Social wellbeing and International Trade: the Food and Nutrition channel

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IATRC, December 13th 2015

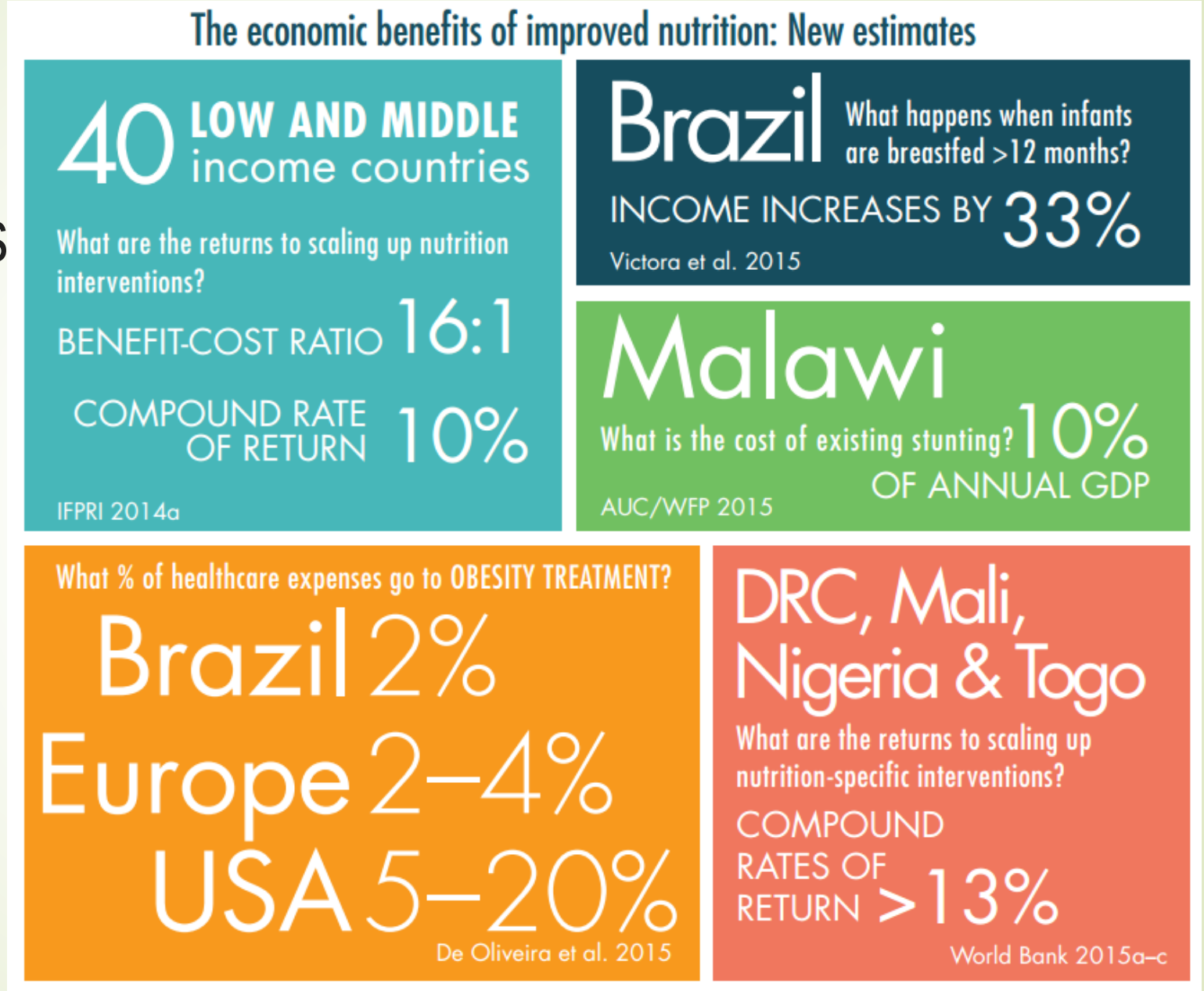
Food and Nutrition Security

Food and Nutrition Security

- Contribution to **individual** and societal well being
  - Matter of fairness but also efficiency
  - Inheritance of inequalities: long standing effects
- FNS: a core element of development strategy. Achieve SDG strategy.
  - FNS outcome as a consequence of economic development (since it depends on income, price, quality)
  - FNS as a way to achieve economic development (social stability, increased productivity, limit conflicts)
- From Agriculture to Food, From Food to Nutrition
- A modelling perspective: Economic Welfare and Utility vs Nutritional requirements
  - Human as a Leontieff Production Function
  - Substitution between products, but absolute requirements for nutrients and micro nutrients
  - Nutrition and “bounded rationality” in consumer choices

