

# THOMAS BOURANY

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## Office Contact Information

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## Research and Teaching Fields

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**Primary:** Macroeconomics, Climate Economics, Trade Economics  
**Secondary:** Fiscal and Monetary Policies, Computational Econ, Macro-Finance, Energy Economics

## Education

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**University of Chicago, PH.D. ECONOMICS** *2019–2025*

**University of Chicago, M.A. ECONOMICS** *2018–2019*  
*MAPSS*

**UPMC – Sorbonne Université, M.Sc. MATHEMATICS** *2016–2018*  
*Applied Mathematics for Modeling, with honors*

**Sciences Po, École Polytechnique & Ensaë, M.A. ECONOMICS** *2014–2016*  
*Economics and Public Policies (EPP)*

**Sciences Po. & UPMC–Sorbonne Université, DUAL BACHELOR** *2011–2014*  
*Sciences and Social Sciences, with honors*

- B.A. Social Sciences, “Diplôme du Collège universitaire” – Sciences Po Paris
- B.Sc. Mathematics – UPMC-Sorbonne Paris
- Exchange program – Indian Institute of Technology, Madras, Chennai, India

## References

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Professor Mikhail Golosov (Chair)  
University of Chicago  
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University of Chicago  
Department of Economics, Statistics  
and Booth School of Business  
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Energy Policy Institute of UChicago  
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### The Optimal Design of Climate Agreements, Inequality, Trade and Incentives for Carbon Policy

**Abstract:** *How can we design a climate agreement that implements the optimal climate policy? In the presence of inequality, trade, and policy constraints, the lack of climate cooperation and free-riding incentives are exacerbated. Through the lens of an Integrated Assessment Model (IAM) with heterogeneous countries and bilateral trade, I study the optimal taxation of fossil fuels and its implementation when countries can deviate from applying the optimal policy. First, I derive formulas for the Social Cost of Carbon (SCC) and second-best fossil fuel taxes and trade tariffs in the presence of inequalities, and general equilibrium effects through energy and good trade. When countries can exit climate agreements, the policy design with participation constraints faces a tradeoff between an intensive margin – a climate club with few countries but a carbon tax closer to the first best, and large emission reduction – and an extensive margin – accommodating a larger number of countries at a cost of lowering the carbon tax. I propose a method to handle the combinatorial policy design problem. I show that if gains from trade are not too small compared to the distortive effects of energy taxation, the second-best optimal policy can be implemented effectively with trade tariffs or carbon border adjustment mechanisms.*

## Working Papers

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### The Optimal Energy Policy, and the Inequality of Climate Change

**Abstract:** *What is the optimal policy to fight climate change? Taxation of carbon and fossil fuels has strong redistributive effects across countries: (i) curbing energy demand is costly for developing economies, which are the most affected by climate change in the first place, (ii) taxation has strong general equilibrium effects through energy markets and trade reallocation. Through the lens of an Integrated Assessment Model (IAM) with heterogeneous countries, I show that optimal carbon policy depends crucially on the availability of redistribution instruments. After characterizing the Social Cost of Carbon (SCC), I derive formulas for second-best fossil fuel taxes in the presence of inequalities in climate damages and incomes, redistributive effects through energy and good trade, and participation constraints if countries can exit climate agreements. I show that a uniform carbon should be reduced twofold in the presence of inequality. If country-specific carbon taxes are available, the distribution of carbon prices is proportionally related to the level of income: poor and hot countries should pay lower energy taxes than rich and cold countries. These qualitative results are general and I propose extensions with international trade, uncertainty, or participation constraints when countries can leave climate agreements.*

### Supply chain disruptions and diversification

(with Ignacia Cuevas and Gustavo Gonzalez)

