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## **Trade Facilitation and Food Security and Its Implications to the U.S. Market**

**Marcel Adenäuer and Jonathan Brooks**

*Selected Paper prepared for presentation at the International Agricultural Trade Research Consortium's (IATRC's) 2017 Annual Meeting: Globalization Adrift, December 3-5, 2017, Washington, DC.*

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# TRADE FACILITATION AND FOOD SECURITY AND ITS IMPLICATIONS TO THE U.S. MARKET

Marcel Adenäuer, Jonathan Brooks



# Background – Trust in international markets at stake

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- “Globalization has delivered many benefits for international donors, but it is the job of politicians to represent people”
  - **Trump on Twitter**
- "I find that because of modern technological evolution and our global economy, and as a result of the great increase in population, our world has greatly changed: it has become much smaller. However, our perceptions have not evolved at the same pace; we continue to cling to old national demarcations and the old feelings of 'us' and 'them'."
  - **The Dalai Lama**



# Background – The OECD Secretary General:

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- From his speech when he received the Bill Frenzel Champion of Free Trade Award in April 2017

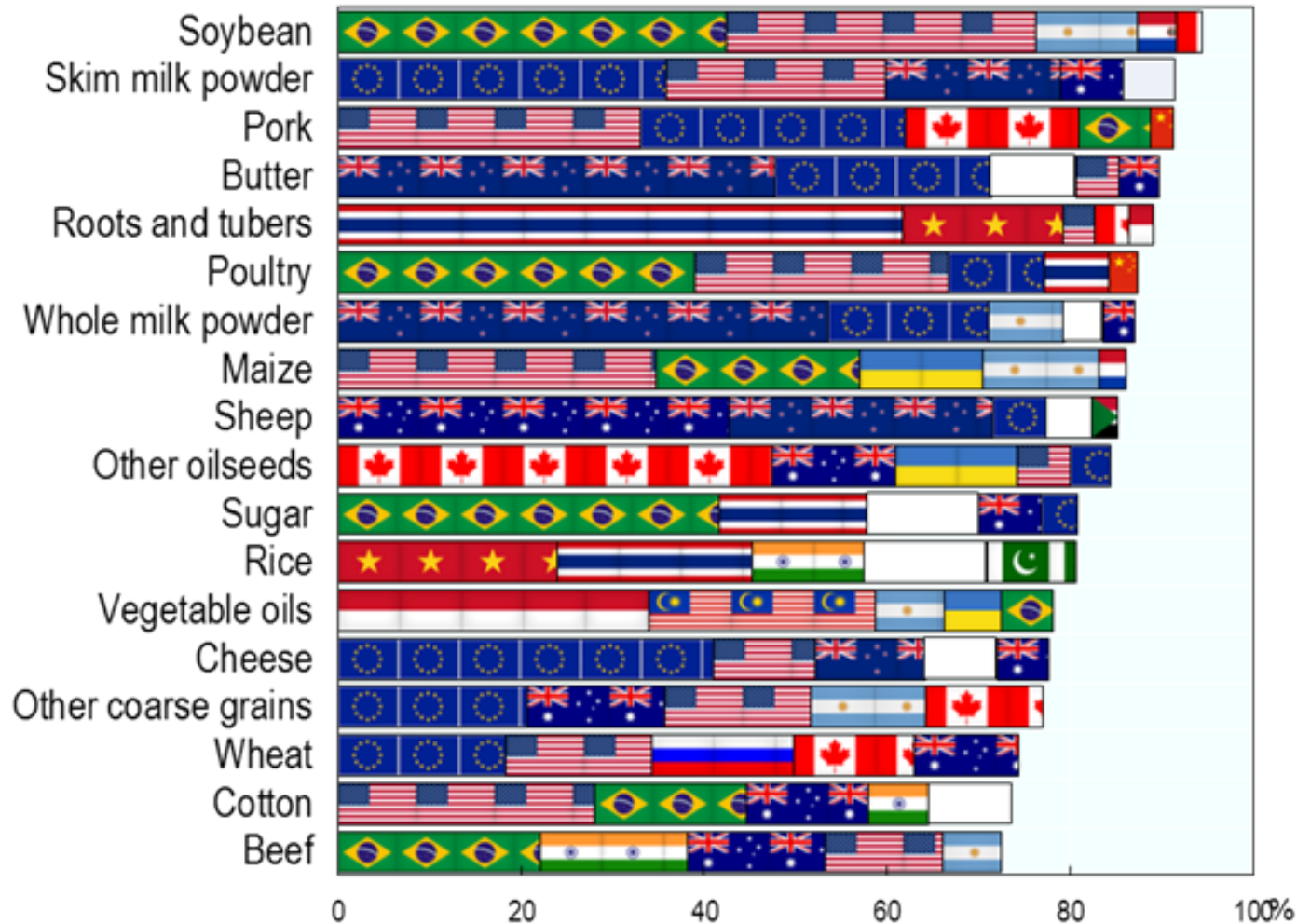


- It is time to move from playing defense on trade to playing offense on a host of other policies that make the system work for all. We must move the ball forward on lifelong learning and skills. Move the ball forward on infrastructure. Move the ball forward on new opportunities for hard-hit regions. Move the ball forward on going digital, both for large firms and for SMEs, to increase productivity.
- But only truly integrated domestic and international policies – focused on opportunity and well-being as the ultimate goal – can help trade achieve what our forefathers intended when they crafted the modern international trade and economic system after a bloody war: to bring about better lives for all.



