

VARUN KSHIRSAGAR, PhD.

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Experienced Economist/Data Scientist with expertise in Commodity Market Analysis, Food Crisis/Famine Early Warning Systems, Resilience, Poverty Estimation, and Agriculture & Rural Development Policies and Programs

SKILLS

Economics: International Economics, Commodity Markets, Econometrics, Cost Benefit Analysis, Program Evaluation, Agriculture Policy, Simulation Modelling, Weather Impacts, Price Analysis, Network Analysis.

Statistics and Computing: Excel, Stata (experienced), R (experienced), Analysis of large and unstructured data sets, Prediction and Anomaly Detection, Time Series, Panel data, Household Surveys, Analysis of Remote Sensed (Satellite-Derived) data, Causal Inference, Penalized Regressions (LASSO), Cross-Validation.

EXPERIENCE

Economist/Data Scientist working on Global Food Security (March 2019 – Present)

- Projects and studies for multilateral and bilateral development organizations that take an interdisciplinary approach to examining global and local food security – includes analysis of food price and weather shocks, as well as poverty and vulnerability estimation
- March 2019-Present: Study on Weather Shocks and Malnutrition (World Bank Poverty Global Practice)

Technical Director, Probability Poverty Index, Innovations for Poverty Action (Dec 2016 – March 2019)

- Designed the new methodology underlying the Poverty Probability Index (PPI), a poverty measurement tool, using established machine learning principles, while retaining its simplicity from a user perspective [link](#)
- A paper describing this methodology won the best paper award at the leading machine learning conference (NIPS) 2017 [link](#) [link](#)
- Led the design and production of the PPI and supporting materials for 10 countries across 3 continents
- Presented and discussed the methodology and applications at bilateral and multilateral organizations, to computer scientists at a NIPS workshop, at a meeting of officials from the 15 member countries of the Southern African Development Community, and at a launch/training event in Kenya for more than 60 NGOs

Kimetrica/USAID (FEWS NET) (July 2015 – Dec 2016)

- Designed a food price analysis tool for areas with sparse data and limited access [link](#)

BOOZ, ALLEN, HAMILTON/USAID SERA Tanzania (Feb 2014 – July 2016)

- Estimated the impacts of both domestic as well as external drivers of local food prices while simultaneously measuring the influence of agricultural trade policies [link](#) [link](#)
- Designed a Market-Network approach to identify the external sources of exogenous demand shocks [link](#) [link](#)
- Led three training sessions on food market analysis to Tanzanian government officials [link](#)

Biospheric Sciences Division, NASA (subcontract through Sigma Space Corp.) (April 2012 – Aug 2014)

- Analyzed local food price dynamics across 554 markets in 51 countries in order to identify key drivers of food price volatility. Incorporated remote sensed (satellite-derived) data in econometric analysis that estimated the influence of domestic weather disturbances and global commodity price shocks on local food prices [link](#)

UNITED NATIONS, FOOD and AGRICULTURE ORGANIZATION (May 2013 – June 2013)

- Performed ex-ante economic (cost-benefit) analyses for a proposed 520 million USD multi-donor basket-fund loan to the Government of Tanzania. Articulated the rationale for the program and modeled the mechanisms through which gains would be realized.

THE WORLD BANK, Washington D.C. (August 2005 – June 2015)

Development Prospects Group, Research Department (Sept 2014-Dec 2014, May - June 2015)

- Related changes in commodity price volatility to changes in macroeconomic uncertainty using financial data
- Analyzed structural changes in volatility across the commodity spectrum

Agriculture Unit, South Asia Region (August 2012 – June 2014)

- Identified drivers of cereal productivity growth in India at the district-level and found that anomalous rainfall patterns explained the slowdown in productivity growth (this was a minority position at the time) [link](#)
- Found that interventions related to both poverty alleviation and agriculture sector support in Afghanistan were least urgent in the regions in which there was the greatest need to shift away from the opium economy
- Synthesized studies and proposed policy strategies in the context of investment lending in Sri Lanka [link](#)

Agriculture and Rural Development Anchor (July 2011-October 2011)

- Examined local food price volatility in 50 developing countries and concluded that local food price volatility had not increased after the 2007/8 crash (this was the minority position at the time). Placed a much greater emphasis on price seasonality than was typically done [link](#)

Development Prospects Group, Research Department (May 2011-July 2011)

- Wrote three policy notes that examined the structure of international food markets, including changes in the magnitude and composition of global food demand.

