



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**The power law of agricultural trade:
Measurement and decomposition of agricultural import diversification across trading partners**

Bo Xiong, bonapartexiongbo@gmail.com

Assistant Professor in Agricultural Economics and Management, Zhejiang University

***Selected Poster prepared for presentations at the
2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31-August 02***

Copyright 2016 by Bo Xiong. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

The power law of agricultural trade:

Measurement and decomposition of agricultural import diversification across trading partners

Bo Xiong, bonapartexiongbo@gmail.com, Department of Agricultural Economics and Management, Zhejiang University

Abstract

Addressing food security in a globalized world requires a diversified profile of agricultural imports, especially when climate change has made adverse weather conditions occurring more frequently.

We provide the first estimates of the degree of agricultural import diversification for 123 nations in 2014. We find that agricultural import diversification is uncorrelated with a nation's per-capita GDP.

Through further decomposition, we find that the degree of agricultural import diversification in a nation primarily hinges on the spread of agricultural imports across trading partners of similar development stages.

Measurement: Normalized Theil index

The Theil index has been widely deployed to measure inequality, segregation, or the lack of diversity in ecological or social communities. In the context of agricultural imports, the normalized Theil index takes the form of:

$$T = \sum_{i=1}^I \left(\frac{v_i}{V} \cdot \ln \frac{v_i}{V} \right) / (I \cdot \ln I)$$

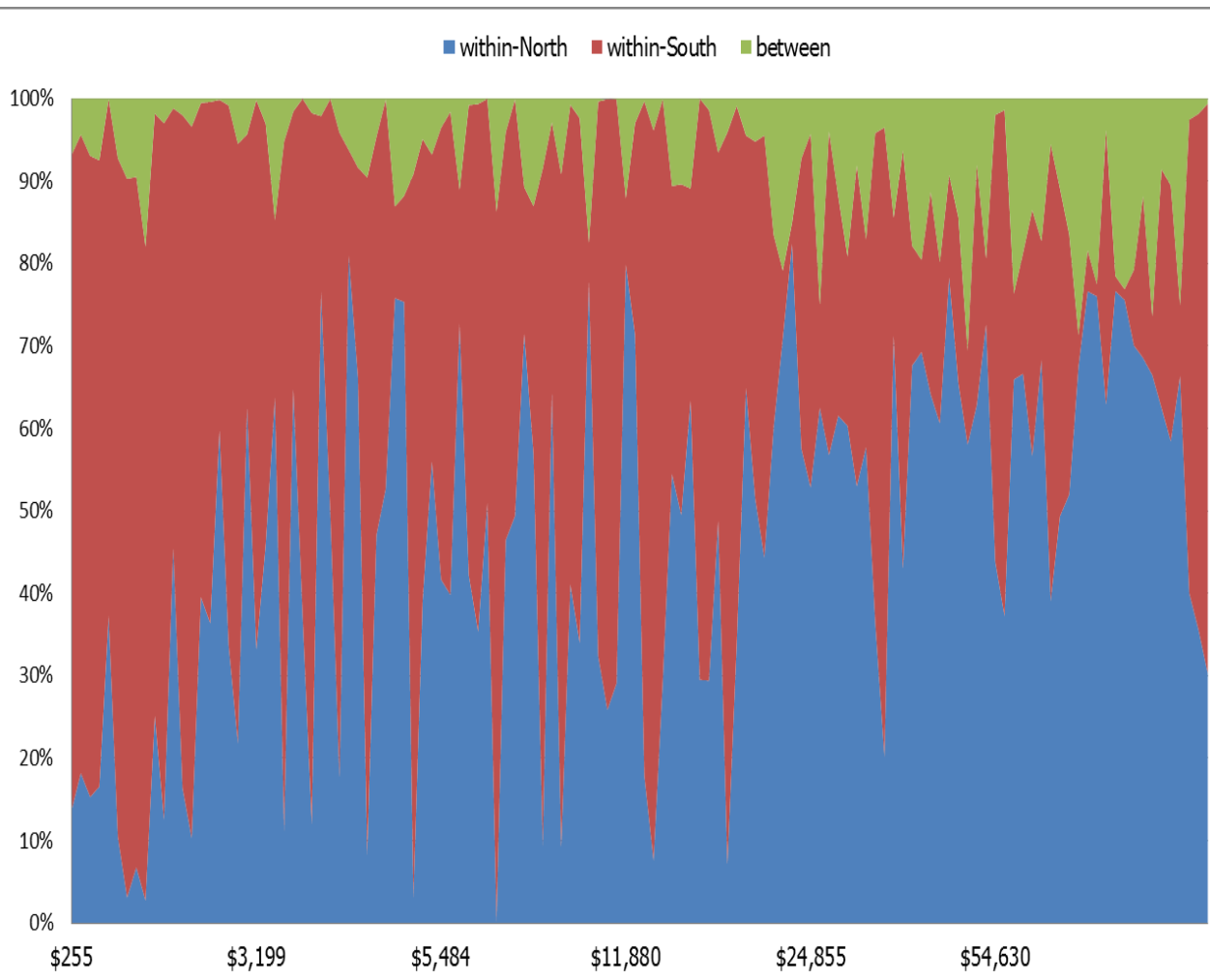
where I is the number of active trading partners that export agricultural products to a nation; V_i is the value of import from trading partner i ; and V with bar is the average import value in that nation. A higher value of the normalized Theil index corresponds to a less diversified, or more concentrated, profile of agricultural imports.