# USA – major exporter for many agro-food commodities

## Export shares of top 5 exporters in 2025





# Background – Functioning agro-food markets essential for Food Security

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- 4 dimensions of FS:
  - availability, access, utilisation, stability
- A global approach using the **Aglink-Cosimo** agricultural sector model can help clarify the role of markets
  - Long term food availability
  - Access to food (prices and purchasing power)
  - Annual domestic and international price variability.
- It can also be used to investigate the role played by trade in affecting these variables
- Is rising “import dependence” among developing countries a problem?
  - What if there are multiple harvest failures and prices rise?
  - Might import bills become unaffordable?
  - Risks and implications of trade interruptions?
  - How to manage imported price volatility?



## Research questions

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- Illustrate the importance of international market integration for
  - World price fluctuations
  - Price stability in domestic markets
    - for major exporters
    - for major importers
- Method: Stochastic simulations with the Aglink-Cosimo model





# The Aglink-Cosimo Model

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- Aglink-Cosimo: an economic model of world agriculture managed by the Secretariats of the OECD and FAO
- Aglink-Cosimo is
  - recursive-dynamic (over 10 years),
  - partial equilibrium
  - used to simulate developments of annual market balances and prices for the main agricultural commodities produced, consumed and traded worldwide.
  - used in the production process of the OECD-FAO Agricultural Outlook and policy scenarios



# The Aglink-Cosimo Model – stochastic simulations




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- 1000 draws on:
  - Macro variables
    - GDP
    - Inflation
    - Exchange rates
  - Crop yields
    - For major products
- For major countries
  - Araujo-Enciso, S.R., S. Pieralli, I. Pérez Domínguez, (2017): Partial Stochastic Analysis with the Aglink-Cosimo Model: A Methodological Overview. JRC Technical Report, EUR 28863 EN, doi: 10.2760/450029



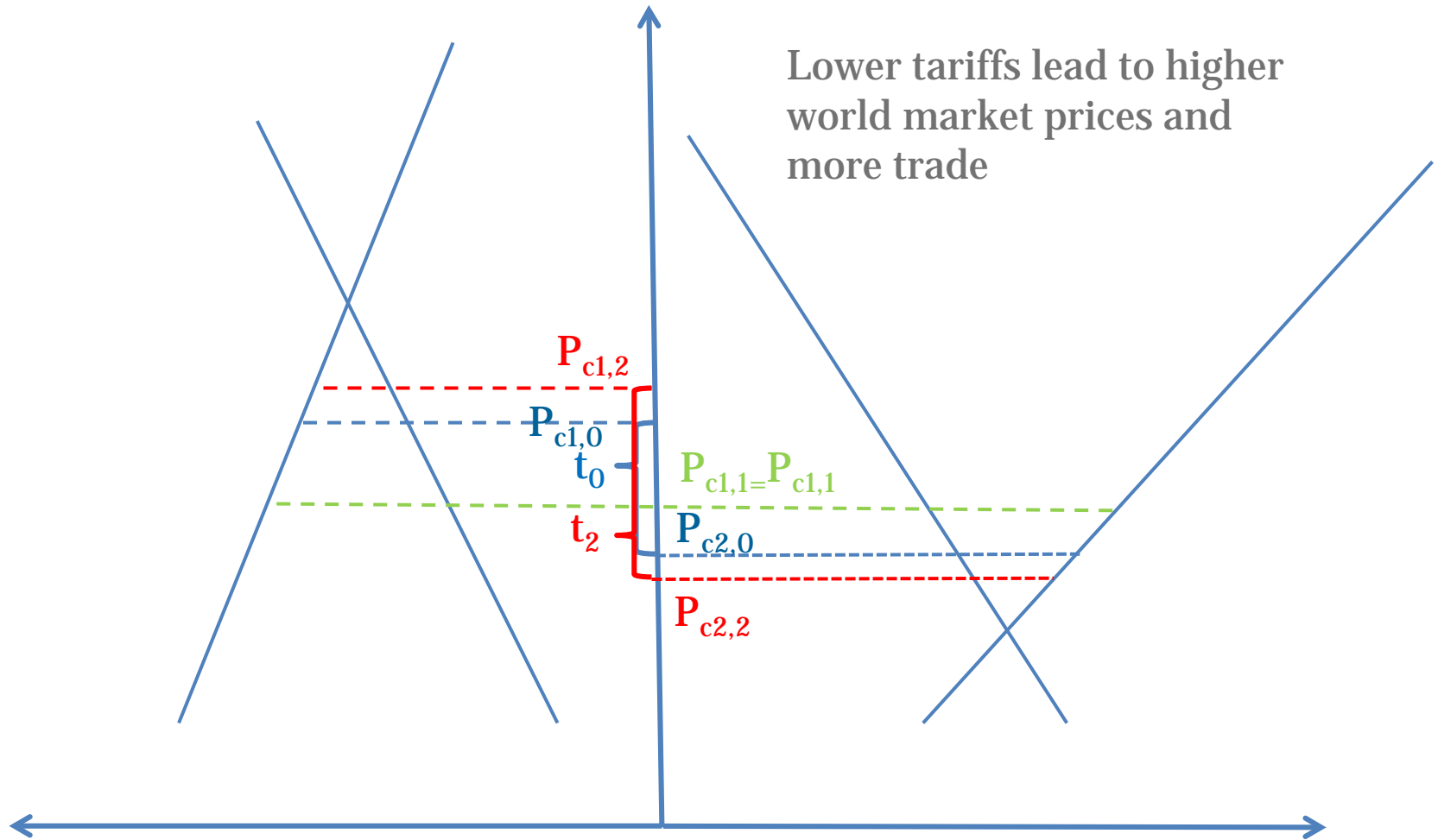
## In this exercise:

