

Improving the empirical basis of agricultural impacts and adaptation in IAMs

Steven Berry^{1,2}, Justin Costa-Roberts³, Lisa Goddard⁴
David Lobell³, Michael Roberts⁵, Wolfram Schlenker^{4,2}

¹Yale University ²National Bureau of Economic Research ³Stanford University
⁴Columbia University ⁵University of Hawaii

Stanford Meeting - December 13-14, 2013

Motivation: Statistical Approaches

- Statistical studies
 - Estimated using real-world data
 - Aggregate or field-level data
 - Limited number of variables
 - Usually precipitation and temperature (degree days)
 - Agronomic models use many more variables
 - Estimated impacts of climate change
 - Predicted changes in yields/profits from panel
 - Estimating adaptation using cross-section
 - Studies regress trends in yields on trends in weather (Burke & Emerick)

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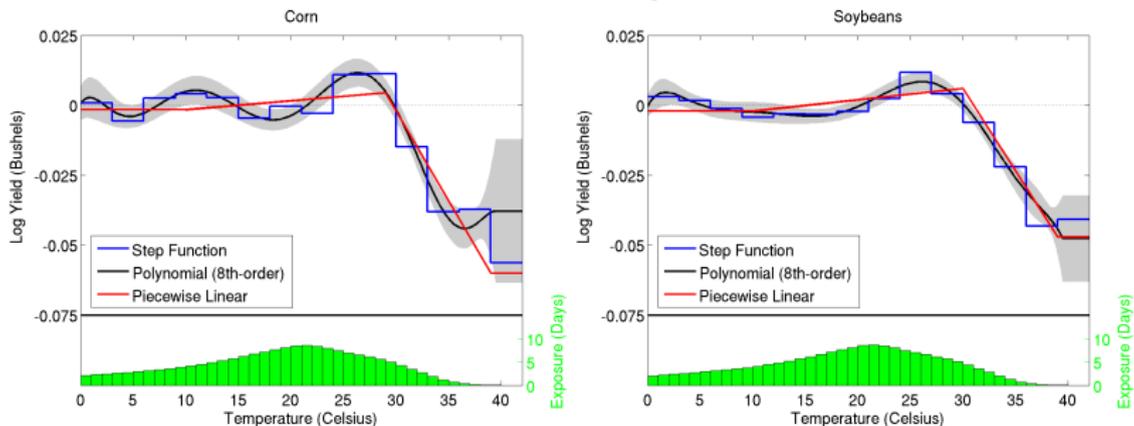
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- Statistical results applied in IAMs
 - Degree days (Diffenbaugh et al., NCC 2012)

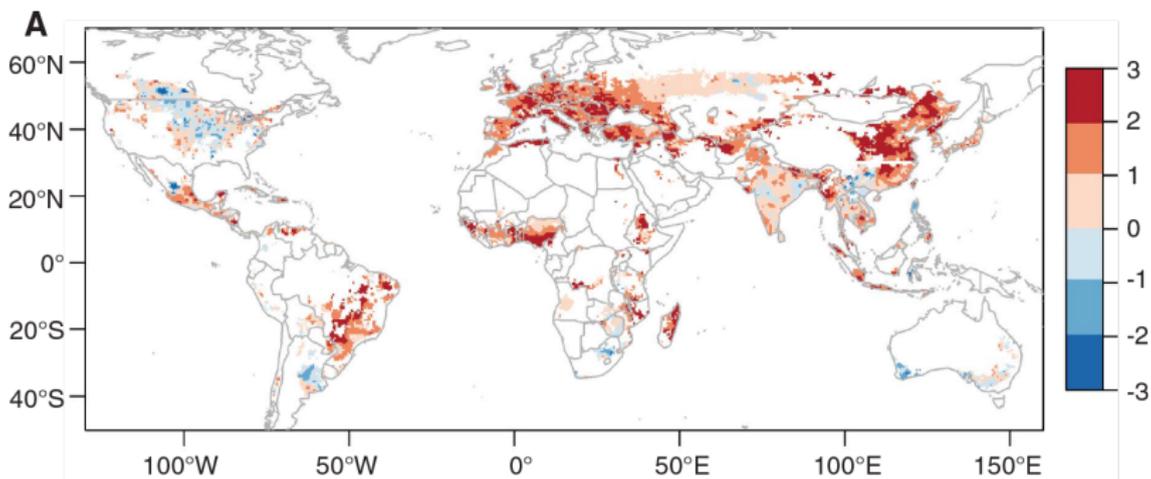
Effect of Weather on US Yields

Panel of Corn and Soybean Yields



Schlenker & Roberts (PNAS 2009)

