

**JAMES E. SAYRE**

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**Doctoral Studies** University of California, Berkeley  
Ph.D., Agricultural and Resource Economics, Expected completion May 2023  
DISSERTATION: “Essays in Agglomeration, Agriculture, Avocados, and Applications of Remote Sensing”

PRIMARY FIELDS: International Trade, Agricultural Economics  
SECONDARY FIELDS: Development, Remote Sensing, Climate Change

Professor Thibault Fally  
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Department of Agricultural  
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Professor Marco Gonzalez-Navarro  
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Professor Sofia Villas-Boas  
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Department of Agricultural  
& Resource Economics

**Prior Education** **University of Minnesota** B.Sc. Economics and Mathematics, *summa cum laude* 2016  
**Harvard College** Visiting Undergraduate Student 2013-2014

**Teaching** **UC Berkeley** Economics C181, *International Trade*, Andres Rodriguez-Clare Sp. 2020 & 2021  
**UC Berkeley** Economics C181, *International Trade*, Thibault Fally F. 2018 & 2020, Sp. 2018  
**UC Berkeley** Public Policy 275, *Spatial Data and Analysis*, Solomon Hsiang F. 2019

**Languages** English (native), Spanish (advanced)

**Grants, Fellowships, and Awards** 2022 The Weiss Fund for Research in Development Economics (\$14,700, with A. Cisse)  
2021 John L. Simpson Graduate Student Research Fellowship in International Area Studies (\$7,500)  
2021, 2017 Giannini Foundation of Agricultural Economics Grant (\$24,675 & \$19,712, with T. Fally)  
2021 Outstanding Graduate Student Instructor Award  
2021 ARE Summer Research Grant (\$3,000)  
2020 Sponsored Projects for Undergraduate Research Grant (\$1,500, with Y. Moon)  
2020 Berkeley Economists for Equity Small Research Grant (\$1,000)  
2019 JPMCC International Commodities Symposium Best Paper Award (\$2,000)  
2019 The Sacheti Family Fellowship (\$1,500)  
2019 J-PAL Crime and Violence Initiative Exploratory Grant (\$9,800)  
2019 ARE Travel Grant (\$1,000) and Graduate Division Travel Grant (\$1,500)  
2017 Data Science for the 21st Century NSF Fellowship & Traineeship (\$50,000)  
Earlier Charles and Myrtle Stroud Scholarship, National Scholarship for University of Minnesota Students, University of Minnesota Honors Program and College of Liberal Arts Dean’s List

## Research Papers

### “Farm to Firm: Clustering and Returns to Scale in Agricultural Value Chains”, Job Market Paper

In many countries, agricultural production is unequally distributed across space. I argue that this relationship is driven by crop-specific farm-to-firm linkages, such as processing and exporting firms. Empirically, I demonstrate that firms in agricultural value chains cause nearby regions to specialize in the crop they produce, and their location does not seem solely driven by land suitabilities. I argue that firms in the agricultural value chains display increasing returns to scale because of their large spatially fixed costs of entry which generate regions of high specialization in crop cultivation, a potential vulnerability in a changing climate. I then develop a model which incorporates both farms and firms in the agricultural value chain with fixed costs, and can explain the concentration of agricultural production across space. I then estimate the fixed costs of entry for firms using the structure of my model, which I find to be large and correlated with phytosanitary barriers to trade. Finally, using climate simulations and model based counterfactual analysis, I examine the spatially fixed nature of investments in agricultural value chains and their implications upon the degree to which crop choice can mitigate potential damages from climate change.

### “Commodity Trade Matters” with Thibault Fally

*Reject and Resubmit*, American Economic Journal: Macroeconomics, 2019.

[NBER Working Paper #24965](#). [ARE Update Article \(Non-technical summary\)](#)

Primary commodities are used as inputs into all production processes, yet they account for approximately 16 percent of world trade. Despite their share in trade, we show that the aggregate gains from trade are largely understated if we ignore key features of commodities: low price elasticities of demand (difficulty in finding substitutes), low price elasticities of supply, and high dispersion of natural resources across countries. We develop a general-equilibrium model of consumption, production, and input-output linkages that explicitly accounts for these features. Our simulations confirm that the gains from trade are significantly larger.

## Research in Progress

### “Predicting Yields at Scale using Remote Sensing” with Joel Ferguson, Ritvik Iyer, and Victoria Sogomo

We develop a procedure to feasibly produce remotely sensed agricultural outcome measures (such as crop yields) using publicly available survey data and large scale satellite imagery. Our approach builds upon the methodology of You et al. (2017) to introduce a dimensionality reduction technique that allows us to train a convolutional neural network in a setting in which the training data are much more aggregated than the level of the satellite imagery, yet maintains the temporal and spatial features necessary for accurate crop discrimination. The primary application of our procedure is to predict maize yields in Mexico, using high resolution satellite imagery from Planet Laboratories obtained for all of the western states in Mexico. Using agricultural microdata, we show that our technique performs well at predicting yields at the close-to-farm level, despite being trained only on aggregated agricultural survey data.

### “The Long Run Impact of Colonization on Crop Choice” with Abdoulaye Cisse

We examine the high degree of path dependence in crop specialization and in crop-specific export patterns in West Africa. We argue that such cultivation decisions can be partially attributed to crops these regions were historically forced to grow under European colonization. Using variation in demand for crops coming from colonists’ home countries of origin as well as historical maps of where crops were grown, we demonstrate that: (i) countries’ production patterns were driven by local demand in European markets, and (ii) countries that historically exported certain crops to Europe are subsequently more likely to cultivate as well as export those crops today and that this finding is not purely driven by agro-ecological conditions or trade costs.

## Prior Employment

**UC Berkeley**, Graduate Student Researcher (Profs. T. Fally, M. Gonzalez-Navarro, & E. Ligon) 2016 - 2022  
**University of Minnesota**, Research Assistant (Professor Paul Glewwe) 2014 - 2015  
**Harvard University**, Research Assistant (Professor Melissa Dell) 2013 - 2014

## External Talks

2022 AAEA Meetings (Anaheim), AEA/ASSA Conference (New Orleans/Online), DevPEC (Stanford), ITFA (Online), PacDev (Online), UEA Summer School (U de Barcelona)  
2021 AAEA Meetings (Online), Agricultural Policy Conference (Online), OSWEET (Online)  
2020 WEAI Graduate Student Workshop (Online)  
2019 JP Morgan Commodities Center International Commodities Symposium (CU Denver)  
2018 Rocky Mountain Empirical Trade Conference (U of Ottawa), Society for Economic Dynamics Annual Meeting (ITAM), Tinbergen Institute Conference on International Trade (Amsterdam)

## Activities

2020 - 2022 Member of the ARE Diversity, Equity, and Inclusion Research and Pedagogy Subcommittee  
2020 - 2022 Mentor for the Berkeley Underrepresented Minorities in Economics and BEEPS groups  
2020 - 2022 Honors thesis advisor, Environmental Economics and Policy and Public Health Departments