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- Stochastic simulations under three different assumption on trade integration
  - Baseline 
  - Highly integrated world 
    - More elastic import and export functions
    - All tariffs put to zero
  - Poorly integrated world 
    - Less elastic import and export functions
    - All products get ad-valorem tariffs (+30 percent points)



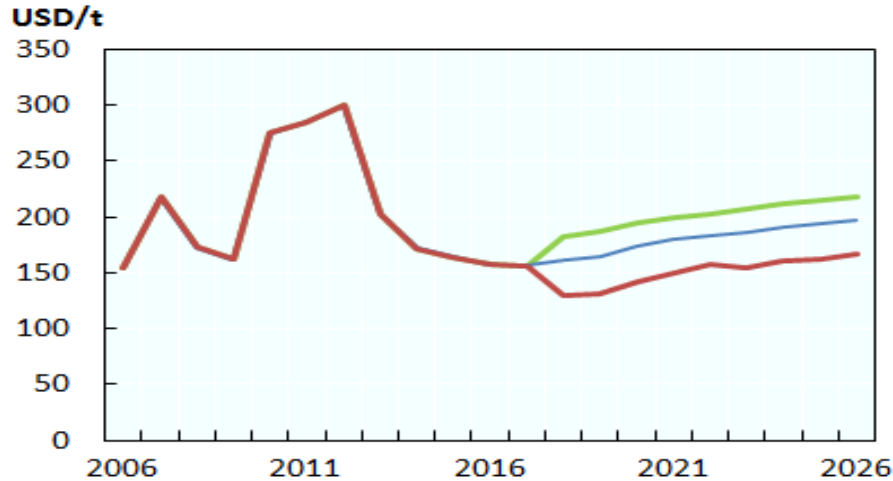