One major advantage of the Theil index is that the overall measurement can be decomposed into lower-level indices that describe the degree of diversification within subgroups. If we can classify exporting nations by the stages of development, the normalized Theil index can be re-written as:

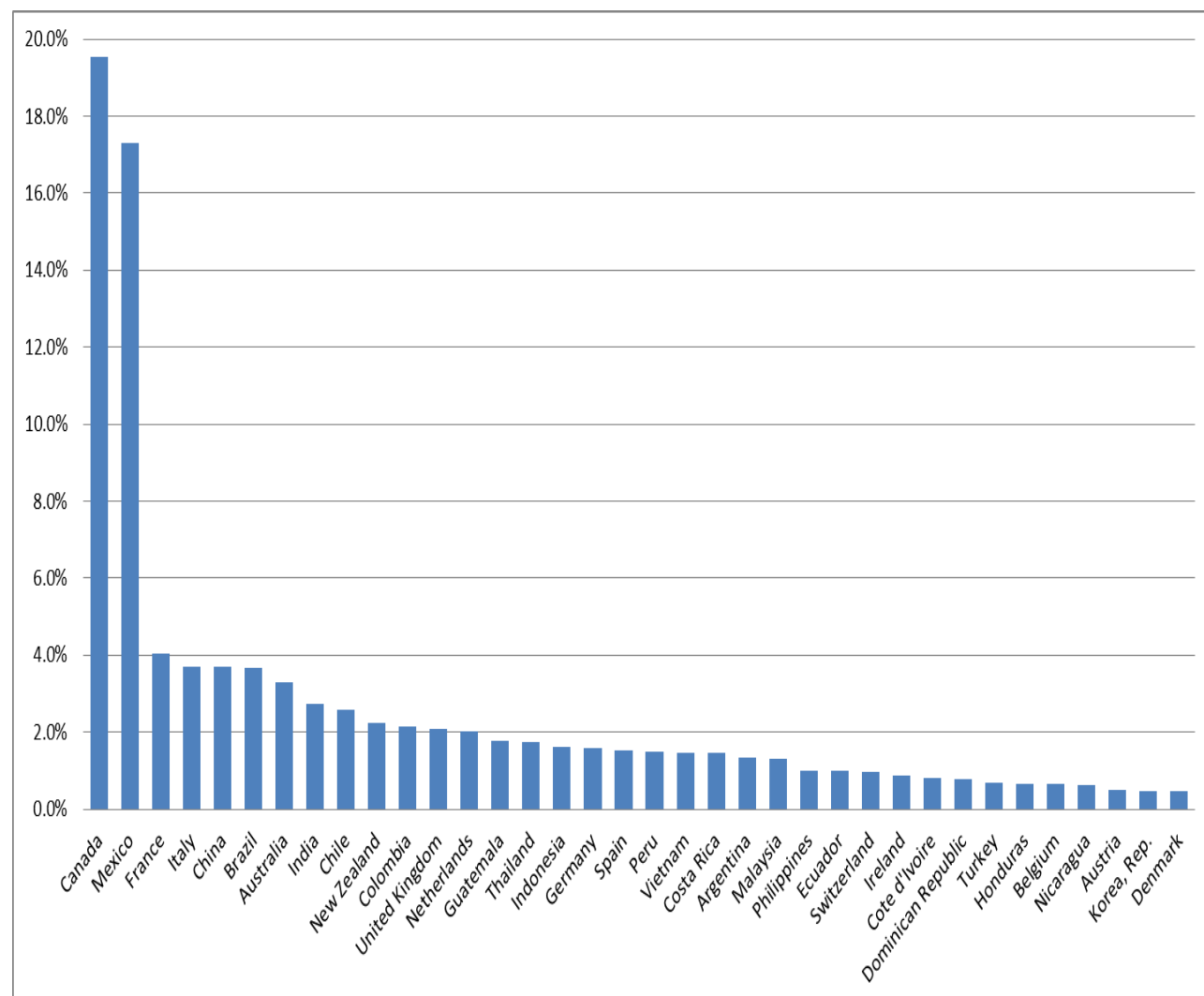
$$T = \underbrace{\frac{s_n T_n \ln I_n}{\ln I}}_{\text{within-North}} + \underbrace{\frac{s_s T_s \ln I_s}{\ln I}}_{\text{within-South}} + \underbrace{\frac{s_n \ln(\bar{v}_n / \bar{v}) + s_s \ln(\bar{v}_s / \bar{v})}{\ln I}}_{\text{between}}$$