Temperature Trend (1980-2008) in Historic Std. Deviation



Lobell, Schlenker & Costa-Roberts (2011)

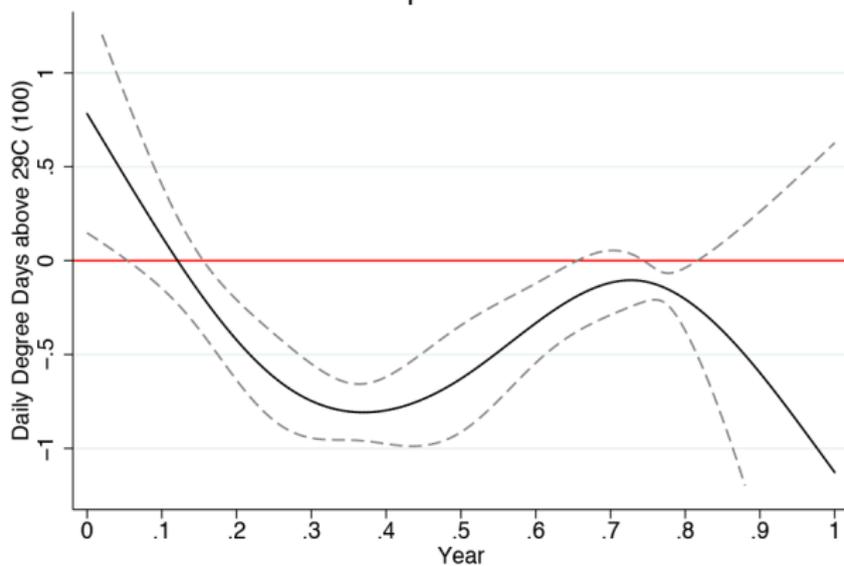
Work in Progress

- ① Effect of extreme heat varies over the growing season
 - Processed based model focus on heat during flowering

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Coefficient Over Growing Season (0: Planting / 1: Harvest)

