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Introduction

I am an applied economist with interests in development, international, and applied methods. I am particularly interested in applying machine learning and data science methods, both as a means of generating new sources of data, and as a complement to econometric methods.

The first section of this statement discusses my work in development, the second discusses my work in international economics. In the third section, I briefly discuss my plans for future research.

1 Development Economics

In development my work has focused on methodological contributions to better assess economic well-being. Most countries in the developing world suffer from “data deprivation”, or the lack of reliable micro-data to inform policy. Between 2002 and 2011, fifty-two countries had less than one data point on the poverty level (Serajuddin et al., 2015).

In my job market paper, *Poverty from Space: Using High Resolution Satellite Imagery for Estimating Economic Well-being and Geographic Targeting* [1], I apply machine vision algorithms to high resolution satellite imagery of Sri Lanka to extract area specific indicators of economic well-being. These include among others the number of cars, type and extent of crops, length and type of roads, roof extent and roof type, building height and number of buildings. Estimated models of local area economic well-being explain 60 to 70 percent of the village-specific variation in poverty and average level of log income. Policy simulations show that geographic transfers using satellite-based estimated poverty rates perform as well for poverty alleviation as census-based estimates, the gold standard which are not always available. These predicted measures are also twice to three times as effective for poverty reduction as night time lights-based predictions, the standard remotely sensed measures.

The second chapter in my dissertation [2] makes econometric contributions to a commonly used method of estimating local area well-being. The standard method (Elbers, Lanjouw, Lanjouw, 2003), was critiqued by Tarozzi and Deaton (2009) for generating narrow prediction error bounds. We respond to this critique by incorporating regularization methods and out of

sample cross validation. We propose a two-step “post-Lasso ELL” estimator, which applies in the first stage Lasso regularization as a method of variable selection. Our method outperforms stepwise or “ad hoc” methods of variable selection, and the rate of improvement increases in the size of the candidate set of variables.

2 International Economics

My work in international economics focuses on trade policies for developing countries, analyzed using both firm-level and aggregate trade flow data.

The third chapter of my dissertation [3] estimates the impact of the African Growth and Opportunity Act (AGOA), a preferential tariff program which unilaterally lowered tariffs between the US and most Sub-Saharan African (SSA) countries. Previous research focused on the impact of AGOA on bilateral trade between Sub-Saharan African countries and the US, finding tariff declines resulted in positive trade growth between US and SSA. We utilize a computationally intensive econometric design which analyzes every trading partner of Sub-Saharan Africa, and estimate the impact of the program between SSA and all of Sub-Saharan Africa’s trading partners. We find that AGOA induced diversion of trade from Europe to the United States, undermining some of the potential benefits of the act. Surprisingly, we do not find evidence to support trade diversion between SSA countries and the US. These results have important policy implications for the design of trade agreements between developed and developing countries.

The fourth chapter of my dissertation [4] analyzes policies and country-level conditions that best explain bilateral trade flows. We compare three different model selection techniques – Lasso regularization, Bayesian Model Averaging, and Extreme Bound Analysis – to examine which explanatory variables are robust determinants of trade. Using a panel of 198 countries from 1970 to 2000, we find large agreement between model selection methods that all suggest that many fewer variables are robust than those suggested by the null hypothesis rejection methodology from ordinary least squares. We conclude with implications for predicting trade flows during the global slowdown of 2008-2011.

3 Future Work

In development I am currently extending my job market paper by exploring contemporaneous forecasting methods – so called “now-casting” – to determine whether changes in area specific indicators of economic activity derived from high-resolution satellite imagery are predictive

of changes in poverty. If successful, this will help estimate the impact of natural disasters, assisting relief efforts by coordinating services. A second project extends the growth diagnostics framework (Hausmann, Rodrik, and Velasco, 2006) by employing hidden Markov models to recover the latent characteristic of a particular growth constraint binding. I am also analyzing the impacts of the African Growth and Opportunity Act using firm micro-data in Ethiopia [6]. I find that contrary to standard models of trade (Melitz, 2002), firms were more likely to enter industries where tariffs declined. Firms lag in their propensity to export, due in part to financing constraints, which has important policy implications. Another project I am developing partners with Etsy, a two-sided market platform for crafts and other homemade items, to determine how international sellers on their platform differ from other sellers from their country who provide similar goods. This may hold important implications for theoretical models of international trade, as information barriers for goods decline and we see more small scale manufacturers engage in this type of trade.

References

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- [4] "Robust Determinants of Trade Flows," (with Marianne Baxter), September 2016.
- [5] "Sweet Diversity: Overseas Trade and Gains from Variety after 1492," (with Hans-Joachim Voth), 2011.
- [6] "Firm Entry and Export Performance when Firm Credit is Constrained; Evidence from Ethiopia and the African Growth and Opportunity Act" (work in progress)

Other Cited Work

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