

# Rafael Serrano Quintero

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Fundamentos del Análisis Económico  
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## EDUCATION

University of Alicante, Ph.D. in Economics, 2021 (expected)  
Job Market Paper: *Structural Transformation in India*  
Advisor: [Prof. F. PÉREZ-SEBASTIÁN](#)

University of Manchester, Visiting Ph.D. Student, Feb - June 2019  
Host: [Prof. A. VALENTINYI](#)

University of Alicante, M.Sc., Quantitative Economics, 2016  
Thesis: *"Decreasing Hours, Balanced Growth, and the Elasticity of Substitution"*  
University of Sevilla, B.A., Economics, 2014  
Final Degree Thesis passed with Honors

## FIELDS OF INTEREST

Structural Change, Economic Growth, Technological Change, Development,  
Spatial Economics, Quantitative Macroeconomics

## WORKING PAPERS

**[Structural Transformation in India: The Role of the Service Sector](#)** (*Job Market Paper*)

*Abstract:* The experience of industrialized countries shows that productivity growth in the manufacturing sector is consistently faster than in the service sector. India's experience shows the opposite. Particularly, I show that the fastest growing industries in services grow faster than in manufacturing. To investigate why this has been the case and what it will convey for structural change and growth, I construct a five-sector model of structural change including agriculture, two manufacturing and two service sub-sectors. These two sub-sectors comprise the fastest and the slowest growing industries within each manufacturing and services. Furthermore, each sector can employ high and low-skill labor. The calibrated model suggests that the large supply of high-skill workers combined with higher skill intensity in the service sector seem to be behind the services take-off. The data imply that service sub-sectors are gross substitutes while manufacturing sub-sectors are gross complements. This will accelerate productivity growth in services and decelerate productivity growth in manufacturing.

**[Decreasing Hours, the Labor Share, and the Elasticity of Substitution](#)**

*Abstract:* The decline in the labor share has attracted the attention of economists in recent years. Empirical literature has found that this decline can be explained by the increasing capital intensity of the U.S. economy. This paper proposes a mechanism that accounts for the increasing capital intensity - the slowdown of labor-augmenting technology. Under substitutability of capital and labor, such slowdown induces an increase in the rental rate to wage ratio, thus decreasing the labor share. To assess the empirical validity of this mechanism, I construct a general equilibrium model with a CES production function, a utility function compatible with decreasing hours of work, and use a supply-side system to estimate the parameters of the model. I simulate the solution of the model using the actual series for the exogenous variables and I find that the

model can account for between half and almost the full decline, depending on the particular specification considered.

WORK IN  
PROGRESS

### **Public infrastructure Complementarities in the Brazilian Structural Transformation** (with [Fidel Pérez-Sebastián](#) and [Jevgenijs Steinbuks](#))

*Abstract:* Trade costs are partly determined by transport infrastructure and their relevance has been widely studied. However, the process of structural transformation and development requires of another key element, electricity. We model jointly the endogenous evolution of transport and electricity networks in a multi-sector quantitative economic geography model for the case of Brazil to ask how much of the spatial evolution of structural transformation can be attributed to electrification and transportation improvements. In particular, if there is some degree of complementarity between the two types of infrastructure. In our model, the government chooses infrastructure investments to maximize welfare. One key aspect is that sectoral TFPs are determined partly by roads access and electricity quality, the underlying assumption being that electricity access allows for a new menu of technologies that were not available before. Furthermore, firms can use electricity as a production input which allows for differential sectoral impact of electricity use. The model can then be used to estimate the optimality of the actual transport network and the degree of misallocation in the economy as well as spillover effects derived from improvements in infrastructure. In particular, improvements in infrastructure in a certain municipality will affect other municipalities through a reduction in trade costs.

### **An Economic Geography Model of COVID-19 for Europe** (with [Fidel Pérez-Sebastián](#))

*Abstract:* We study the spatial dynamics of COVID-19 through the lens of a SIR model incorporated into a multi-sector economic geography model that allows for trade in intermediate goods. The model proceeds in two phases. During the first phase, in each location and moment of time, the population structure (susceptible, infected, and recovered) is taken as given and we solve for the spatial distribution of economic activity and trade flows. In a second phase, we determine how the population structure evolves as the virus spreads. We extend the canonical SIR model to account for spatial linkages and the amount of personal interactions. We assume that the number of infected people in a location depends on the number of infected people in the regions that it trades with. Furthermore, since the population structure changes from one day to the next, we assume that local amenities and sectoral productivities as well as the workforce are affected by the number of cases. In the model, each region and sector pair uses intermediate inputs from other sectors which generates an amplification mechanism of geographical lock-downs. Particularly, if one region is the main supplier of a certain intermediate input and a quarantine is imposed, not only that region will be affected but all other sector regions pairs that use that intermediate good will also be affected. On the other hand, if no quarantine is imposed, the infection can spread to other regions because of trade. The spatial and sectoral linkages allow us to estimate the differential impacts of lock-down policies and how these effects spread over the whole network while also taking into account possible regional-specific policies of quarantine that reduce the amount of interactions in that region. The rich structure of the model allows us to address policy issues like sequential lifts of quarantine policies by regions.

