

# Alejandro Rojas Bernal

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## Contact Information

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## Fields

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Macroeconomics, International Finance, International Economics, Production Networks

## Education

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<b>Ph.D. Candidate in Economics - University of British Columbia</b> <i>Emphasis in macroeconomics and international finance</i>	<b>Vancouver, Canada</b> 2024 (expected)
<b>Master of Arts in Economics - Universidad de Los Andes</b> <i>Emphasis on finance and econometrics</i>	<b>Bogotá, Colombia</b> 2018
<b>Bachelor of Arts in Law - Universidad de los Andes</b> <i>Summa Cum Laude</i>	<b>Bogotá, Colombia</b> 2016
<b>Bachelor of Arts in Economics - Universidad de Los Andes</b> <i>Cum Laude</i>	<b>Bogotá Colombia</b> 2016

## References

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# Job Market Paper

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## Inequality and Misallocation under Production Networks

In this paper, I develop an aggregation theory for distorted production network economies with heterogeneous households and endogenous labor supply. I provide nonparametric formulas that capture the impact of changes in the income and consumption distributions on the aggregate and distributional propagation of microeconomic shocks. I demonstrate that macroeconomic theories that rely solely on an aggregate production function and ignore variations in the consumption distribution are biased when households have no symmetry in the centrality of their expenditure on the income distribution. I compare the outcomes of a decentralized economy with those of a constrained social planner and show that the distributions of income and consumption are inefficient when the dilution of the consumption expenditure that reaches labor revenue is not symmetric across workers. Finally, I estimate the first quantitative implementation for a production network environment in the United States with household heterogeneity. The results suggest that income distribution variations fostered growth before the Great Recession by increasing TFP by 8.2% and after the Great Recession hindered growth by reducing TFP by 7.5%. Additionally, the variations in the income distribution are responsible for 20% of the business cycle volatility, and microeconomic shocks and the production network play a significant role in explaining income and real consumption inequalities.

## Working Papers

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### 1. International Misallocation and Comovement under Production Networks

In this paper, I develop an aggregation theory for a distorted open production network economy with endogenous labor supply. I provide nonparametric formulas that decompose the country-level TFP variation. These formulas account for within-country household heterogeneity, factorial reallocation between countries, and labor supply elasticity. The decompositions depend on sufficient statistics that allow me to characterize the effect on domestic real GDP from (i) firm-level productivity and distortion shocks in domestic and foreign firms and (ii) variations in the global income distributions. Additionally, these decompositions do not require measures of real variations, facilitating their empirical implementation, as price data is no longer necessary. These results support a theory of economic spillovers and contagion through industrial networks, corroborating the essential role of global value chains in creating strong complementarities and commonalities in business cycles across countries.

### 2. Growth Through Industrial Linkages

with Xiaojun Guan

In this paper, we estimate how changes in the structure of global input-output networks have influenced growth. Using an open economy production network model, we identify sufficient statistics that characterize how productivity shocks across domestic and foreign firms influence country-level TFP. We estimate these sufficient statistics using data on input-output networks and sectoral productivity shocks. Structural changes in global input-output networks between 1965 and 2000 were advantageous for developing countries and unfavorable for advanced economies. Holding the global input-output network fixed, TFP growth in China and India would have been 26.6% and 9.7% lower between 1965 and 2000. Whereas for the US and Australia, TFP growth would have been 4.0% and 16.8% higher. Finally, we show that the dynamics of the domestic intermediate input cost share capture the

importance that the structure of the global input-output network has on the amplification of shocks on TFP. Our analysis illustrates the importance of industrial linkages and robust domestic intermediate input markets for economic growth.

### 3. The Macroeconomic Impact of Microeconomic Shocks under Distortions

with [Ali Karimirad](#) and Sudipta Gosh

Microeconomic shocks, such as sectoral disruptions, notably impact aggregate variables like GDP. However, the extent of this influence on macroeconomic factors and the role of economic structure remains a pertinent question. Hulten (1978) posits that the first-order impact of sectoral shocks on GDP within an efficient economy hinges on their sales shares. Nonetheless, the second-order impact of severe shocks can hold substantial significance and profoundly alter outcomes. Furthermore, economic inefficiencies must be considered, particularly since they transform the face of severe disruptions like the Great Recession or the COVID-19 pandemic. This study offers a resilient second-order approximation method to assess the ramifications of microeconomic shocks on GDP, encompassing shifts in frictions or sectoral shocks. Our proposed approach remains resilient despite various distortions, spanning from those that squander output to those that channel output back to households.

### 4. Stairway To Haven

This paper attempts to identify the main channels for the propagation of the macroeconomic effects from corporate profit shifting into tax havens. This question is answered by building a general equilibrium model that introduces firm profit shifting to tax havens in a multi-country environment with production networks. In this model, haven jurisdictions specialize and compete for shifted profits by trading concealment assets in a differentiated oligopolistic environment, and non-haven countries defend these profits by setting enforcement levels over capital flows. The central point of the model is that profit shifting introduces two classes of optimal distortions, first, rebated distortions that by modifying the terms of trade and the effective marginal tax rate alter the decision of firms, but also wasted distortions that optimally squander resources via enforcement policies and the corporate costs that firms have to incur in order to access and develop concealment strategies. I show that the main transmission channels for the propagation of these distortions occurs by increasing corporate dividends, the tax base, and wages in tax havens; while non-haven countries are affected by opposite effects in addition to the wasted distortions. We confirm these results in a three country one sector global economy that additionally provides evidence about the relevance of the structure of the production network and the consumption bundle in the magnitude of the effect from introducing profit shifting.