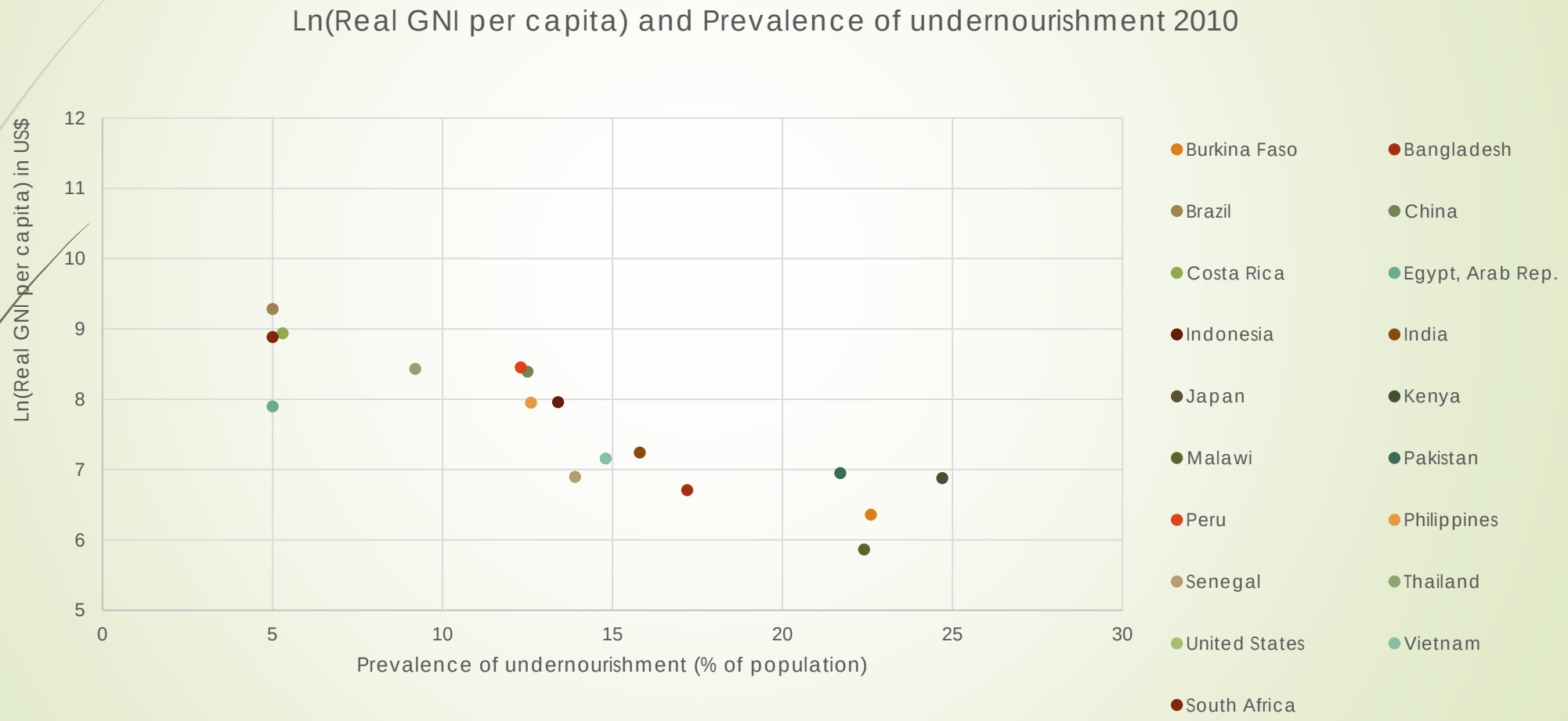
Nutrition matters

Large long term costs



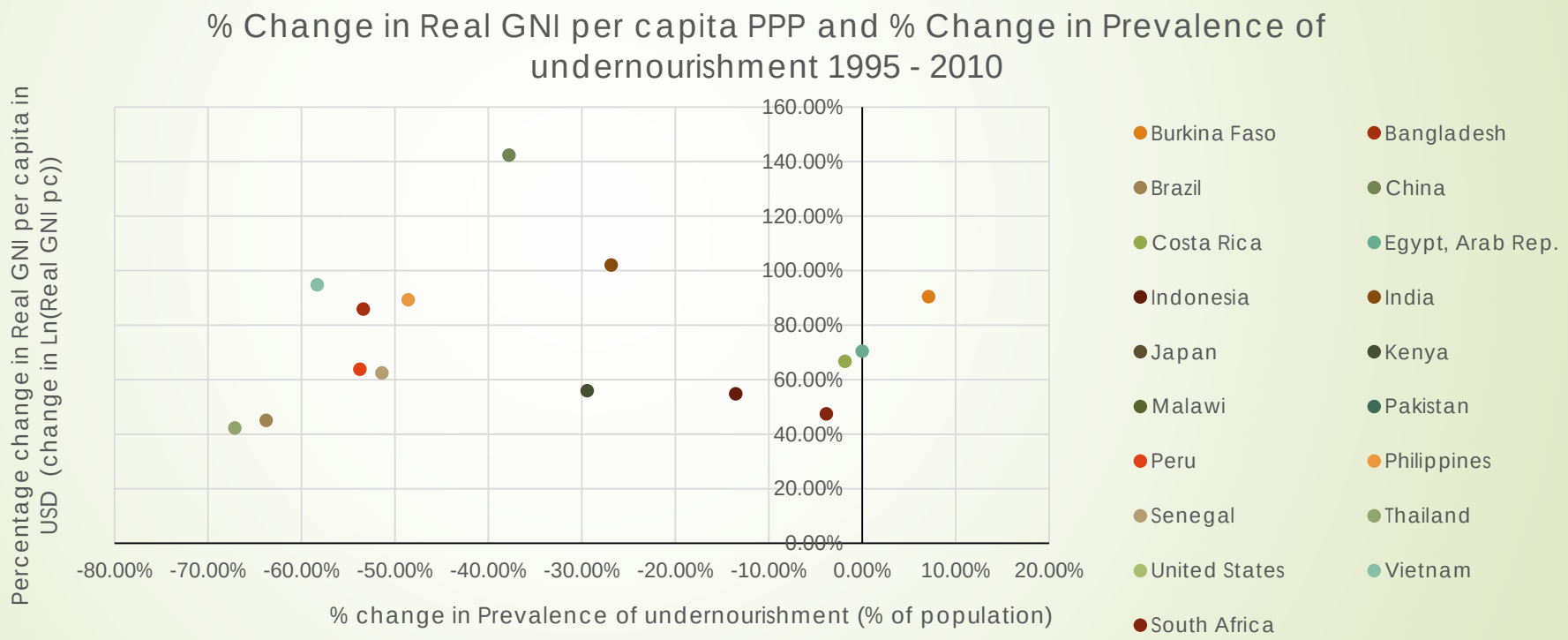
Global Nutrition Report 2015

Income per capita and Undernourishment

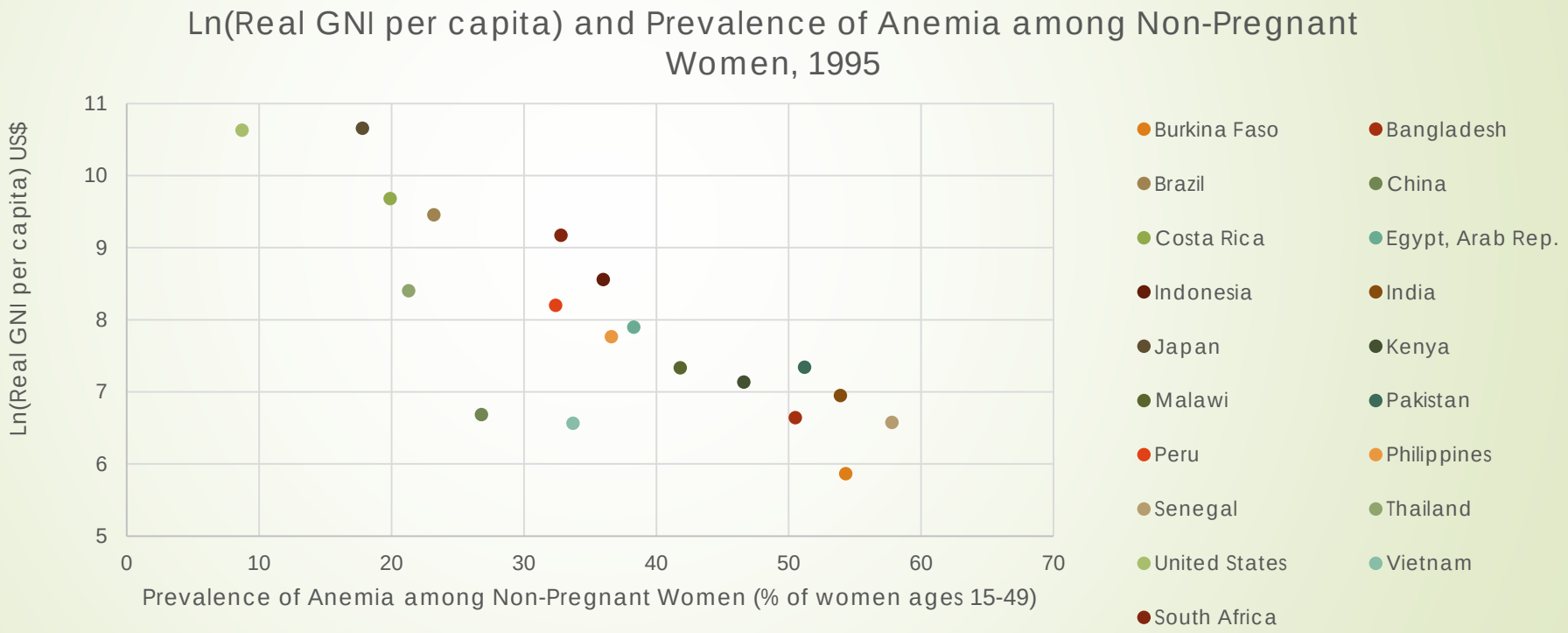


Laborde and al. 2015

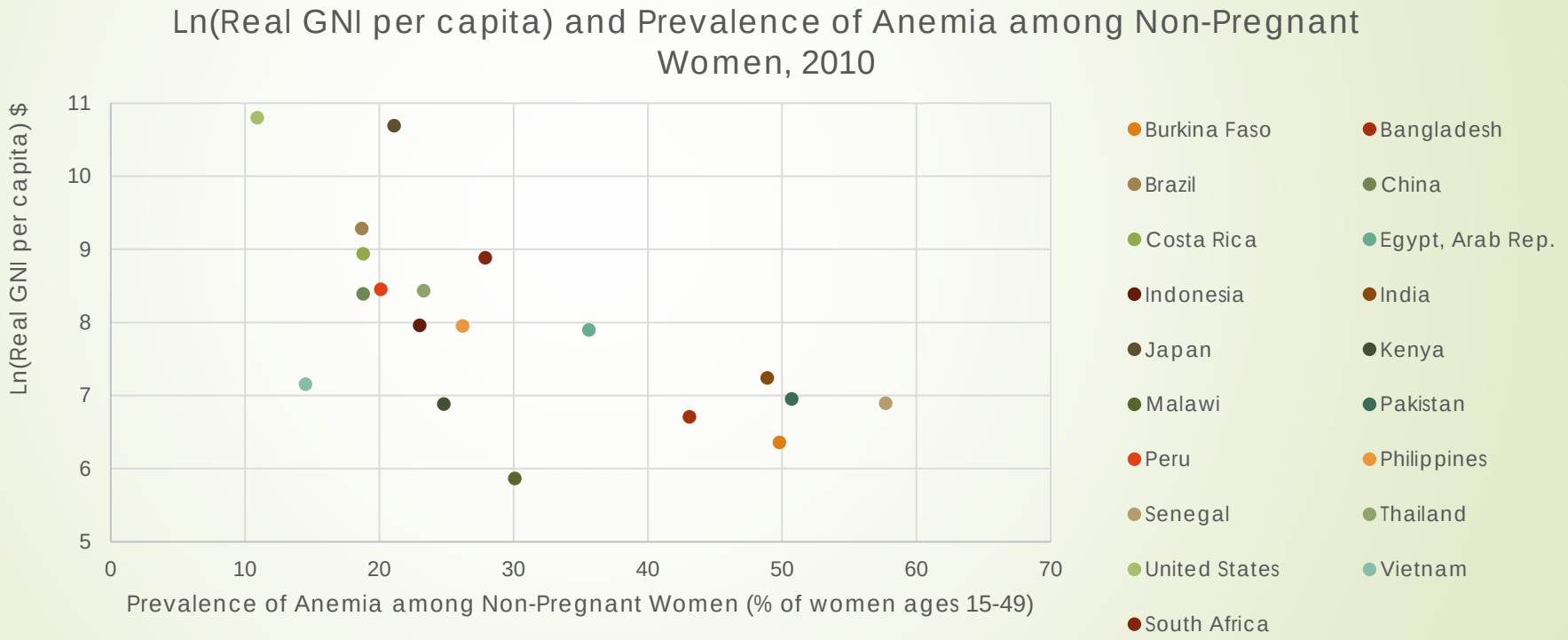
Income per capita and Undernourishment: Different performance over time



