Crop shifting in Colombia’s lower marginal coffee-producing region due to climate change

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September 4, 2019

# Introduction and motivation

Changes in weather conditions, exemplified by a significant warming trend and the increase in extreme weather events, are now at the forefront of the economic agendas of developed and developing countries, and are highly relevant in any policy-making endeavors (Eriksen et al, 2015). Agriculture, the economic sector most sensitive to weather conditions, will be greatly affected by such changes regardless of geographical region (Citations). The particular case of coffee is of great interest; not only it is the second most traded commodity by volume worldwide (Torok citation), it directly provides livelihoods for 25 million coffee producers and indirectly to upwards of 100 million people that are in someway linked to the industry (Caswell citation). A stream of economic literature has attempted to quantify the effect of climate variability on coffee yields (Citations for different countries). However, a more in-depth analysis of the dynamics of adaptation to climate change in general, and crop shifting strategies to cope with adverse weather conditions is so far lacking, to the knowledge of the author. This research proposal aims at tackling this.

Our set of predictions is subject to a number of limitations. First, our study comprises a small number of years, which limits our ability to observe weather and productivity combinations that could potentially mimic those in the future for a subset of municipalities. This problem could be addressed by including observations after 2013, however, it is currently not possible as they have not been made available by the University of Los Andes. Second, our model is not sensitive to climate change adaptations that farmers can undertake and that could mitigate the magnitude of our predictions. Those adaptations have been documented in the literature, and include shading [@schroth2009understanding; @jaramillo2011some], crop diversification [@rahn2014climate], and eventually crop shifting [@kabubo2007economic]. We believe our model can be enriched with data on these adaptation strategies to provide better estimates. Finally, our model ignores the technological progress that could make coffee plants more resilient to the weather conditions in the future. Even though the effort to develop a CBB-resistant variety have yet been unsuccessful, some avenues of research suggest this might be possible in the future [@romero2015evaluacion]. Similar efforts are have been conducted to develop drought-resilient coffee plants [@silva2018reciprocal]. Nevertheless, we still believe that our estimates provide meaningful insights to policy-makers on the negative consequences of not addressing the challenges posed by future climate uncertainty.

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# Research questions and objectives

# Research method

# Timeline for work

# Roles and capacities

## Student

## Mentor

## Advisor

# Budget

# Budget justification