## Publications

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### 1. Pricing the exotic: Path-dependent American options with stochastic barriers

with [Mauricio Villamizar-Villegas](#)

**Latin American Journal of Central Banking**

We develop a novel pricing strategy that approximates the value of an American option with exotic features through a portfolio of European options with different maturities. Among our findings, we show that: (i) our model is numerically robust in pricing plain vanilla American options; (ii) the model matches observed bids

and premiums of multidimensional options that integrate ratchet, Asian, and barrier characteristics; and (iii) our closed-form approximation allows for an analytical solution of the option's greeks, which characterize the sensitivity to various risk factors. Finally, compared to the traditional Monte Carlo simulations method, we highlight that our estimation's prediction is more accurate and requires less than 1% of the computational time.

## Presentations

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### 2023

- North American Summer Meeting of the Econometric Society Meeting, UCLA, Los Angeles
- Asian Meeting of the Econometric Society, East and Southeast Asia, NTU, Singapore
- Australasian Meeting of the Econometric Society, UNSW, Sydney
- Canadian Economic Association, U-Manitoba and U-Winnipeg, Winnipeg

### 2021

- Quantil: Applied Mathematics Seminar, Bogotá

## Teaching Experience

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### University of British Columbia - Teaching Assistant

- **International Finance**, Econ 356, Geoffrey Newman (2019, 2020, 2021, 2022)
- **Monetary Theory**, Econ 447, Geoffrey Newman (2020, 2021, 2022)
- **Law and Economics**, Econ 367, Sam Norris (2021)
- **International Macroeconomics and Finance**, Econ 456, Michael B. Devereux (2022, 2023)
- **Money and Banking**, Econ 345, Geoffrey Newman (2023)
- **International Finance (Master and PhD)**, Econ 556, Michael B. Devereux (2023)

### Universidad de Los Andes - Teaching Assistant

- **Advanced Econometrics (Master and PhD)**, Raquel Bernal and Diego Amador (2017, 2018)
- **Introduction to Macroeconomics**, Marc Hofstetter (2017, 2018)

### Universidad de Los Andes - Undergraduate Teaching Assistant

- **Roman Law**, Nicolás Pájaro (2011)
- **Constitutional Law**, Diego Eduardo López (2011)
- **General Criminal Law**, Yamila Fakhouri (2013)
- **Special Criminal Law**, Ricardo Posada (2013)
- **General Criminal Law**, Ricardo Posada (2014)
- **Constitutional Hermeneutics**, Daniel Eduardo Bonilla (2014)
- **Intermediate Econometrics**, Jorge Alexander Bonilla (2015, 2016)
- **Financial Derivatives**, Jairo Rendon, Financial Derivatives (2016)

## Professional Experience

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- **Central Bank of Colombia**: Analyst in Financial Markets Development (2016 - 2018)

## Scholarships Awards and Honors

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### 2023

- International Tuition Award UBC: \$2,633
- Graduate Student Travel Award UBC: \$500
- President's Academic Excellence Initiative PhD Award UBC: \$475

### 2022

- Faculty of Arts Graduate Award UBC: \$7,511
- Bank of Montreal Graduate Fellowship: \$4,583
- International Tuition Award UBC: \$3,199
- President's Academic Excellence Initiative PhD Award UBC: \$1,620

### 2021

- Bank of Montreal Graduate Fellowship: \$9,166
- International Tuition Award: \$3,199
- Kathleen Simpson Memorial Graduate Scholarship: \$2,250
- President's Academic Excellence Initiative PhD Award UBC: \$515
- Honorable Mention in the Central Bank Award Rodrigo Gómez CEMLA

### 2020

- AD Scott Fellowship in Economics: \$13,325
- Faculty of Arts Graduate Award UBC: \$11,775
- International Tuition Award UBC: \$5,332
- President's Academic Excellence Initiative PhD Award UBC: \$652

### 2019

- Faculty of Arts Graduate Award UBC: \$25,524
- International Tuition Award UBC: \$2,133

### 2016

- Summa Cum Laude in Law: This honorific distinction is given to the students that have a GPA that is in the top 1% of his department in the last 5 years and display comprehensive achievements in an interview with the Academic Council
- Cum Laude in Economics: This honorific distinction is given to the students that have a GPA that is in the top 5% of his department on the last 5 years
- [Commencement Speech at the graduation of Law, Architecture, Design and Humanities](#)
- [Commencement Speech at the graduation of Economics, Bussiness and Government](#)

### 2015

- Winner of the Jorge Méndez Munévar 2015 award: Annually given by the Department of Economics of the University of Los Andes to the student with the best research proyect in all the subjects of the B.A in Economics. This award was given due to the work *An Optimal Taylor Rule for Colombia: 2003-2015*
- Best National Higher Education Exam (Ecaes) in Law
- Winner of the Cavelier Association Competition and Scholarship First Place in the competition for the best article of investigation in Law, second semester of 2015, with the article *"The city, the property and the environment: Colective construction of a sustainable urban space"*. As a consequence, I won a

scholarship for eighth million colombian pesos

## **Programming**

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- Julia, Stata, Matlab, R, Arcgis

## **Languages**

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- English (fluent), Spanish (native), German (intermediate)