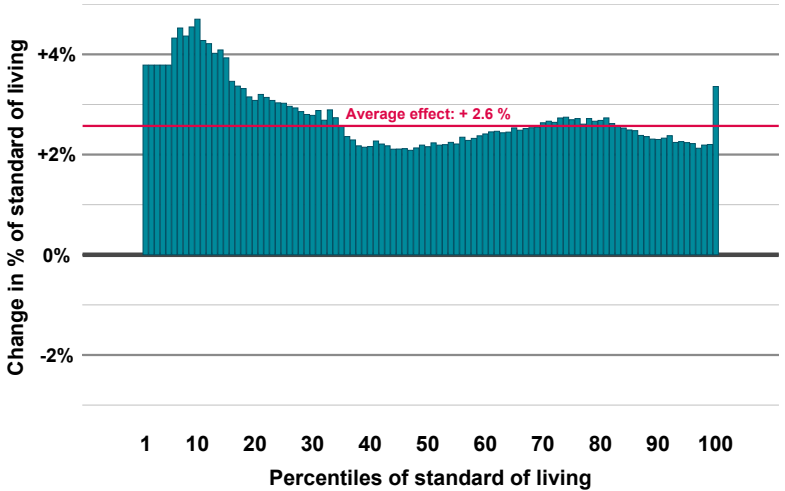
◂ Motivation

Decomposition of effects of benefits



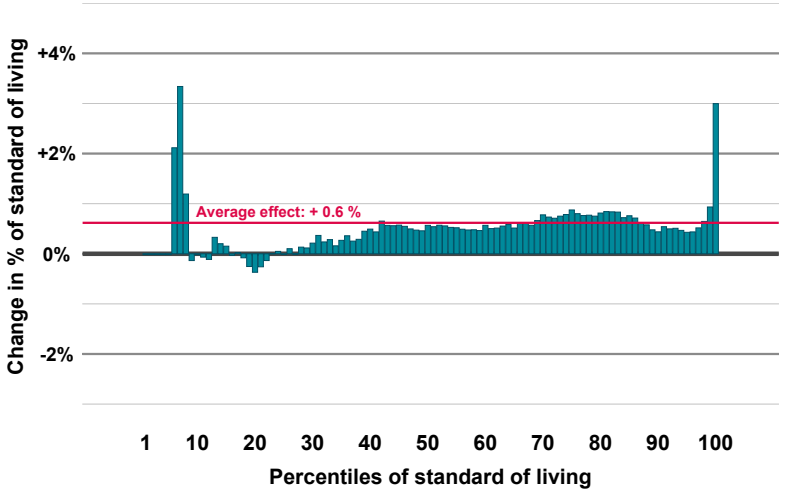
Main Decomposition

Total effect by group: "Active" households



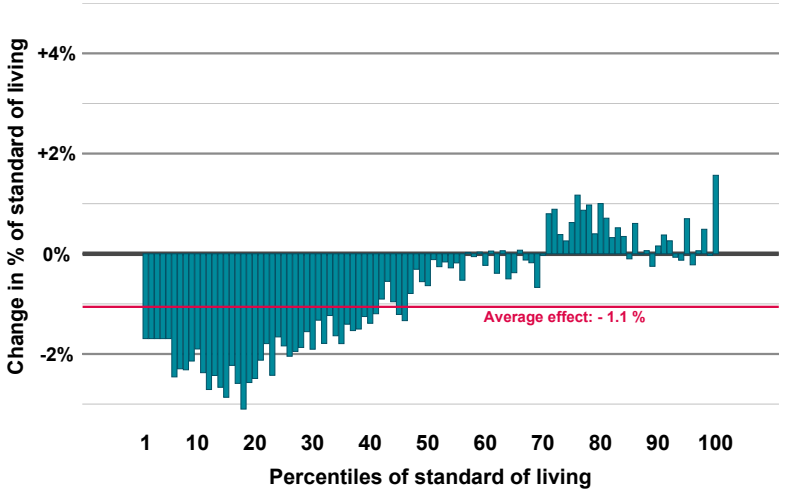
Winners/Losers

Total effect by group: "Retired" households



Winners/Losers

Total effect by group: "Unemployed" households



Winners/Losers

Example of a parameter: Values

Back to Methodology

```
>>> parameter.yaml

description:  Some aid, a housing benefit for instance
values:
  2015-01-01:
    value:  21.90
  ...
  2020-01-01:
    value:  37.66
  2021-01-01:
    value:  46.47
  2022-01-01:
    value:  52.24
```