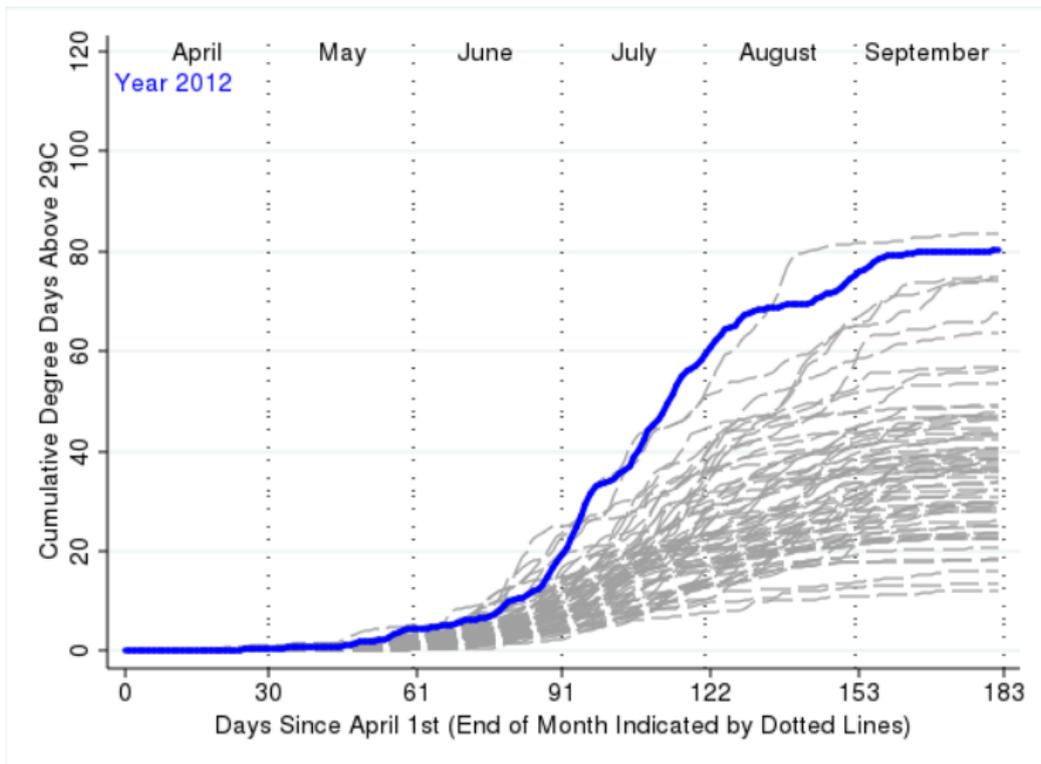
5 Spline Knots



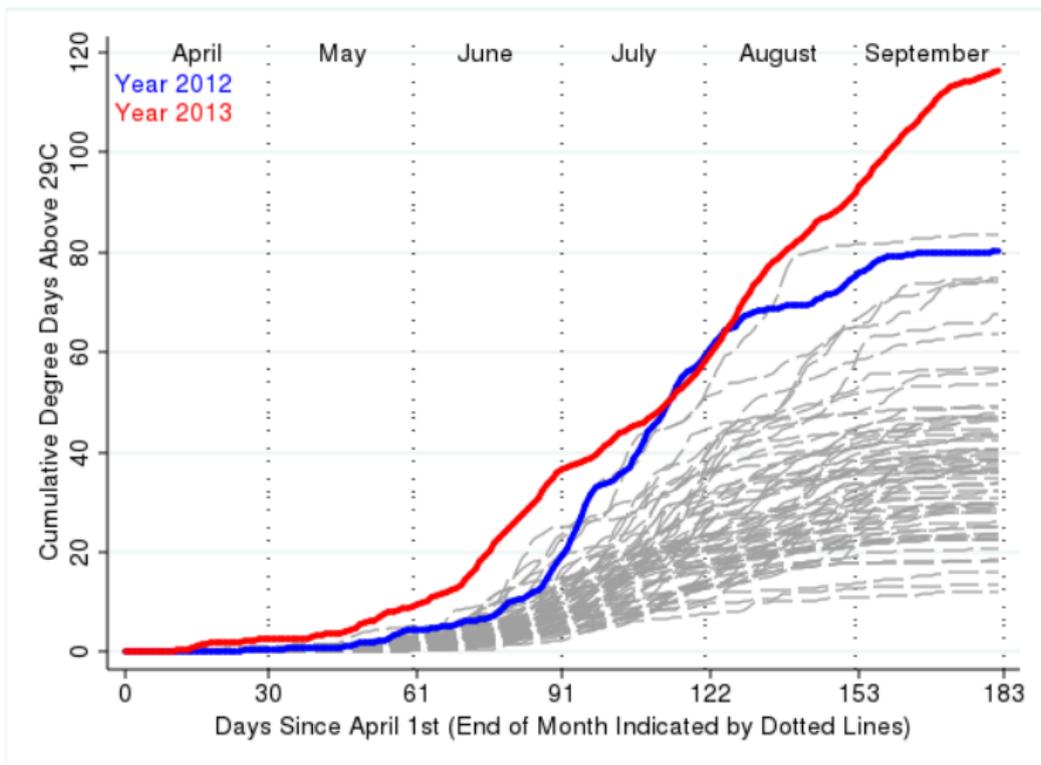
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- 2 Will wetter weather mitigate damaging effects of extreme heat?
 - Learning from 2013. Strange year: hottest and wettest!