# What do we expect – tariff effect



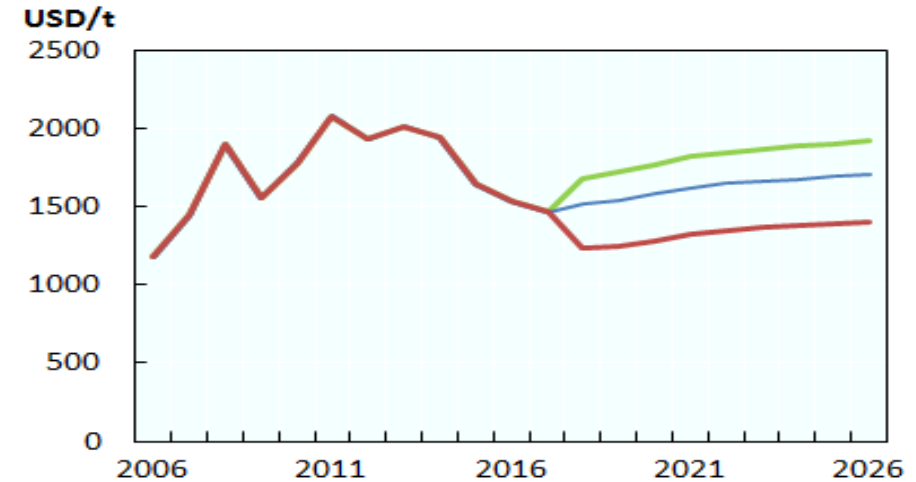


# Model results confirm that expectation

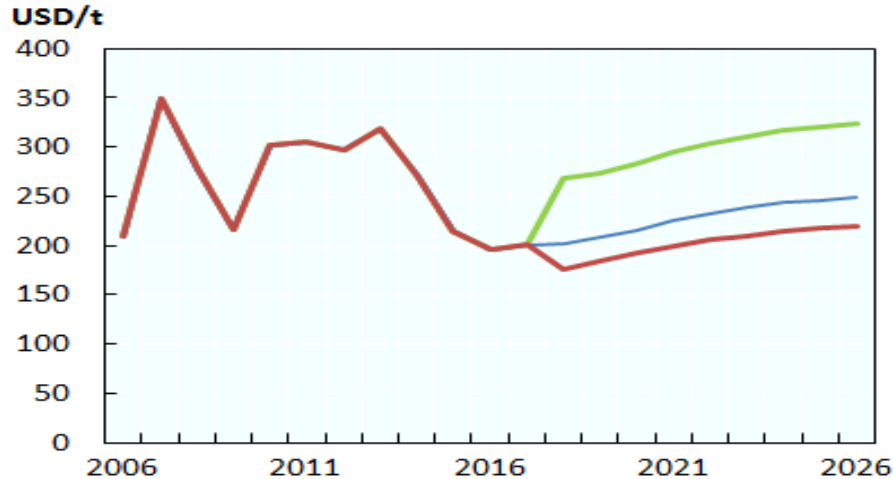
## World Market Price of Maize



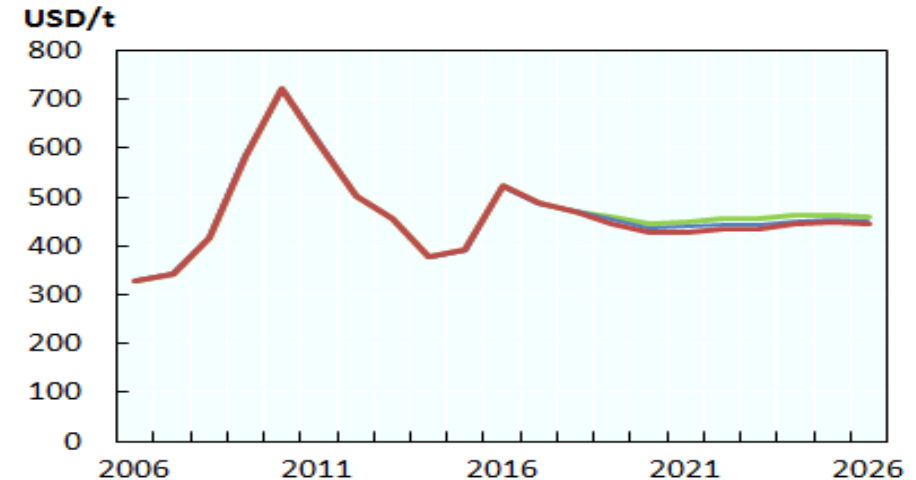
## World Market Price of Poultry



## World Market Price of Wheat

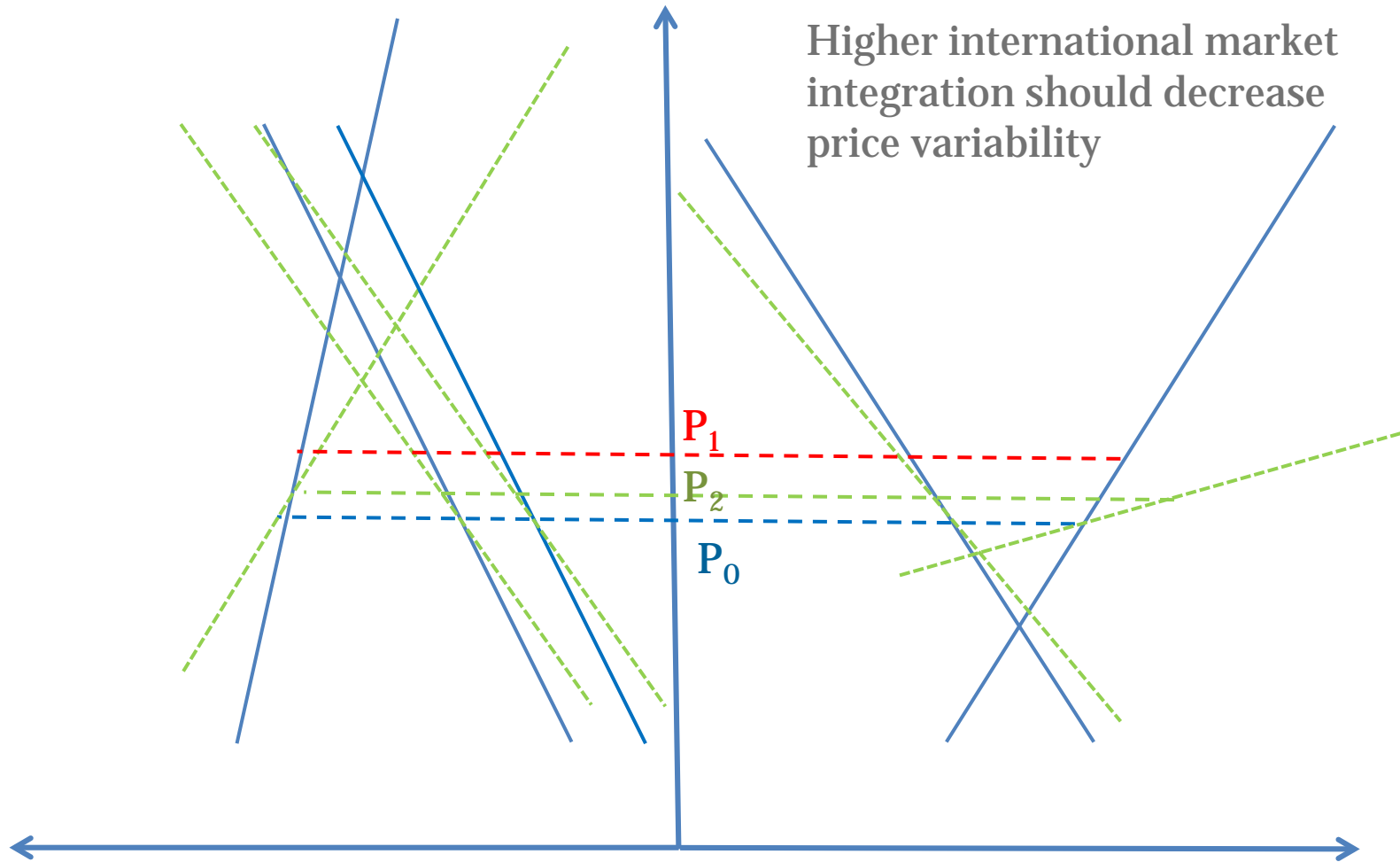


## World Market Price of Sugar





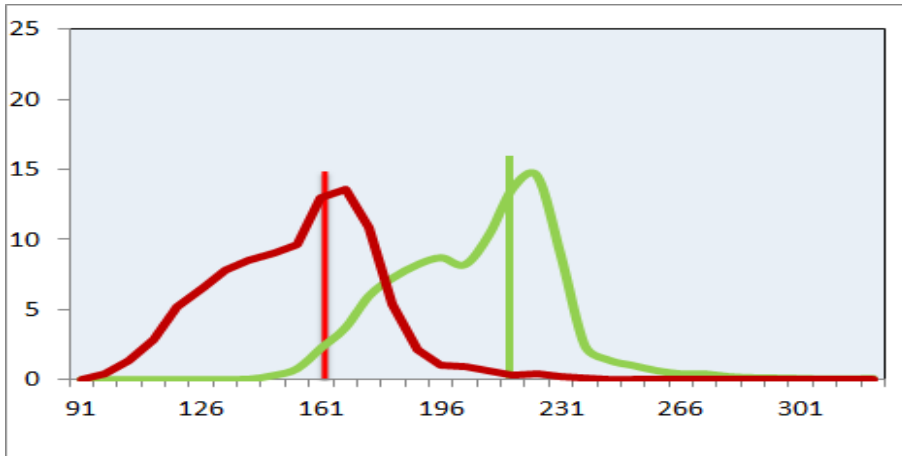
# What do we expect – higher market integration