Example of a parameter: Metadata

Back to Methodology

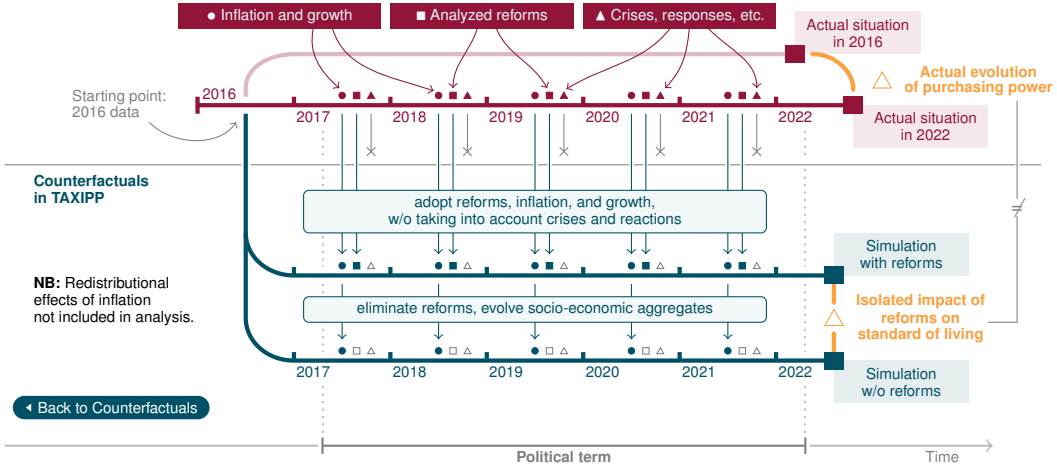
```
>>> parameter.yaml (cont'd)

metadata:
  unit:  currency
  reference:
    2015-01-01:
      href:  https://www.legifrance.gouv.fr/link/to/law
      title:  Article 1 of Law...
    ...
  notes:
    2015-01-01:
      title:  This aid was enacted in 2015.
```

Example of a formula

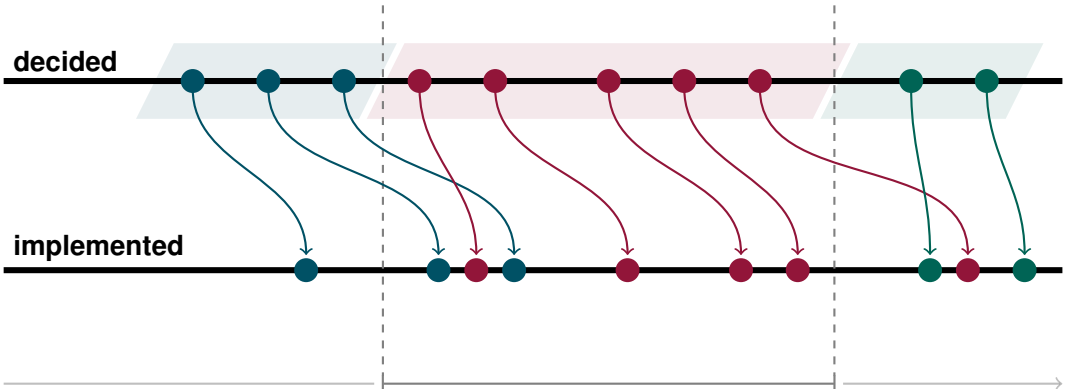
Back to Methodology

```
>>> formula.py

class family_variable(Variable):
    value_type = float
    entity = Famille
    label = "Builds sum of variable within the family"
    definition_period = MONTH

    def formula_2019_01_01(famille, period, parameters):
        value_individuals = famille.members('indiv_level_var', period)
        sum_individuals = famille.sum(value_individuals)
        return sum_individuals
```

Counterfactuals



Timing of reforms



Back to Challenges
Back to Comparison