Agriculture & Rural Development Unit, Africa Region (Feb 2009 – June 2012)

- Performed ex-ante economic analyses for a 120 million USD loan to finance Uganda's Agricultural Technology and Agribusiness Advisory Services Project and a 115 million USD loan to finance Kenya's Arid Lands Resource Management Project. Modeled the mechanisms through which economic gains would be realized and quantified the expected gains under alternative scenarios.
- Wrote field reports that included qualitative analyses of the projects in Kenya and Uganda. In Kenya, discovered the (under-used) potential for *combining* price and remote-sensed monitoring in data scarce environments. In Uganda, highlighted (in an operational context): i) the importance of complementary investments in primary production and marketing, ii) the interaction of transport costs and local effects, iii) the importance of evaluating the entire intervention process (not just the outcome). All three themes have assumed considerably greater importance in the ensuing years. [link](#)
- Performed ex-post economic analysis of Kenya's Arid Lands Rural Management Program.
- Conducted ex-post economic analysis of Uganda's Agricultural Research and Training Project II. The analysis used propensity score matching techniques to adjust for selection bias when assessing the yield impact associated with the adoption of improved varieties.
- Analyzed the impacts of Uganda's National Agriculture and Advisory Services. Identified the mechanisms through which project interventions led to favorable outcomes while correcting for selection bias using matching and difference-in-difference techniques. [link](#)
- Designed and implemented an econometric model that estimates transport fuel demand and forecasts fuel net import costs. Synthesized analyses from the private sector, the public sector and the academic literature that identified factors that drive energy demand in Africa. This was incorporated into a World Bank report on Biofuels in Africa. [link](#)
- Identified policy instruments that engender inclusive growth in Uganda [link](#)
- Provided quick turn-around analyses to the Africa Agriculture manager during the 2011 food price spike.

Poverty Reduction Unit, Poverty Reduction and Economic Management (Nov. 2008 –Feb. 2009)

- Developed, with one other person, a tool kit (and users' guide) to analyze the poverty impact of food price shocks in countries with sparse data. Developed a simulation model in Excel and Stata, using both household survey and macroeconomic data.

Development Prospects Group, Research Department (March 2008 – November 2008)

- Worked with four experienced commodity experts to provide quantitative analyses on several features of global commodity markets for the 2009 *Global Economic Prospects* report.
- Identified and explained the relationship between revenue volatility decompositions and the structural characteristics of individual commodity markets.

Office of the Chief Economist, Africa Region (October 2007 – Feb 2008)

- Examined ethnicity-based incorporation differences across small enterprises in Africa

Finance & Private Sector Development Unit, Research Department, (Aug 2005 –Sept 2007)

- Analyzed the balance sheets and income statements of 346 microfinance institutions in 51 countries and identified robust relationships between the composition of their financial structure and the nature and extent of their outreach activities
- Created a comprehensive cross-country microfinance regulation database and used it to examine the effect of regulation on outreach and profitability

TEACHING EXPERIENCE, JULY 2001-AUG 2005

Taught economics classes (designed the syllabus, classroom instruction, graded papers) every semester for 4 years.

Visiting Assistant Professor, Department of Economics, Old Dominion U., Norfolk, VA (Aug 04 – Aug 05)

- Courses: Managerial Economics, International Economics, International Trade (Grad)

Instructor, Department of Economics, North Carolina State University, Raleigh, NC (July 2001 – July 2004)

- Courses: Introductory Economics, Macroeconomics, and Intermediate Microeconomics

EDUCATION

07/98 – 12/04 **Ph.D. in Economics**

NORTH CAROLINA STATE UNIVERSITY, Raleigh, North Carolina

Fields: International Economics, Econometrics, and Industrial Organization

07/94 – 06/98 **Master of Arts** (First Year), **Bachelor of Arts** (First Class, Economics)

BOMBAY UNIVERSITY (St. Xavier's College), Mumbai, India

WORKING/ACADEMIC PAPERS

Household poverty classification in data-scarce environments: a machine learning approach. Co-authored with Jerzy Wiecek (CMU), Sharada Ramanathan (IPA) and Rachel Wells (IPA). Won the best paper award at a *NIPS 2017 Workshop on Machine Learning for the Developing World*. December 2017.

Shocks to Food Market Systems: A Network Approach. Co-authored with John Baffes (World Bank). SSRN working paper July 2018.

The Impact of Weather Anomalies and International Price Shocks on Local Food Prices. Co-authored with Molly Brown (NASA). *Global Environmental Change* 35, 31-40 (2015).

What Drives Local Food Prices? Evidence from the Tanzanian Maize Market. Co-authored with John Baffes (World Bank) and Donald Mitchell (USAID). *World Bank Economic Review* (accepted May 2017).

Sources of Volatility during Four Oil Crashes. Co-authored with John Baffes. *Applied Economics Letters*, 2016

REFERENCES

Professional References

John Baffes, Senior Economist (Commodities unit), Prospects Group, World Bank, jbaffes@worldbank.org

Karen Brooks, fmr Director CGIAR and World Bank Africa Agriculture Manager, KMCCBROOKS@gmail.com

Gary Eilerts, Food Security Specialist (managed USAID's FEWS NET from 2003 to 2015), geilerts@usaid.gov

Madhur Gautam, Lead Economist, Agriculture Practice, World Bank, mgautam@worldbank.org

Donald Mitchell, fmr Lead Economist, World Bank/Chief of Party USAID, don.mitchell09@gmail.com

WORK AUTHORIZATION: United States Permanent Resident, Indian Citizen.