TEACHING  
EXPERIENCE

### **Graduate Courses**

- *Mathematics Camp*,  
QED M.Sc. in Quantitative Economics, University of Alicante  
2019, 2020  
Language of instruction: English
- *Macroeconomics III*,

QED M.Sc. in Quantitative Economics, University of Alicante  
2017, 2018  
Language of instruction: English

### Undergraduate Courses

- *Mathematics I*,  
B.A. Business Administration, University of Alicante  
2019, 2020  
Language of instruction: Spanish
- *Intermediate Macroeconomics*,  
B.A. Business Administration and Tourism, University of Alicante  
2016, 2017, 2018  
Language of instruction: English and Spanish

### OTHER RELEVANT EXPERIENCE

*Short-term Consultant (STC)*, The World Bank  
Reference: Jevgenijs Steinbuks. 2020.

### PRESENTATIONS

- 44<sup>th</sup> Symposium of the Spanish Economic Association (SAEe) (Dec 2019),  
University of Alicante, Alicante, Spain
- X Workshop on Institutions, Individual Behavior and Economic Outcomes (June 2019),  
CRENoS, Università di Sassari, Alghero
- Student Seminars (May 2019),  
University of Manchester Department of Economics  
Structural Transformation in India
- NWSSDTP PhD Conference 2019 (May 2019),  
Lancaster University Management School  
Poster session: Structural Transformation in India
- 12<sup>th</sup> Annual Meeting of the Portuguese Economic Journal (July 2018),  
ISEG, Lisbon School of Economics and Management  
Decreasing Hours, the Labor Share, and the Elasticity of Substitution
- Applied Seminar, University of Alicante (May 2018),  
Structural Transformation in India
- Department of Economics Seminar, University Pablo de Olavide (May 2018),  
Decreasing Hours, the Labor Share, and the Elasticity of Substitution
- QED Jamboree Meeting (May 2017)  
University of Paris I Panthéon-Sorbonne, France  
Decreasing Hours, the Labor Share, and the Elasticity of Substitution
- Applied Seminar, University of Alicante (March 2017),  
Decreasing Hours, the Labor Share, and the Elasticity of Substitution

### REFEREEING ACTIVITIES

The Manchester School

### COMPUTER SKILLS

**Advanced:** MATLAB, R, Dynare, Stata, MS Office, L<sup>A</sup>T<sub>E</sub>X, GAMS, Git

**Basic:** Python, Wolfram Mathematica, EViews, Gretl

SCHOLARSHIPS  
AND OTHERS

**Scholarships**

- Predoctoral Research Grant (2017 - 2021)  
FPI SCHOLARSHIP, MINISTRY OF ECONOMICS, INDUSTRY, AND COMPETITIVENESS
- Teaching Assistantship (Oct 2015 - Oct 2016)  
FUNDAMENTOS DEL ANÁLISIS ECONÓMICO (FAE), UNIVERSITY OF ALICANTE
- Department Scholarship (Oct 2014 - Oct 2015)  
FUNDAMENTOS DEL ANÁLISIS ECONÓMICO (FAE), UNIVERSITY OF ALICANTE
- Erasmus Scholarship in Krakow, Poland (Sep 2013 - July 2014)  
KRAKOWSKA AKADEMIA IM. ANDRZEJA FRYCZA MODRZEWSKIEGO

**Others**

- Workshop on Big Data (April 2017), UNIVERSITY OF ALICANTE  
From Big Data to Knowledge: Approaches and Tools for Enabling Value Extraction from Data
- Organizing Staff in XXX Jornadas Economía Industrial (2015), UNIVERSITY OF ALICANTE  
Welcome team and organization staff

LANGUAGES

Spanish (Native), English (Fluent), French (Basic)

CITIZENSHIP

Spanish

TEACHING  
RESOURCES

**Graduate**

- [Notes for Introduction to MATLAB \(English\)](#)
- [1<sup>st</sup> MATLAB Problem Set](#)
- [2<sup>nd</sup> MATLAB Problem Set](#)