where n and s designate the group of North and South respectively; S_n is the import from North over the total imports; V_n with bar is the average import from partners in North. S_s and V_s with bar are defined similarly.

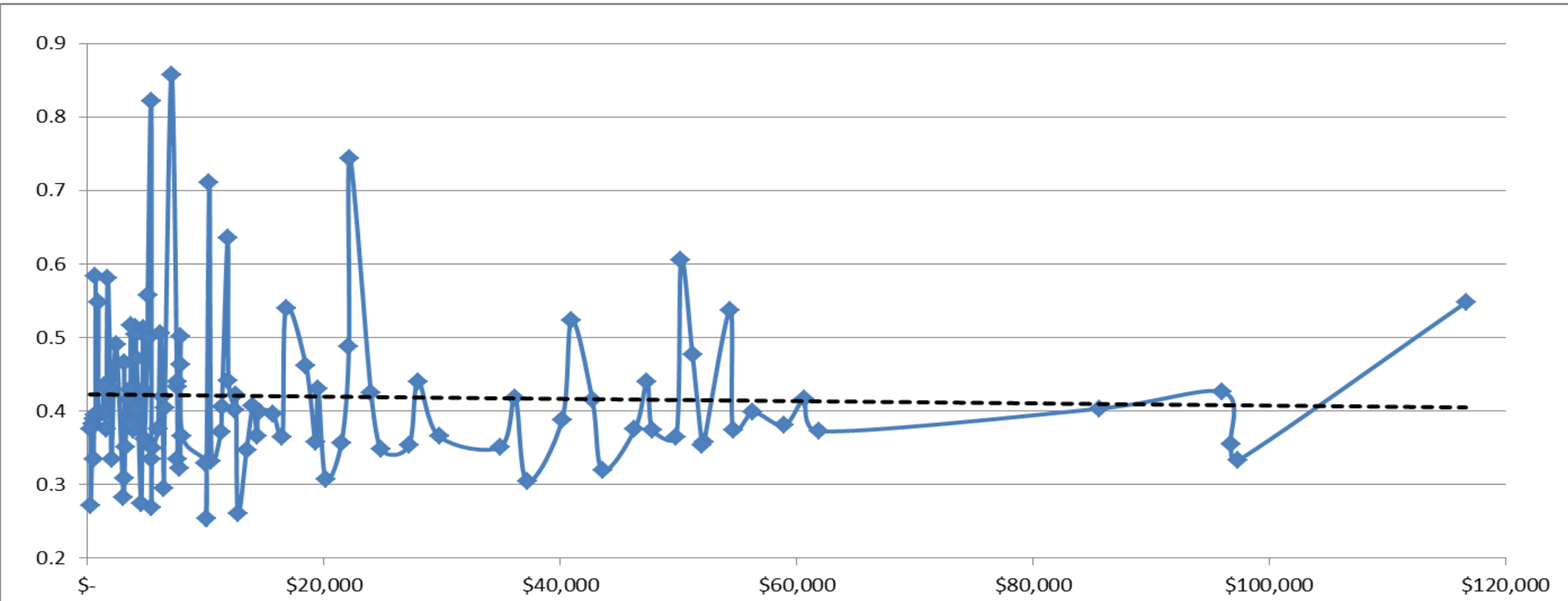
Decomposition



Example: U.S. agricultural import distribution



Agricultural import diversification, against per-capita GDP



Conclusions

- We propose the normalized Theil index as the measurement of agricultural import diversification across trading partners.
- We find that the stage of economic development is not a determinant of agricultural import diversification.
- In addition, we find suggestive evidence that a nation's agricultural import diversification is primarily driven by the distribution of imports across trading partners of similar development status.