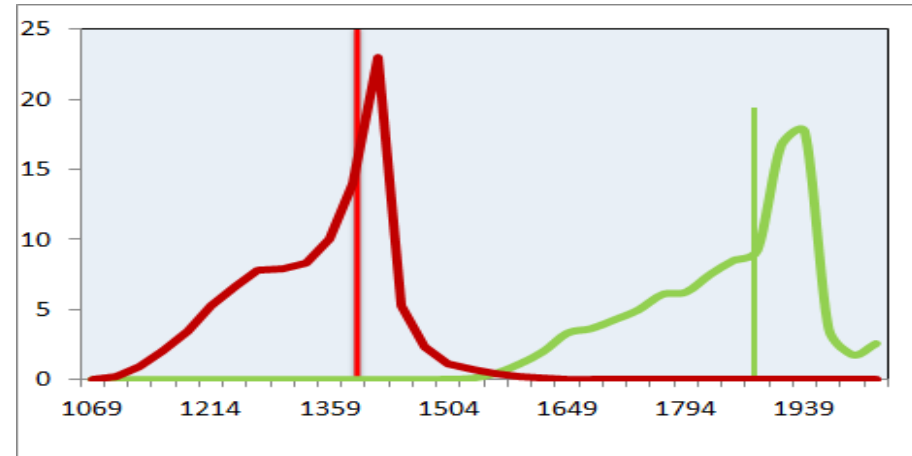


# Model results confirm also that expectation (cv = coefficient of variation)

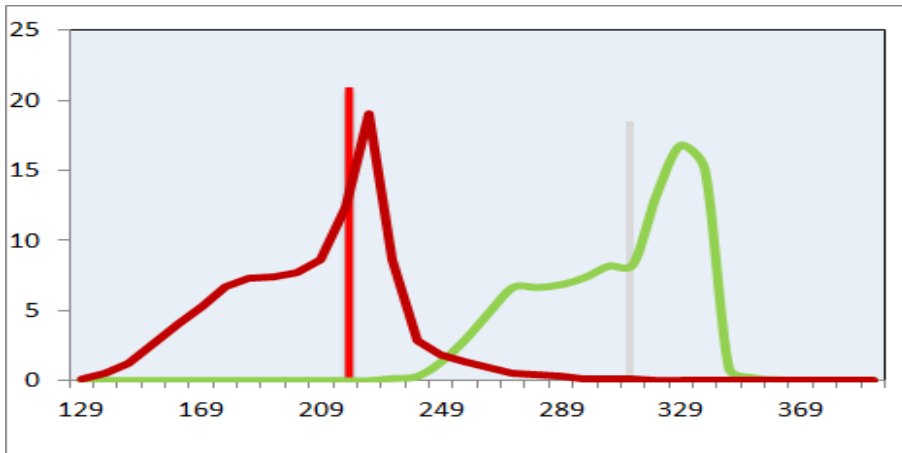
Distribution World Market Price Maize  
(cv **0.15 for low** and **0.11 for high**)



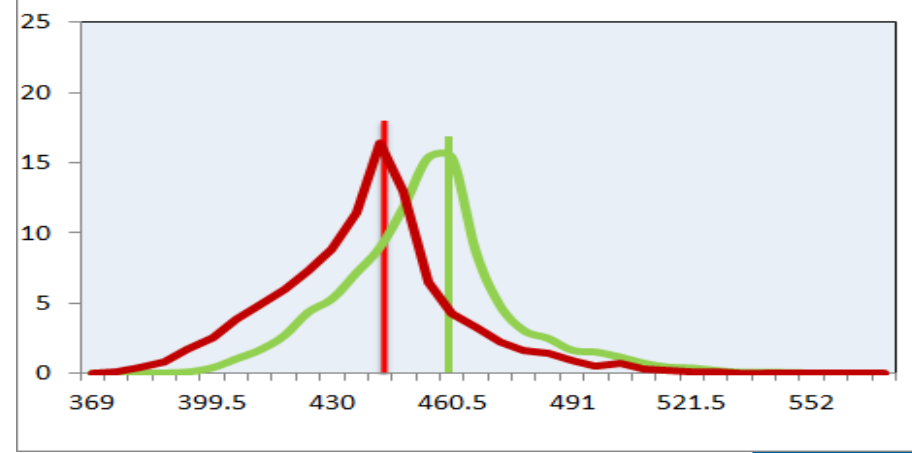
Distribution World Market Price Poultry  
(cv **0.07 for low** and **0.05 for high**)



Distribution World Market Price Wheat  
(cv **0.14 for low** and **0.08 for high**)