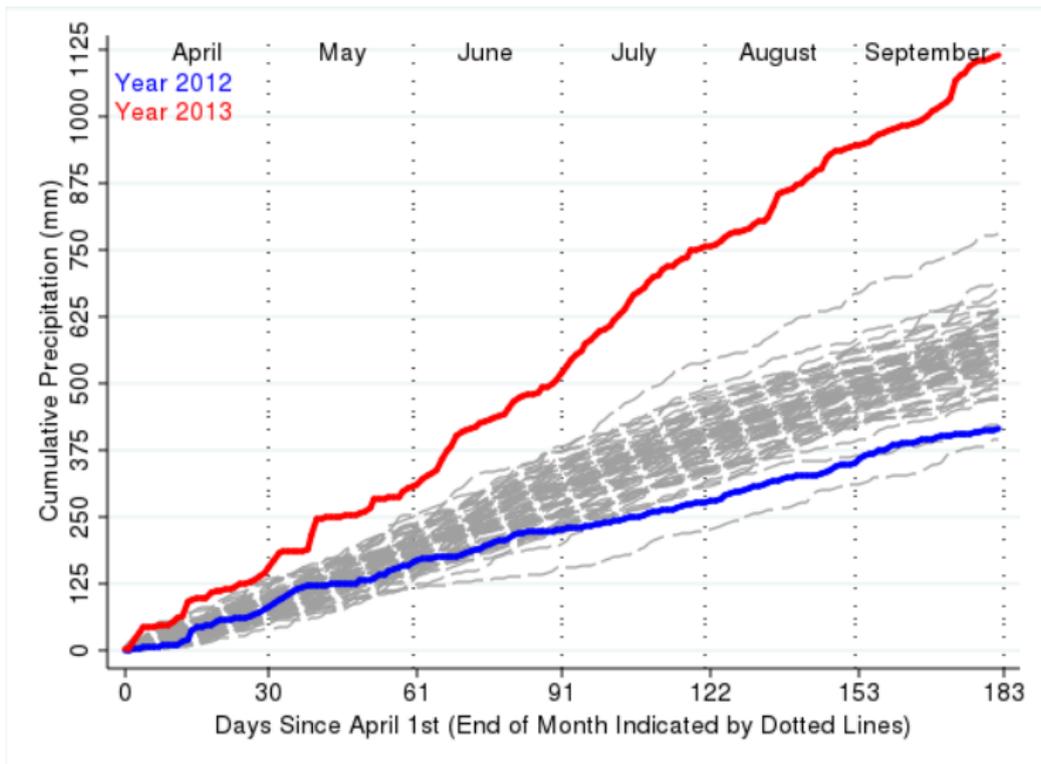
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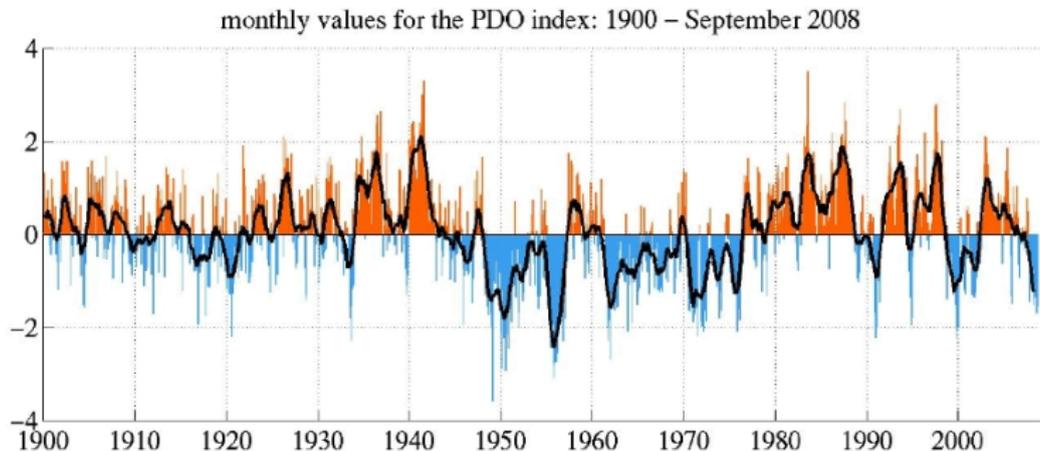
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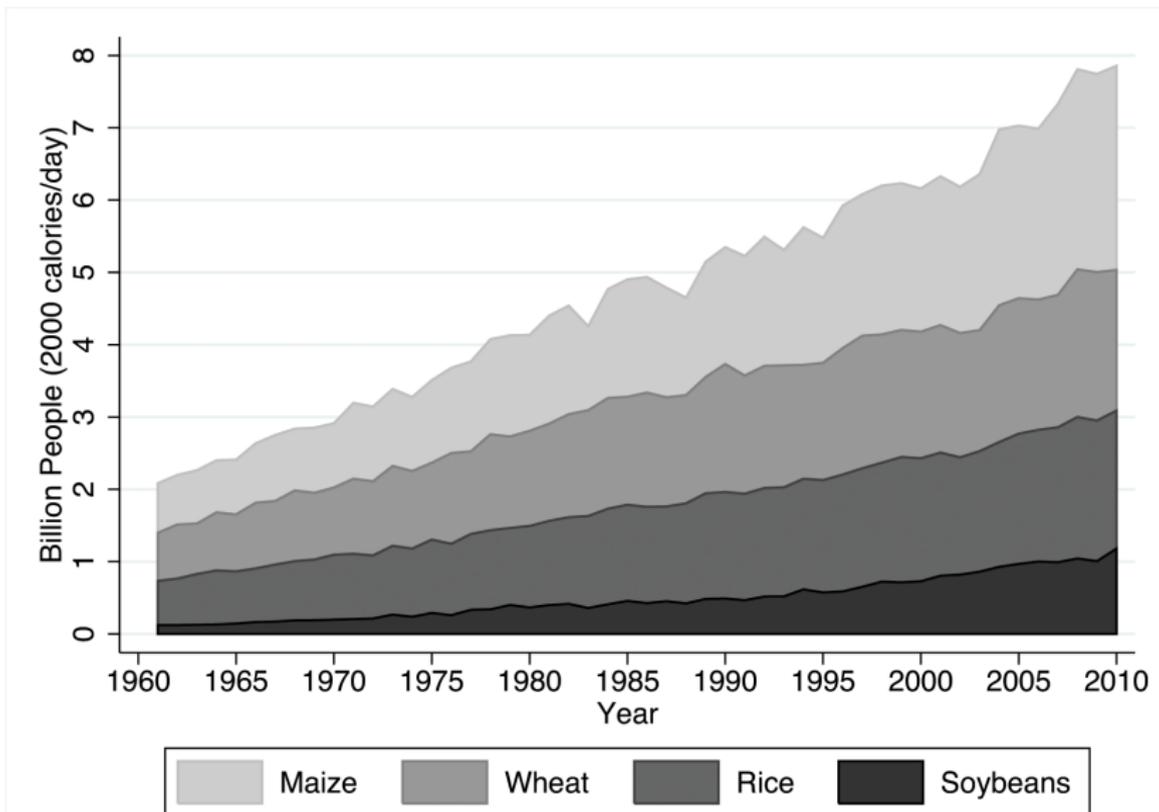
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- 7 Change in correlation