Laborde and al. 2015



Laborde and al. 2015

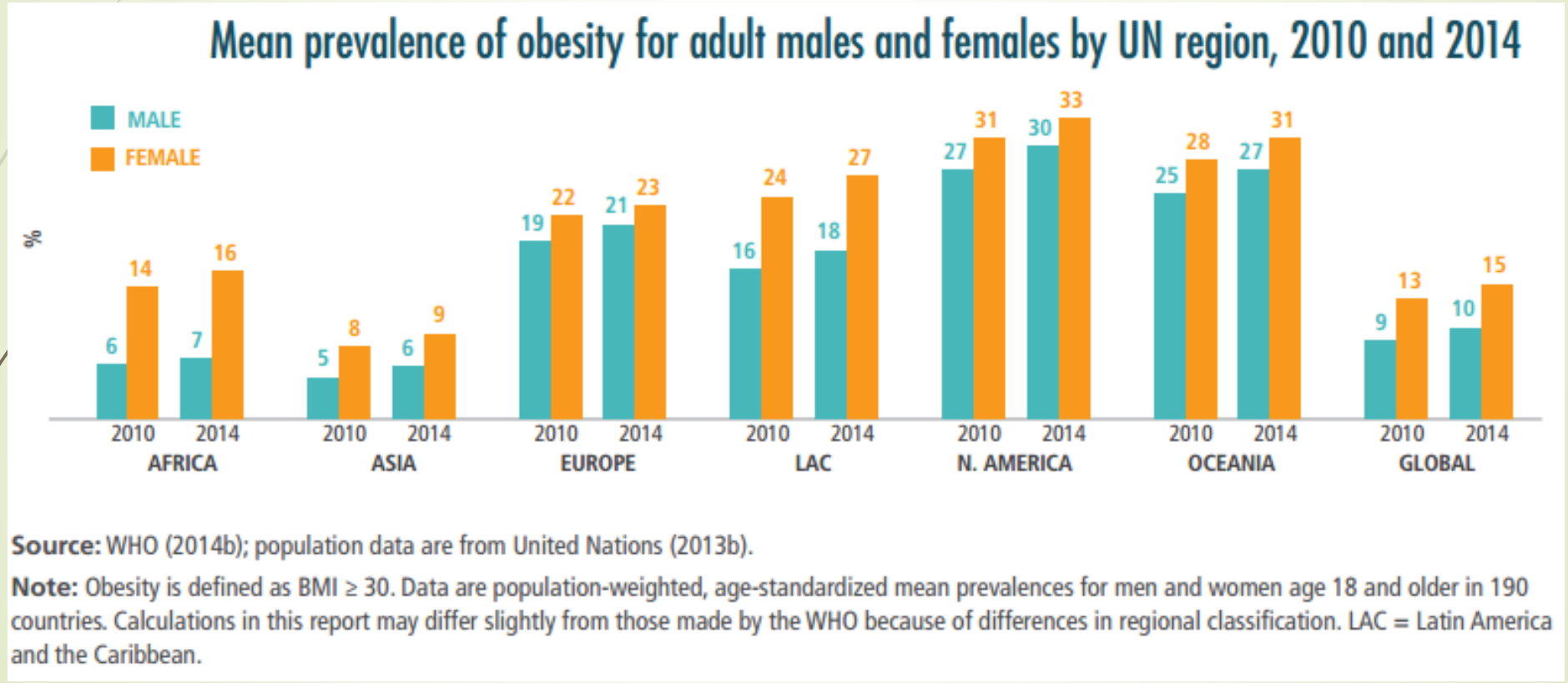


Laborde and al. 2015

Undernutrition, Malnutrition and Obesity

- UN estimates
  - Undernourishment : 800Mios people
  - Iron deficiency and anemia affect at least 3.5 billion people
  - 2 billion are at risk for dietary iodine deficiency
  - By 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese
- Food consumption pattern matters: role of high nutritional food (*Meat consumption is associated with less stunting among toddlers in four diverse low-income settings Krebs and al. 2011*)
- Obesity is not a “rich” country problem:
  - nutritional stunting causes increased risks of obesity
  - Overweight/obesity and underweight coexisted in 30% of households. (Florêncio et al., 2001)
  - A recent study in a very poor community (income less than US$1/day) in Northeast Brazil found overweight adults (17%, BMI $\geq$ 25) eating less than 80% of requirements (adjusted to stature
- The first epidemiological evidence for this hypothesis came from the study of the **Second World War Dutch Famine**. As one of the most important epidemiological sets, this population has been extensively studied. Ravelli et al. (1976) showed an increase in the incidence of obesity in 19 year-old men whose mothers suffered food deprivation during the first half of gestation.

Obesity: where do we stand



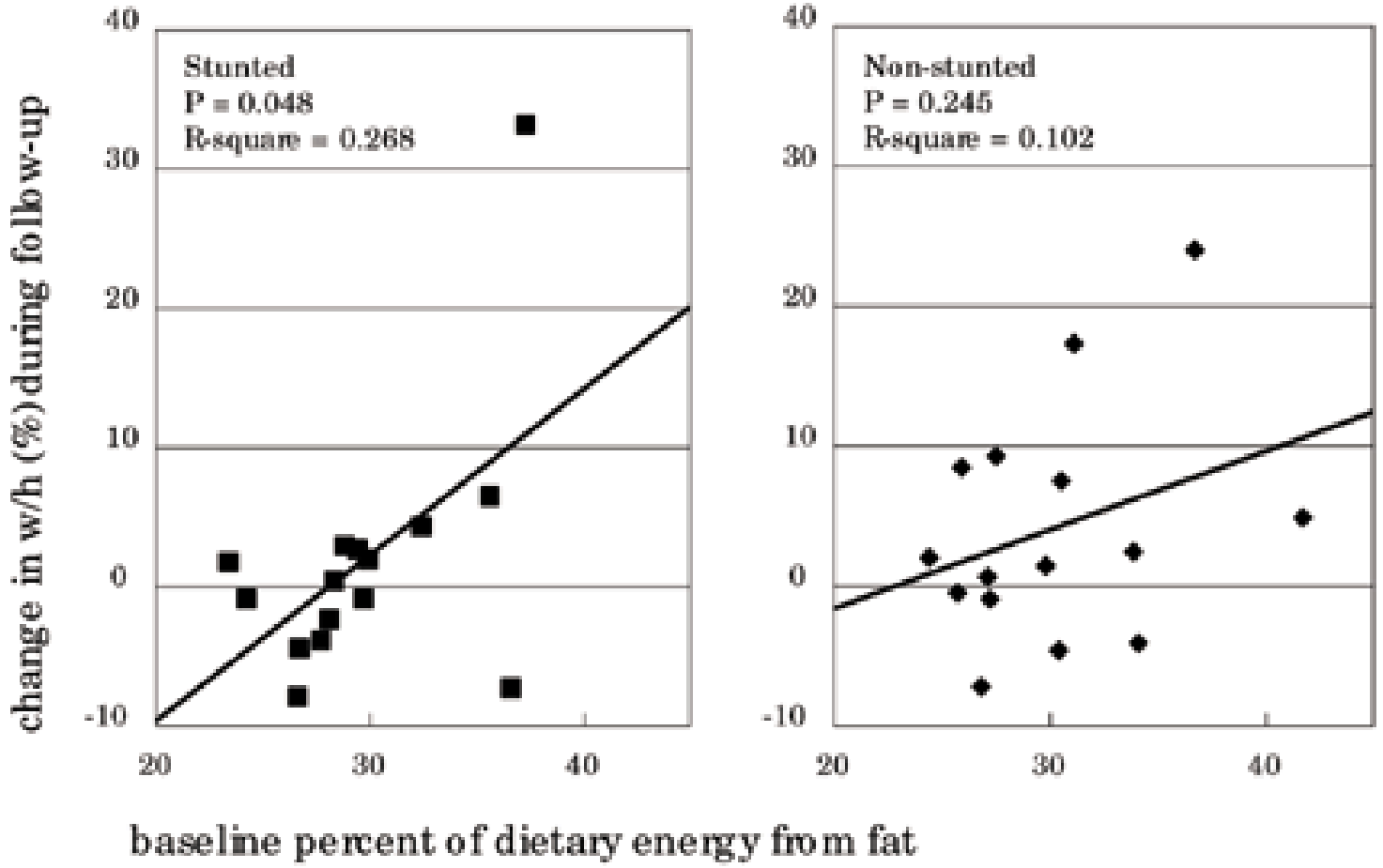
Source: WHO (2014b); population data are from United Nations (2013b).

Note: Obesity is defined as BMI ≥ 30. Data are population-weighted, age-standardized mean prevalences for men and women age 18 and older in 190 countries. Calculations in this report may differ slightly from those made by the WHO because of differences in regional classification. LAC = Latin America and the Caribbean.