**Abstract:** *Supply chain disruptions are becoming increasingly frequent, generating uncertainty for firms that need to source inputs to produce. We aim to understand whether firms, faced with supply chain disruption risk, would choose to diversify their sourcing from foreign countries, engage in re-shoring, or select suppliers based on cost or risk considerations. To answer this, and drawing inspiration from Antràs, Fort, and Tintelnot (2017), we write a multi-country sourcing model considering firms' self-selection into importing based on productivity, cost minimization, and trade disruptions that can alter the cost of importing. Our findings reveal that, even in the presence of aggregate or idiosyncratic uncertainty, a clear pecking order emerges, with larger firms self-selecting into importing from a more extensive set of suppliers. Despite the quantitative significance of marginal cost reduction as the primary driver of firms' sourcing decisions, risk introduces a nuanced dimension. Specifically, firm-specific import risk introduces a positive option value associated with diversifying the set of suppliers. Meanwhile, country-specific aggregate uncertainty has an ambiguous impact since it affects the market demand, leading to a reduction in firms' profits, as well as giving a positive option value. To empirically validate our model, we estimate supply chain disruption uncertainty and fixed costs of sourcing using firm-level data from Chile. Our analysis includes counterfactual scenarios to assess the impact of external shocks, such as the Covid-19 pandemic, on firms' sourcing strategies. Through this research, we contribute to understanding how firms navigate supply chain uncertainties and make strategic sourcing decisions in the face of disruptions.*

## **A Perturbational Approach for Approximating Heterogeneous-Agent Models**

(with Mikhaïl Golosov, Anmol Bhandari, and David Evans)

**Abstract:** *We develop a perturbational technique to approximate equilibria of a wide class of discrete-time dynamic stochastic general equilibrium heterogeneous-agent models with complex state spaces, including multi-dimensional distributions of endogenous variables. We show that approximating policy functions and stochastic process that governs the distributional state to any order is equivalent to solving small systems of linear equations that characterize values of certain directional derivatives. We analytically derive the coefficients of these linear systems and show that they satisfy simple recursive relations making their numerical implementation quick and efficient. Compared to existing state-of-the-art techniques, our method is faster in constructing first-order approximations and extends to higher orders, capturing the effects of risk that are ignored by many current methods. We illustrate how to apply our method to a broad set of questions such as impacts of first- and second-moment shocks, welfare effect of macroeconomic risk and stabilization policies, endogenous household portfolio formation, and transition dynamics in heterogeneous agent general equilibrium settings.*

## **Non-Keynesian stabilizers and inflation spirals**

(with Xavier Ragot and François Le Grand)

**Abstract:** *When both prices and wages are subject to nominal frictions, an increase in input prices such as energy can trigger a wage-price spiral, as both nominal wages and prices adjust slowly. To analyze optimal policy in this environment, we consider a heterogeneous-agent model, with both wage and price stickiness. We derive joint optimal fiscal-monetary policy, using a rich set of fiscal tools, for both supply and demand shocks. We first identify the set of fiscal instruments that implements nominal price and wage stability as an optimal outcome. Starting from this equivalence result, we remove fiscal instruments to identify the most efficient one for restoring price and wage stability. A time-varying wage subsidy appears to be a powerful tool to stabilize inflation and activity over the business cycle. We call this policy a non-Keynesian stabilization policy because it does not operate directly through aggregate demand management. Finally, we compare the results with those obtained in the representative agent economy*

## **When is aggregation enough? Aggregation and Projection with the Master Equation**

**Abstract:** *In this paper, I adapt the Master Equation – developed in the Mean Field Games literature – to economic applications. In particular, I show how one can apply projection methods to obtain a global characterization of the value, agent policy, and aggregate dynamics in heterogeneous agents models with aggregate risk.*

## **Work in Progress**

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**Energy shocks and aggregate fluctuations, 3rd-year paper**

**Credit Cycles, Asset prices, and Heterogeneous Firms, 2nd-year paper**

## **Pre-Doc**

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**Wealth distribution over the business cycle, A mean-field game with common noise,**  
Master thesis (M2) in 2018, M. Sc. Mathematics at UPMC-Sorbonne. Supervisor: Yves Achdou

### **Fiscal policy in monetary union**

Master thesis (M2) in 2016, M.A. Economics / EPP. Supervisor: Jean Baptiste Michau

### **Fiscal Policy and Tax compliance over the business cycle**

Master thesis (M1) in 2015, M.A. Economics / EPP. Supervisor: Francesco Pappadà

## Teaching Experience

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### University of Chicago, Department of Economics

Mathematical Methods in Economics, <i>PhD</i>	Lecturer	<i>Summer 2020, 2021 &amp; 2022</i>
Applied Macroeconomics: Heterogeneity & Macro, <i>PhD</i>	TA for Prof. J. Vavra, R. Kekre	<i>Winter 2022</i>
Monetary Economics, <i>PhD</i>	TA for Prof. F. Alvarez	<i>Fall 2021</i>