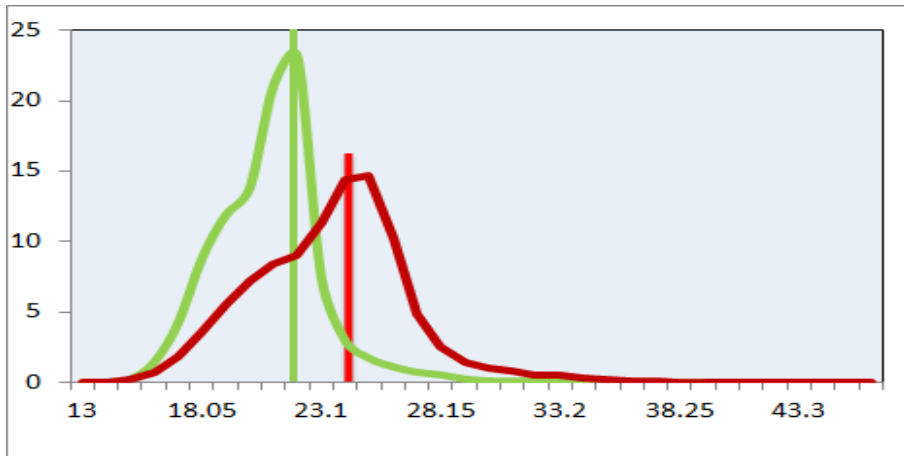
Distribution World Market Price Wheat  
(cv **0.06 for low** and **0.05 for high**)



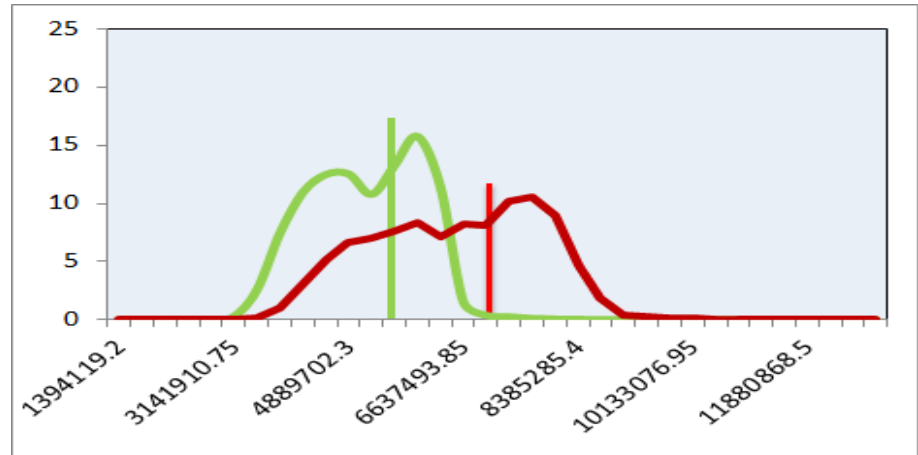


# Domestic market price distributions for major maize importing countries

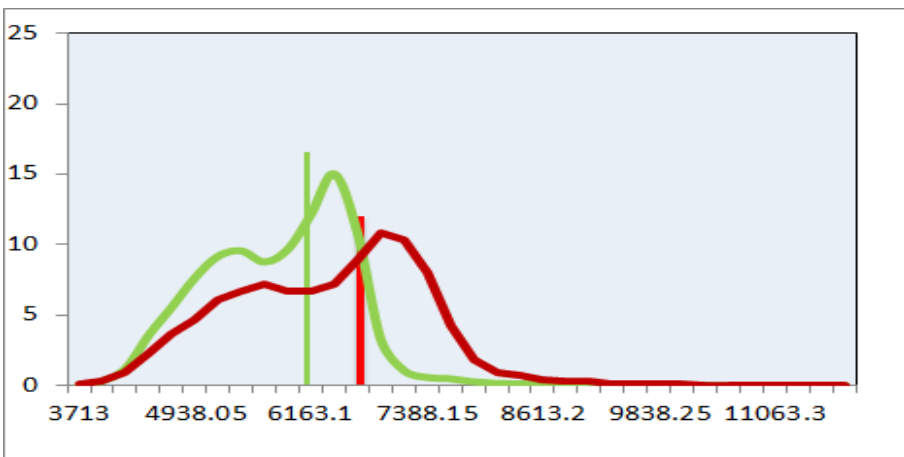
**Japan**, cv **0.14** for low and **0.10** for high



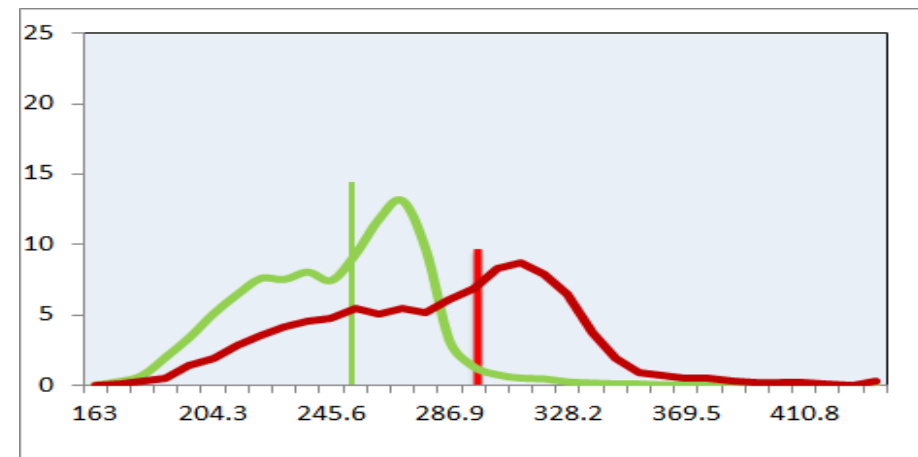
**Viet Nam**, cv **0.15** for low and **0.12** for high