Global Nutrition Report 2015

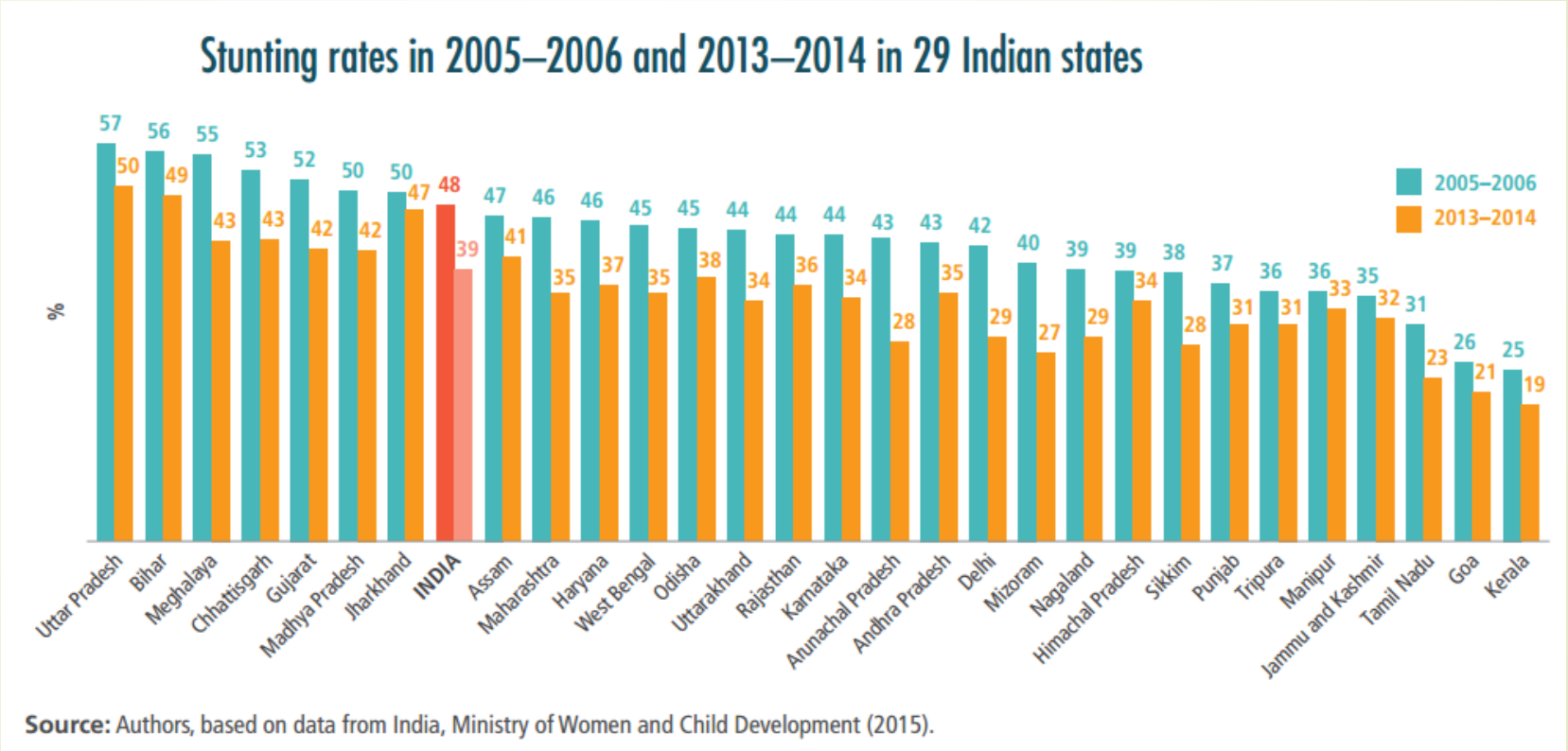
Figure 1

Association between baseline percentage of dietary energy from fat and change in weight-for-height (percentage of median) during the follow-up period, in stunted and non-stunted school girls living in shantytowns in the city of São Paulo, Brazil.



Sawaya et al., 1998

Heterogeneity within one country



Source: Authors, based on data from India, Ministry of Women and Child Development (2015).

Global Nutrition Report 2015

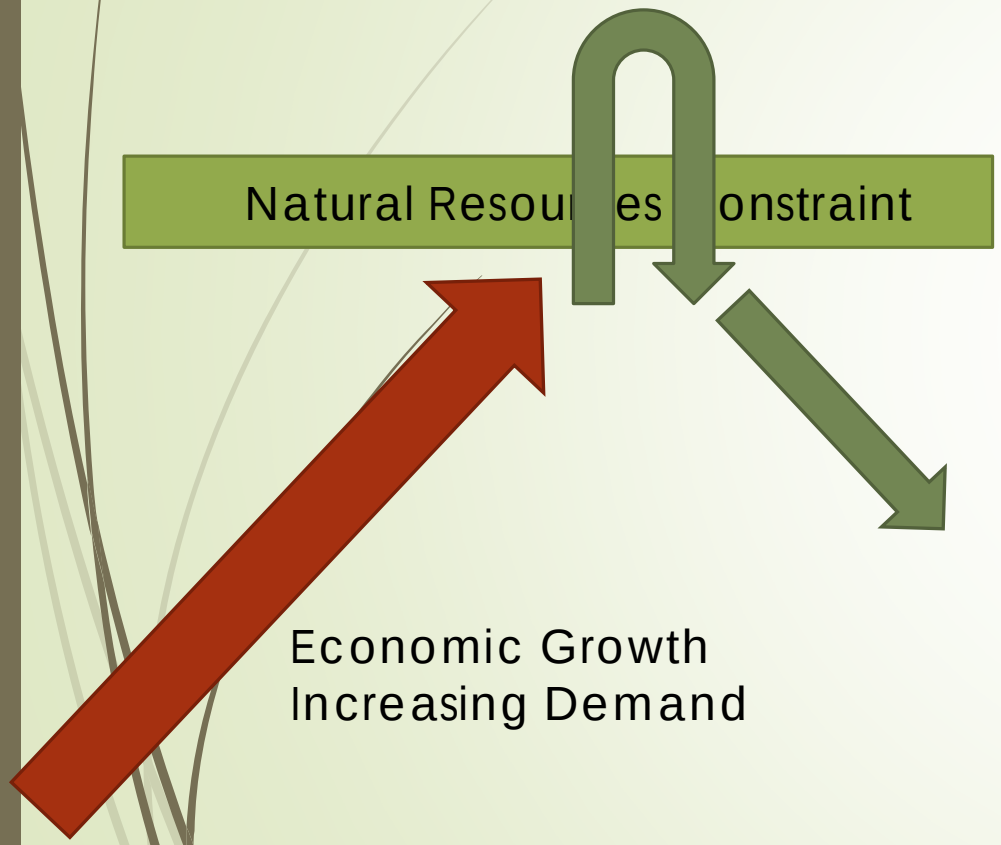
International Trade and FNS

Conceptual Framework

Food and Nutrition Security and Trade

- Why International Trade contribute to FNS:
  - Improve Availability of food products (quantity). Trade allows to rely on world supply (larger and more stable, leading to increase stability for consumers)
  - At a low price. By definition, for importing countries : world price < domestic price, and in "real" terms: increasing income of households → trade liberalization. Imroved accessibility.
  - Of improved quality.
    - Nutrition and diversity
    - Role of SPS
  - At all time
- But two different scales: FNS is individual, Trade and Trade policy: a country dimension
- *Constraints*, in particular in terms of crisis (domestic or international)
  - Balance of payments for importing countries
  - Income constraints for household
- Concretely, history of mankind is marked by agricultural trade
  - To tackle the structural consequences of urbanization/economic concentration
  - Rome and Egyptian wheat during the Antiquity, XIXth century Europe and the outsourcing to the new world and to the East (thanks to transportation improvement).
  - Peaceful trade versus conflict

A brief history of growth, driven by agriculture (inspired by David Ricardo)



At one point, You hit the wall

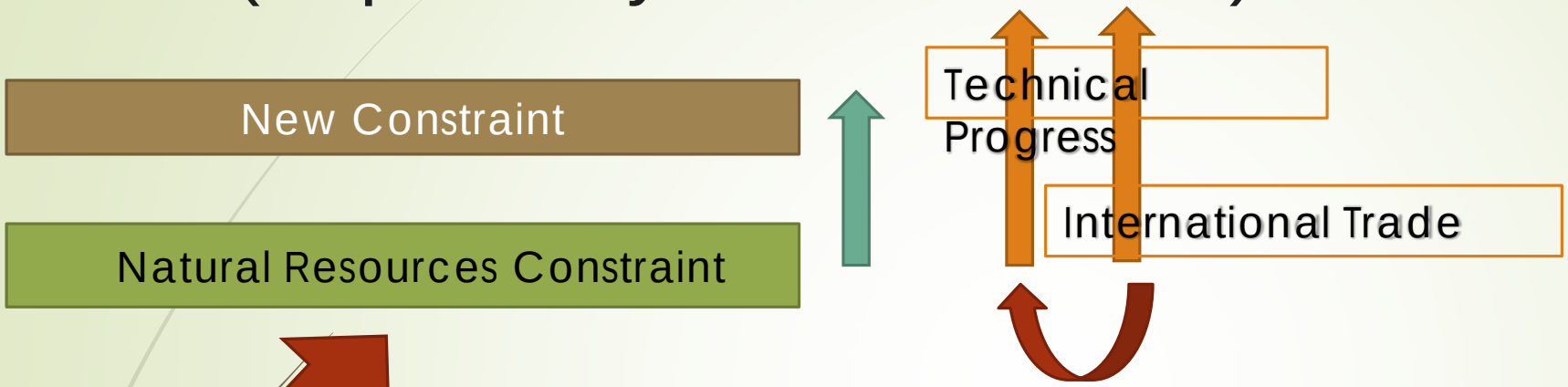
Option 1:
You try to break the wall

Unsustainable development

And the Natural Resources will strike back

Conflicts, Wars : Demand (population) reduction, redefinition of property rights
See Easter Islands, Pre-Columbian Civilizations… (reaching the point of “closed” economies)

A brief history of growth (inspired by David Ricardo)



Economic Growth
Increasing Demand

Option 2: You "Push" the wall.

A. You expand to new "world(s)" (it will trigger also expand trade). Today, mostly done...

B. You expand the constraint thanks to **Technical Progress**

C. You expand the constraint thanks to **Optimal Production allocation: International trade**.

And Trade will foster Technical Progress:

- *Innovation [Larger Markets]*
- *Diffusion [Ideas travel with people, goods and services]*
- *Adoption [Competition]*

International Trade, Food consumption and FNS (1)

- Role of Ag and Non Ag flows and policies
- Direct Price channels
- Income channel
  - For the household and the government
  - Income distribution matters: HOS framework
- Rural urban migration: change in diets
  - Trade: factor reallocation
  - Ecological studies suggest that increasing national income and urbanization are associated with changes in diet and prevalence of obesity. Popkin, 1999; Dixon et al., 2007).