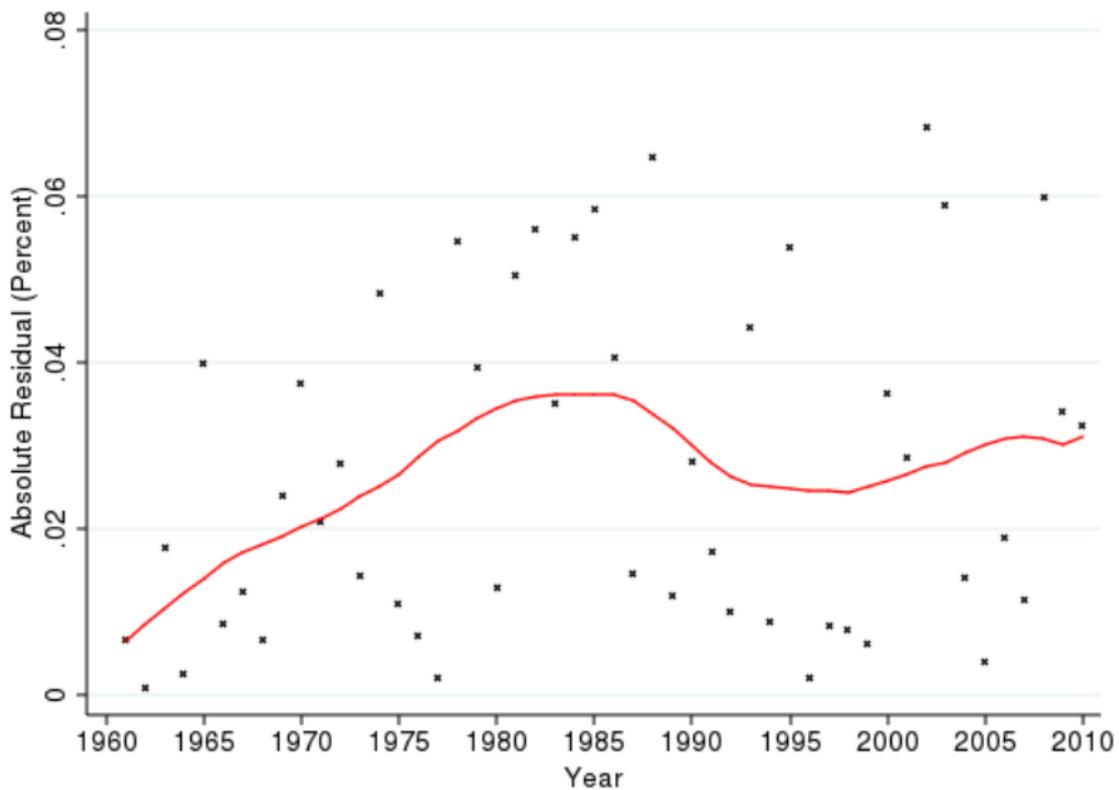
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