### Chicago Booth School of Business

Global Strategy and Economics, <i>EMBA</i>	TA for Prof. G. Lorenzoni	<i>Spr. 2022, 2023, 2024</i>
International Financial Policy, <i>MBA</i>	TA for Prof. R. Kekre	<i>Spr. 2020, 2021, 2022</i>
Money and Banking, <i>MBA</i>	TA for Prof. K. Huber	<i>Winter 2021</i>

### University of Chicago, The College

Economic Policy Analysis, <i>undergrad</i>	TA for Prof. K. Kuevibulvanich	<i>Spring 2019</i>
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### Sciences Po, Doctoral School, Economics Department

Graduate Macroeconomics & finance, <i>PhD</i>	TA for Prof. X. Ragot	<i>Fall 2016, 2017</i>
Fiscal and monetary policy, <i>PhD</i>	TA for Prof. J. Barthelemy	<i>Fall 2016</i>

### Sciences Po, School of Public Affairs, Master in Public Policy

Macroeconomics, <i>MPP</i>	TA for Prof. T. Chaney	<i>Fall 2016, Spr. 2018</i>
Macroeconomics for public policy, <i>MPP</i>	TA for Prof. X. Ragot, P. Andrade	<i>Spr. 2016</i>
Public Economics, <i>MPP</i>	TA for Prof. Mark Stabile	<i>Fall 2015</i>
Quantitative Analysis, <i>MPP</i>	TA for Prof. M. Foucault	<i>Fall 2015</i>

## Awards, Scholarships, and Grants

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University of Chicago MAPSS Merit Scholarship	<i>2018</i>
Sciences Po, Prize for the Best Master Thesis in Economics	<i>2016</i>
École Polytechnique, Prize for the Research Internship	<i>2015</i>

## Research Experience

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Research Assistant, University of Chicago <i>Prof. Mikhail Golosov</i>	<i>2019–2021</i>
Research Assistant (ponctual), University of Chicago <i>Prof. Greg Kaplan, Prof. Robert Lucas, Prof. Kilian Huber</i>	<i>resp. 2019, 2020, 2023</i>
Research Intern, Université Paris Diderot <i>Prof Y. Achdou</i>	<i>2018</i>
Research Intern, Banque de France, International Macro Division & Forecasting <i>Prof F. Pappadà and Y. Zylberberg</i>	<i>2015</i>

## Academic Experience

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**Conferences**      **2024:** Society of Economic Dynamics, Yiran Fan Memorial Conference, *UChicago*, 49th Annual Conference, *Eastern Economic Association*, Boston  
**2023:** Economic & Environmental Consequences of Climate Change, *IMSI UChicago*, HEC Economics PhD Conference, *HEC, Paris Area*  
**2018:** Macroeconomic Implications of Micro Heterogeneity, *OFCE, Paris*  
*Note: only presentation of solo projects*

**Presentations**      **2024:** EPIC Lunch, *UChicago*  
**2020-2024:** PhD workshops (Macro, Trade, Environment, Finance), *UChicago*  
**2017, 2023:** PhD workshops, *Sciences Po*  
**2019:** Fiscal Affairs Department, *International Monetary Fund*  
**2018:** Workshop on MFG, *Université Paris Diderot*  
**2015:** DGEI Internal Conference, *Banque de France*

**Refereeing Activity**      *Journal of Political Economy*, *Journal of European Economic Association*, *IEEE Transactions on Automatic Control* (Maths)

### Seminar organization:

Student organizer of Capital Theory, *UChicago*      2023–2024

Student organizer of Advanced Macro Reading Group, *UChicago*      2022–2024

Organizer of 2nd-3rd year students Macro workshop, *UChicago*      2019–2020

### Others student activities:

Graduate Student Liaison (GSL) – Student representative, *UChicago*      2023–2024

Political Economy Club (PEC) – Social Events, *UChicago*      2021–2022

## Additional Information

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**Citizenship**      France

**Programming Skills**      Julia, Matlab, Dynare, Stata, Python, R

**Languages**      French (Native), English (Fluent), Spanish (Intermediate)