International Trade, Food consumption and FNS (2)

- FDI and distribution network
  - Supermarkets: processed food but also food diversification (Kennedy et al., 2004; Schmidhuber & Prakash, 2004; Popkin, 2006).
  - Role of advertisement
- Reciprocal Causality: trade and change in diets
- Framing the policy debate: Food security, Self Sufficiency and Food Sovereignty
- Literature linking trade and FNS: clear conceptual framework (Diaz Bonilla,2006) but limited strong evidences
  - Role of local conditions
  - Complexity of mechanisms
  - See Swinnen and al. (2014): Trade openness favors FNS (half of the cases) or has no impact

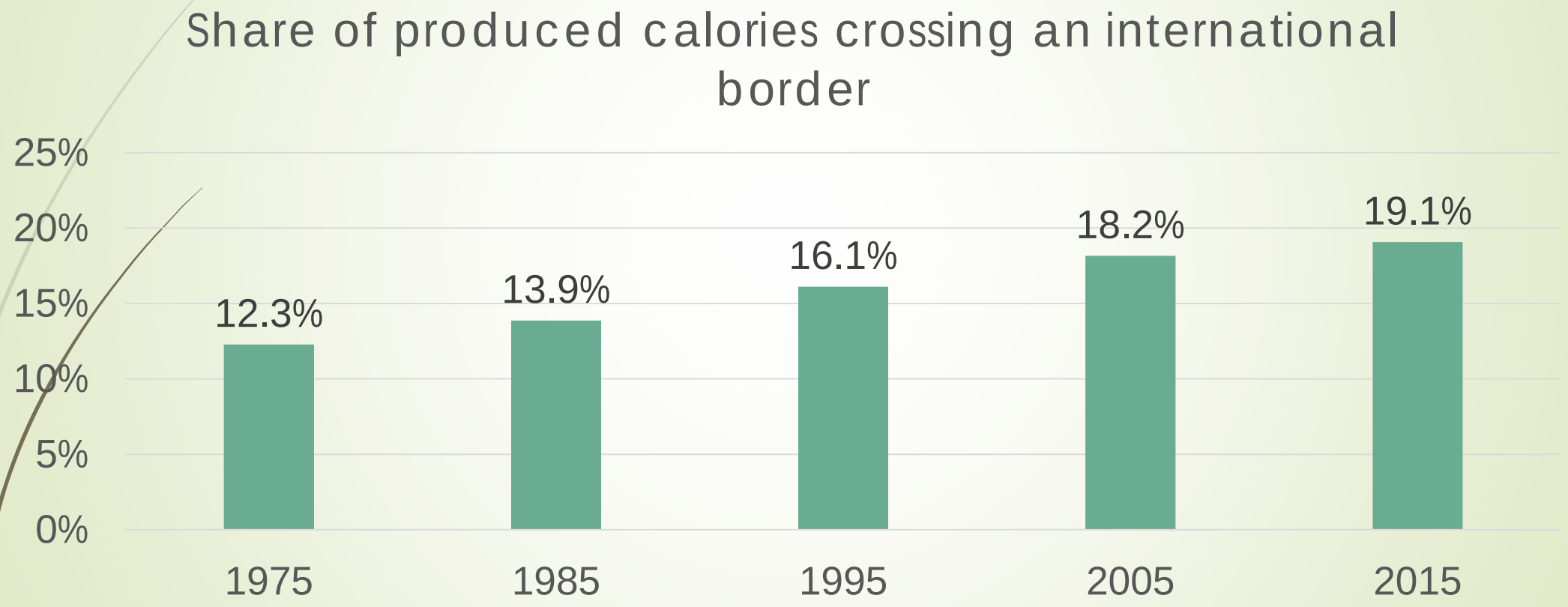
Trade policies

- Restrictive Trade policies are still regressive, and limit food diversification
- World average tariff on:
  - Agricultural products: 18.9%
  - Food products: 21%
  - Meat, Dairy…: above 35%
  - Except. Fish below 8% in average

International Trade and FNS

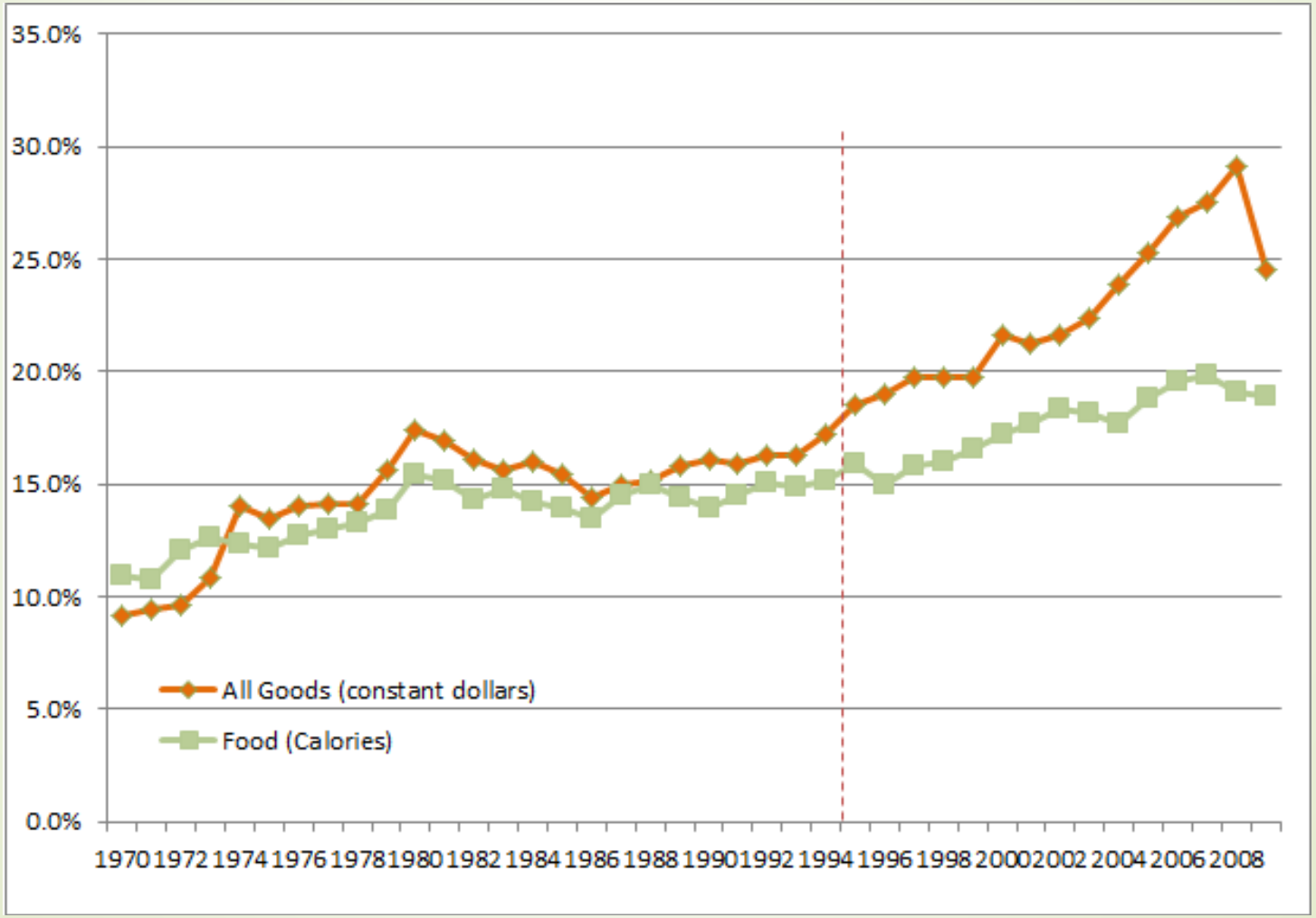
A few facts

A continuous trend towards internationalization of food markets



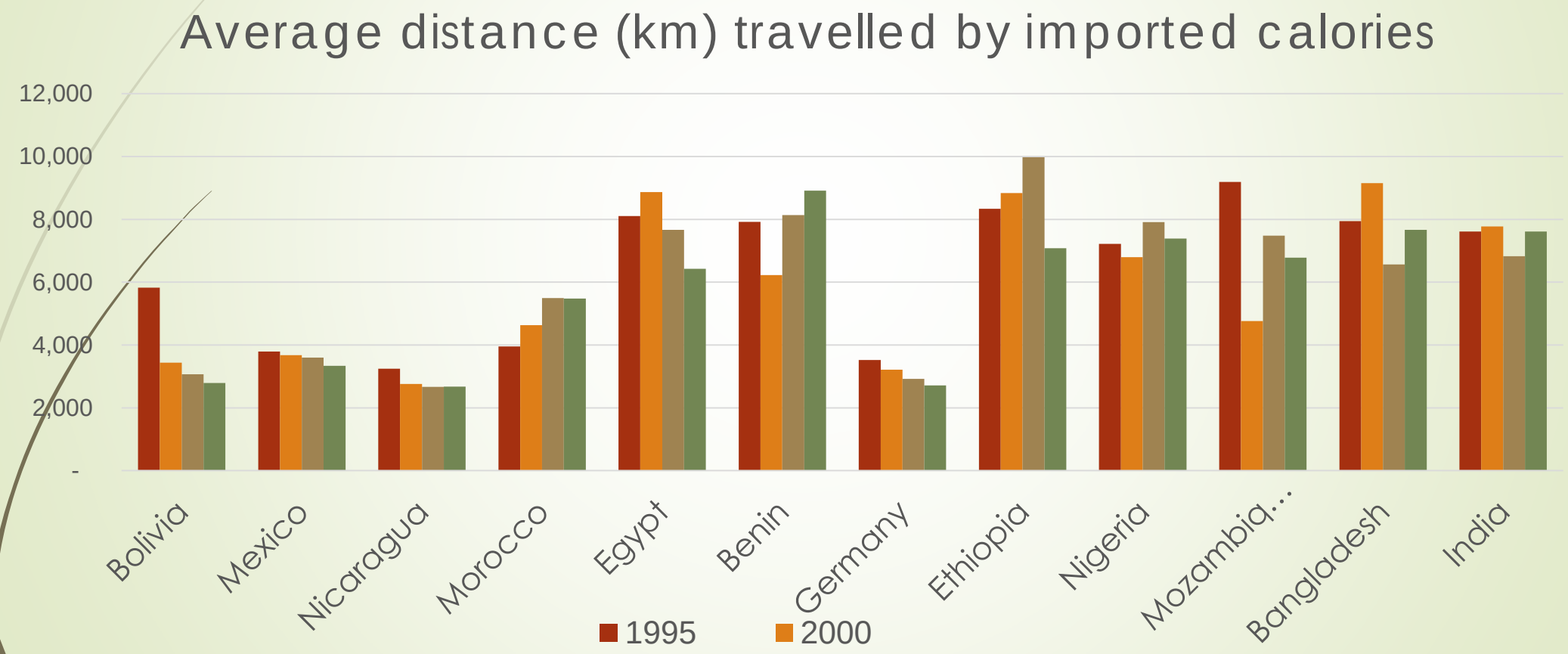
Source: Laborde (2015)