**Mexico**, cv **0.16** for low and **0.13** for high



**South Korea**, cv **0.15** for low and **0.12** for high

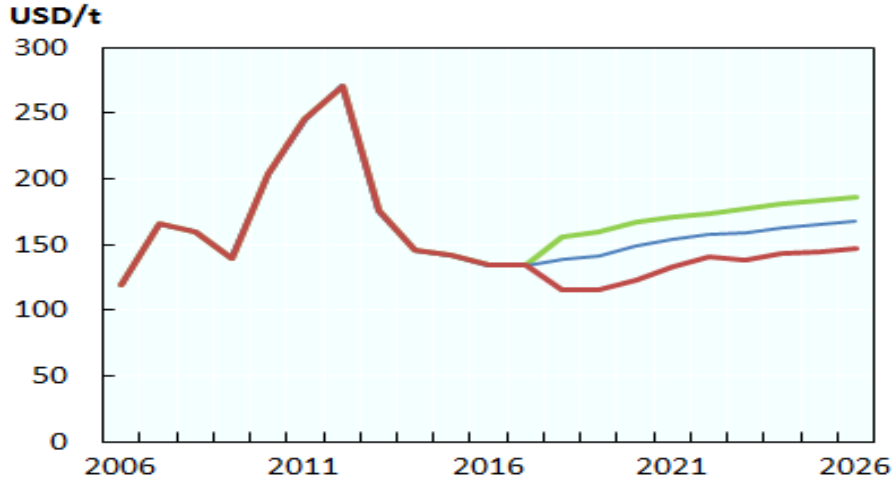




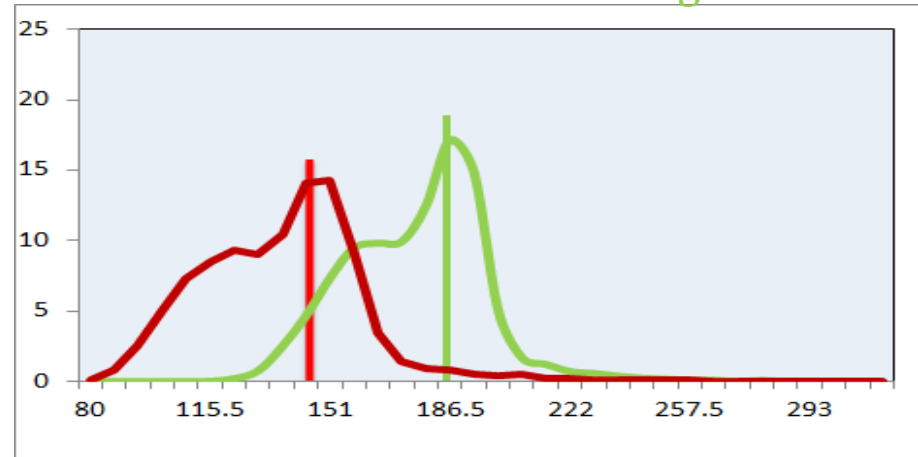


# The US perspective - Maize

## USA Domestic Maize price

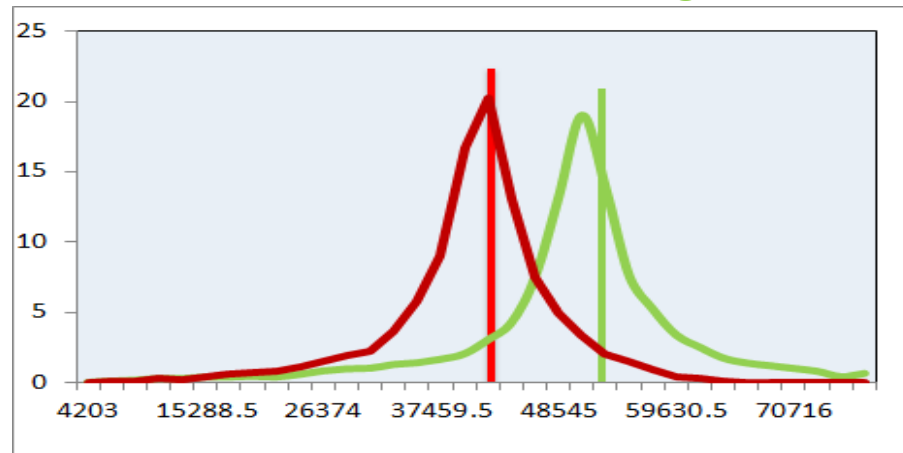


## USA Domestic Maize price cv **0.18 for low** and **0.11 for high**



## USA Maize exports

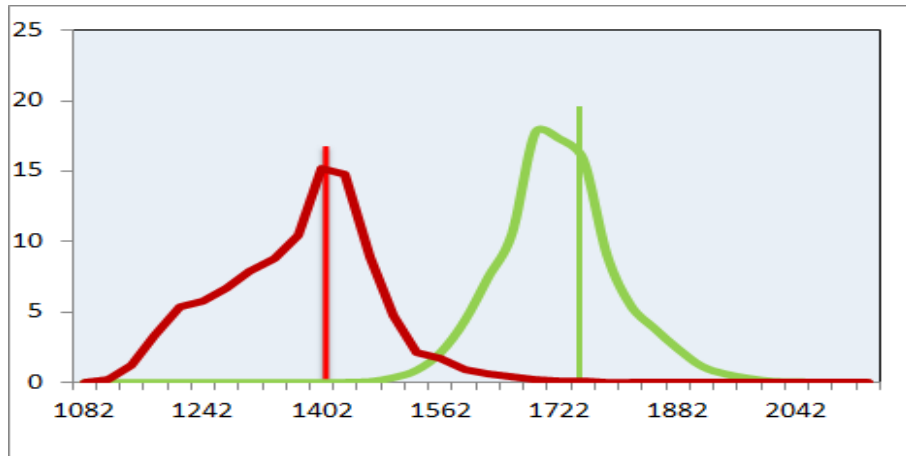
cv **0.18 for low** and **0.21 for high**