Food vs Total Trade: Differences and similarities



Source: Laborde (2015)

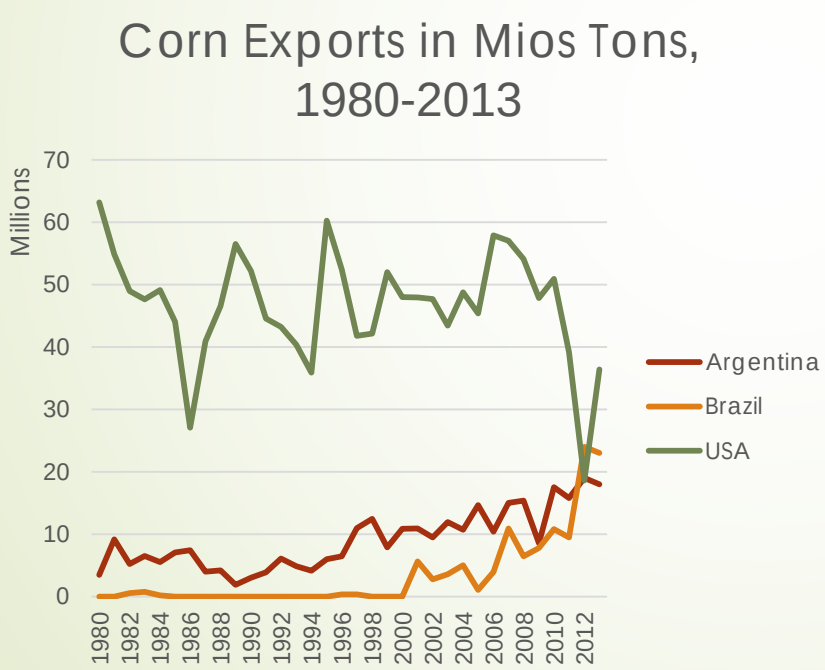
Globalization and/or Regionalization



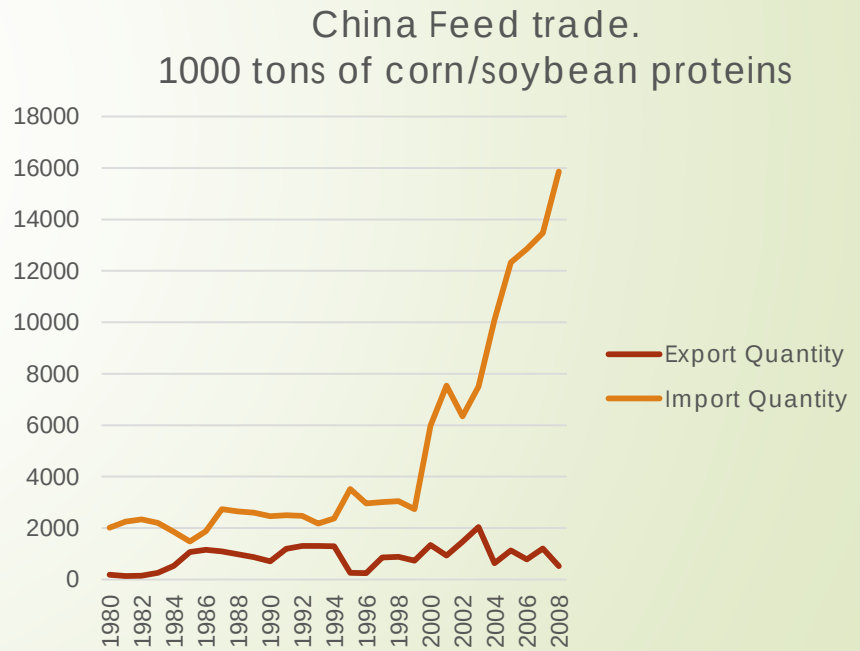
Source: Laborde (2015)

Traditional and New Producers: The role of emerging countries

New Exporters

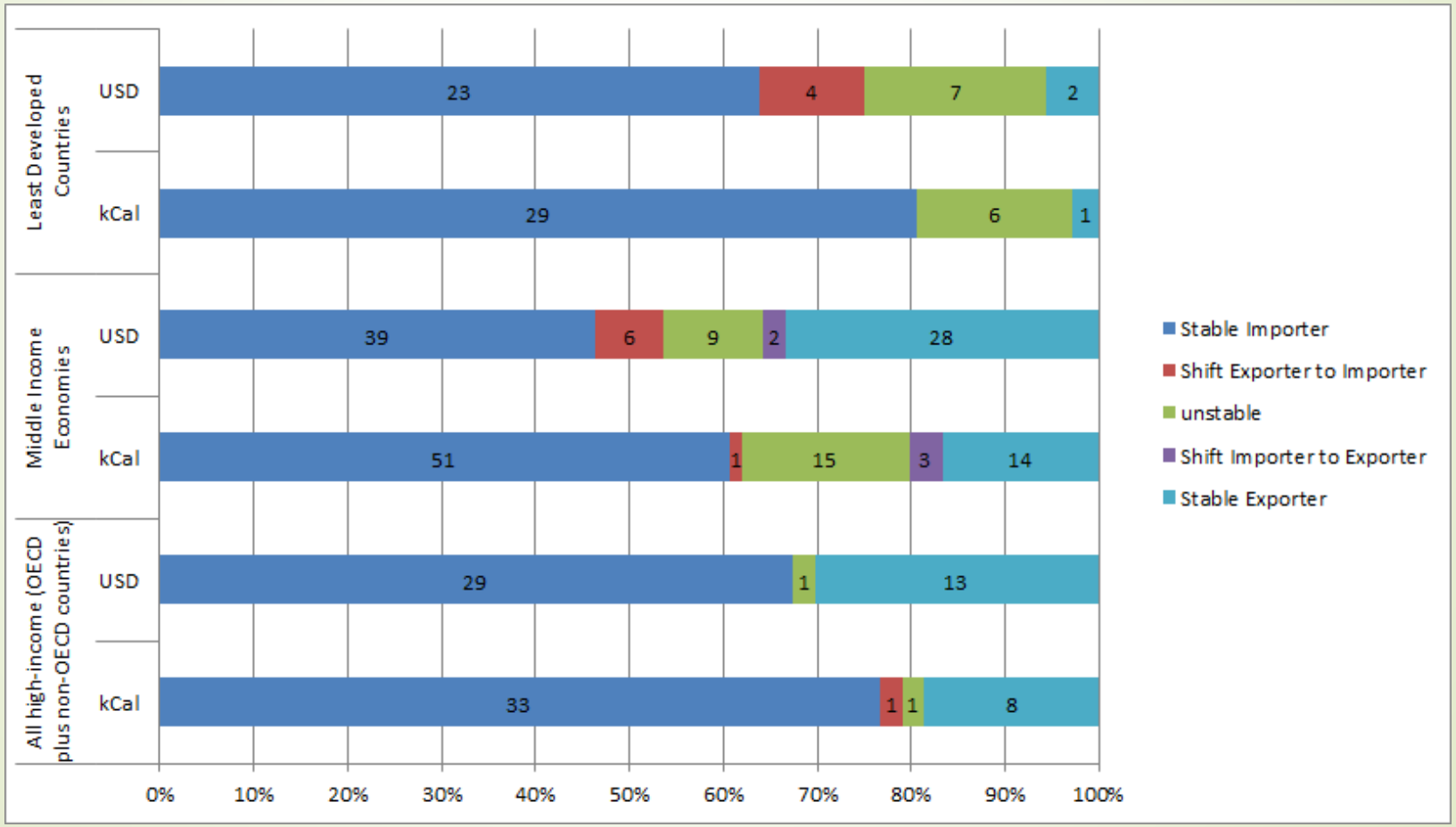


New Importers



Source: COMTRADE

Development and structural change in country status regarding food trade



Source: Deason and Laborde (2010)

Affordability of import food bill

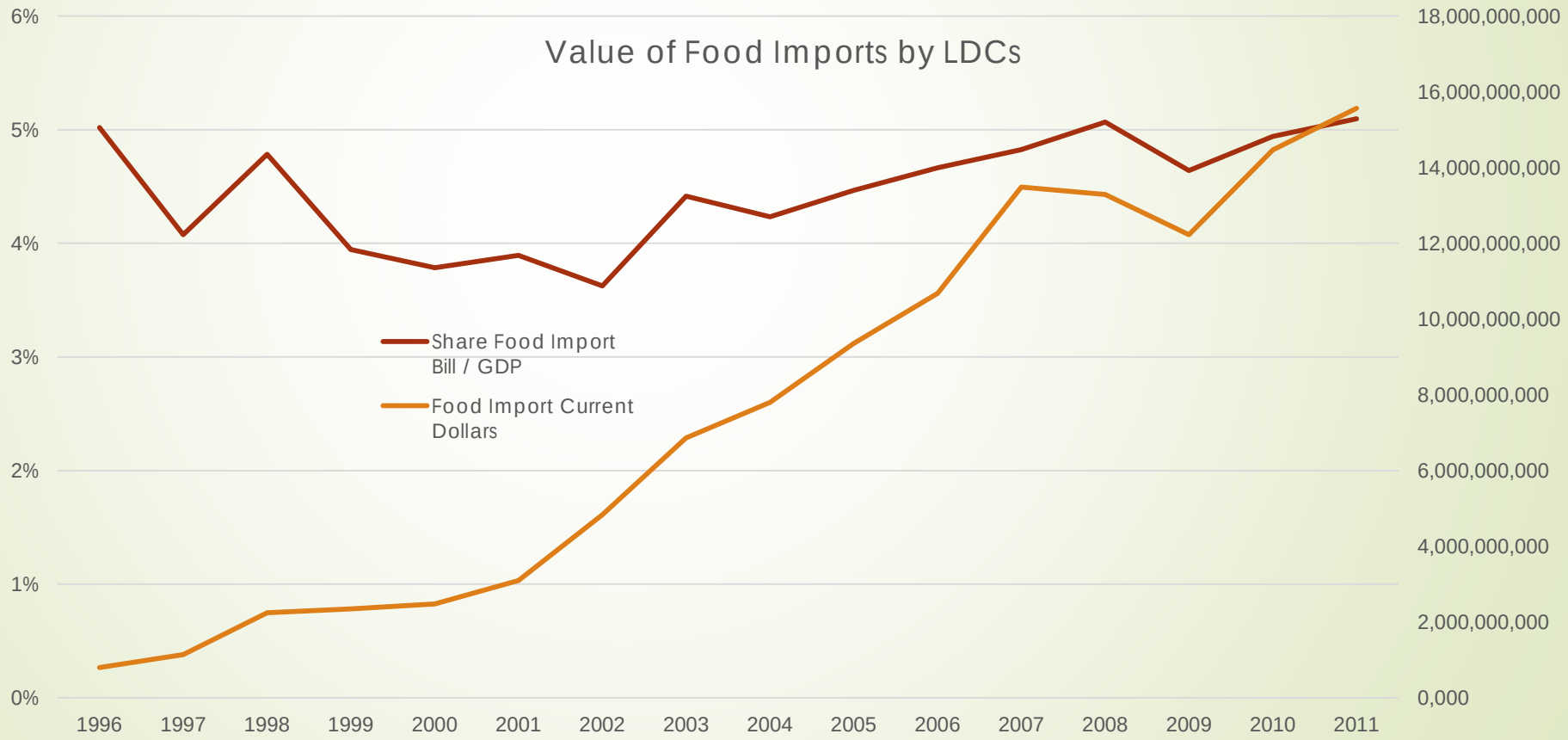
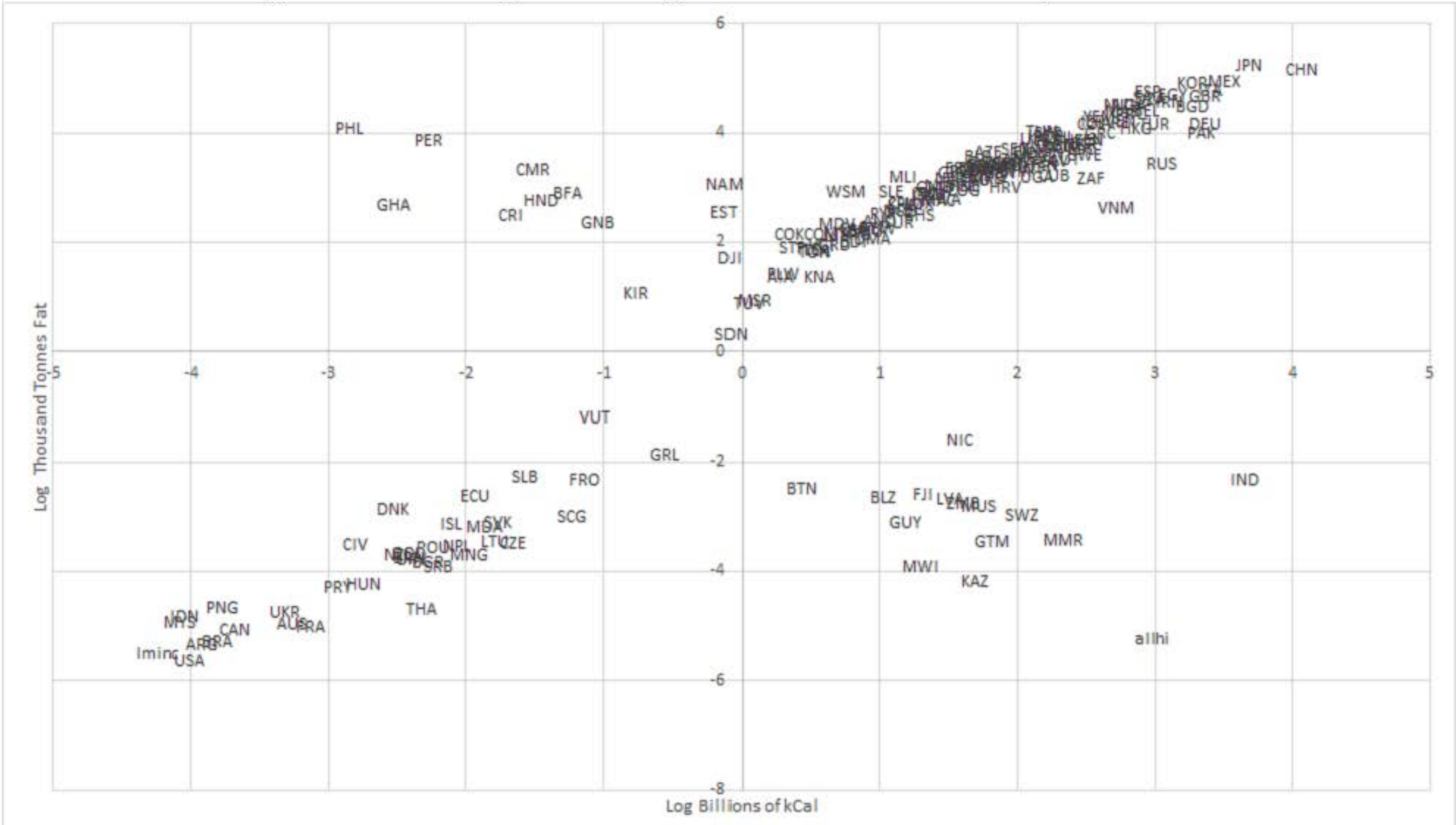
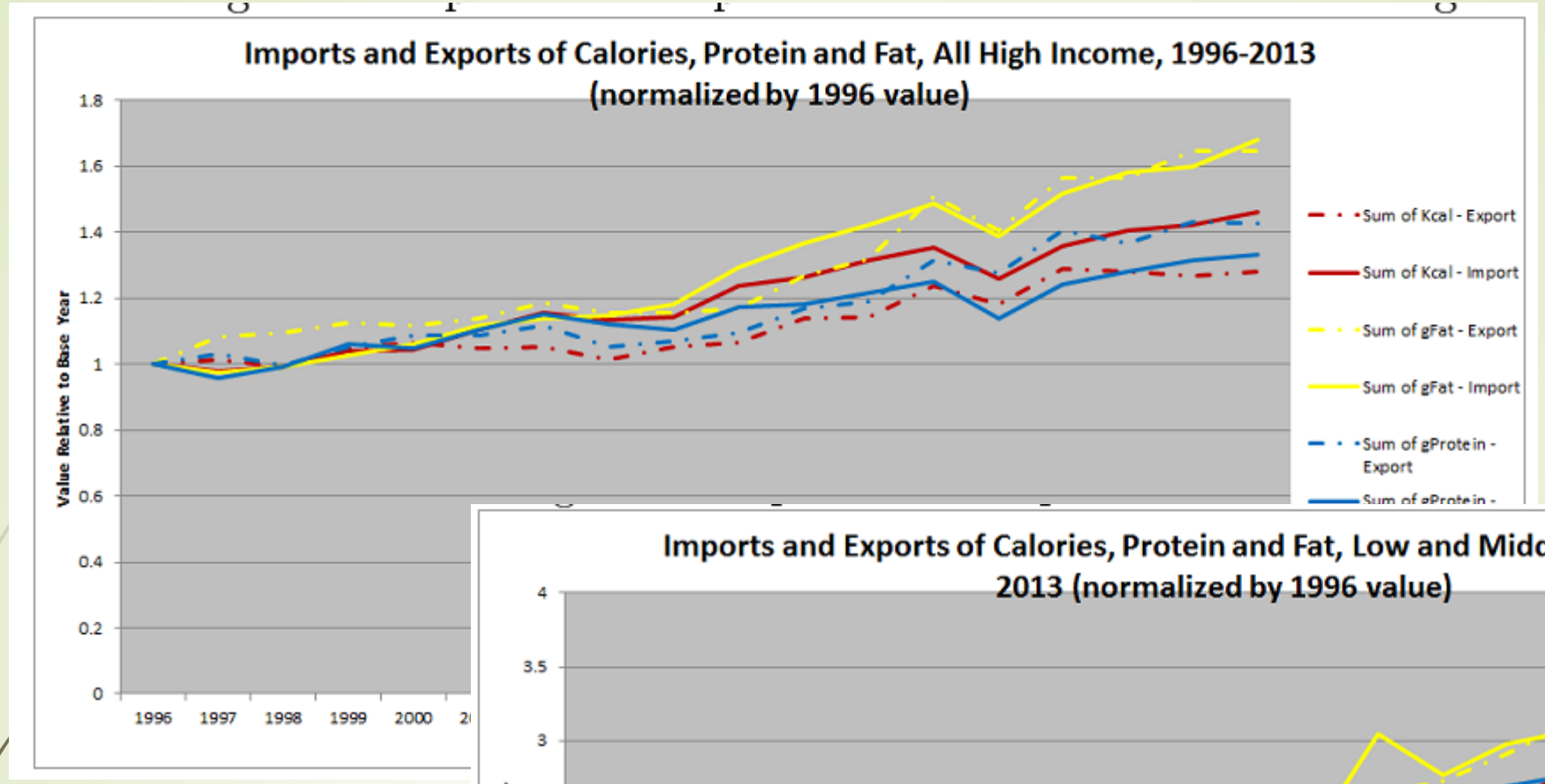