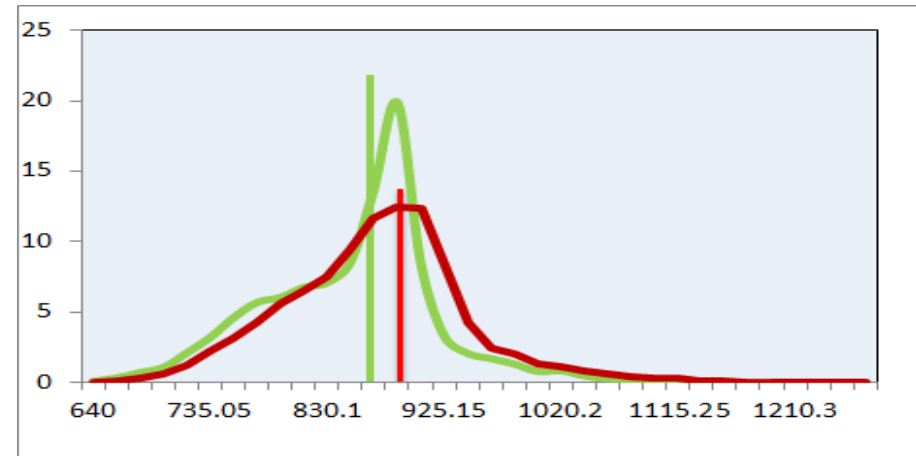


# The US perspective – Pork and Vegetable Oils

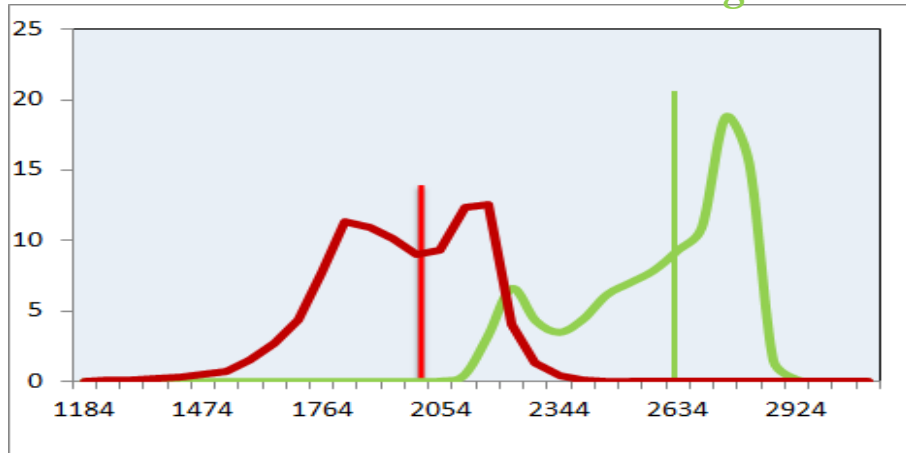
USA Domestic Pork price  
cv **0.08** for low and **0.04** for high



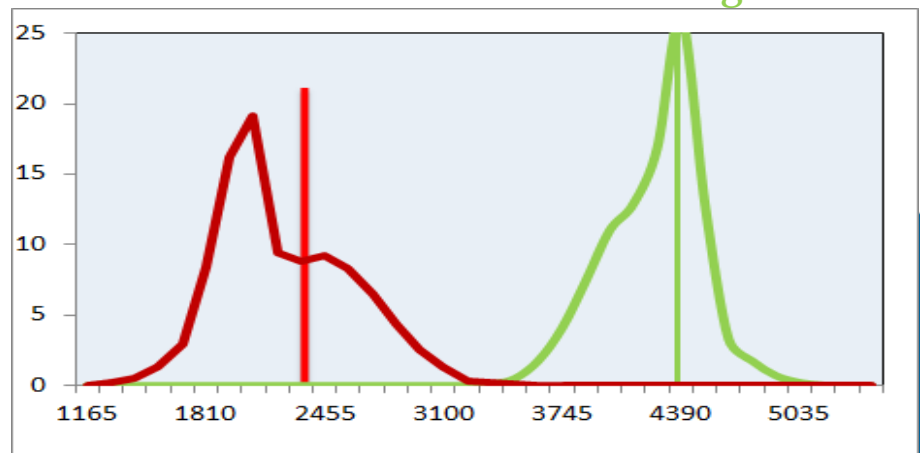
USA Domestic Vegetable oil price  
cv **0.09** for low and **0.08** for high



USA Pork exports  
cv **0.08** for low and **0.06** for high



USA Vegetable oil imports  
cv **0.16** for low and **0.06** for high





# Conclusions

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- Analysis suggests that
  - International market integration has **positive** impacts on Food Security by
    - Increasing availability of food
    - At **more stable** prices
    - But price effects create winners and losers in terms of access
  - For export oriented countries like the US
    - Overall gains from price increases
    - Lower price variability, but more variability in trade volumes



## Where to go from here?

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- This type of Analysis has the potential to address many interesting of Ag-Markets beyond the traditional uses of the model.
  - E.g. effects on the distributions of
    - calorie availability
    - farmers revenues
    - budget cost for trigger policies
    - Consumer expenditures for food