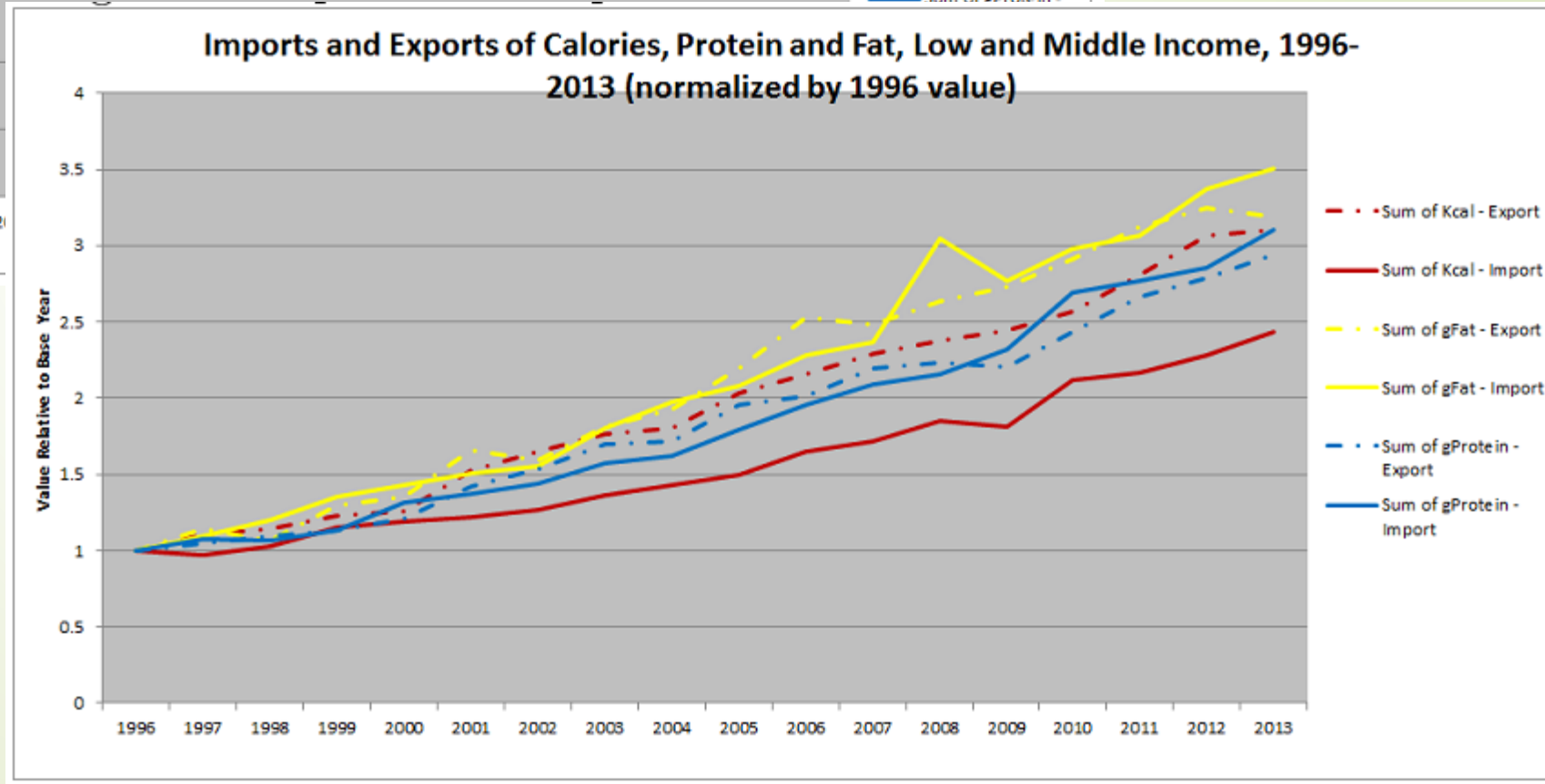
Figure 3: Average Net Imports Value vs. KCal, 1996-2013

Figure 1: Average Net Imports of Protein vs. KCal, 1996-2013

Figure 2: Average Net Imports of Fat vs. KCal, 1996-2013




Imports and Exports of Calories, Protein and Fat, All High Income, 1996-2013 (normalized by 1996 value)
Value Relative to Base Year
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1996
1997
1998
1999
2000
Sum of Kcal - Export
Sum of Kcal - Import
Sum of gFat - Export
Sum of gFat - Import
Sum of gProtein - Export


Imports and Exports of Calories, Protein and Fat, Low and Middle Income, 1996-2013 (normalized by 1996 value)
Value Relative to Base Year
4
3.5
3
2.5
2
1.5
1
0.5
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Sum of Kcal - Export
Sum of Kcal - Import
Sum of gFat - Export
Sum of gFat - Import
Sum of gProtein - Export
Sum of gProtein - Import

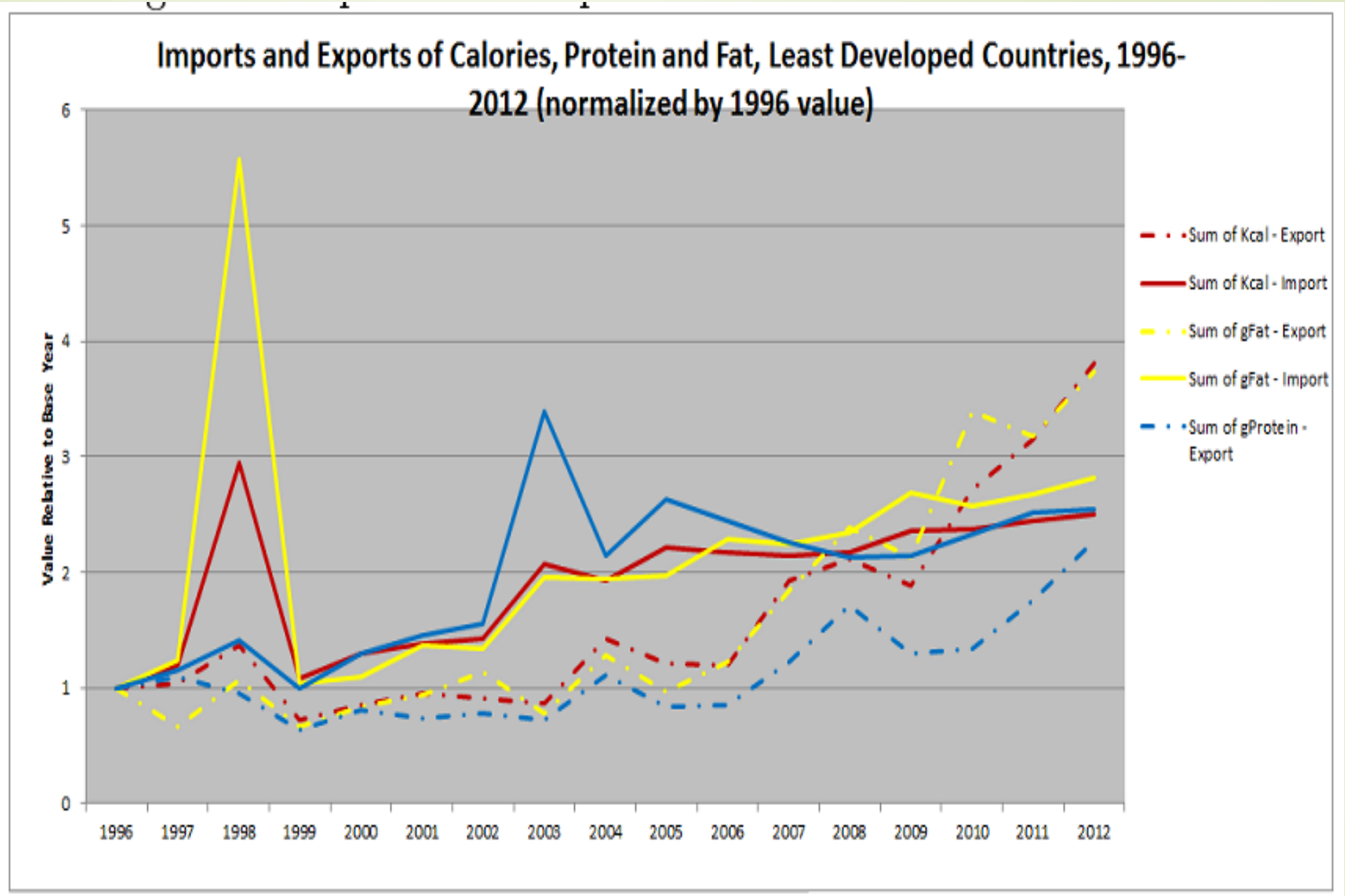

Imports and Exports of Calories, Protein and Fat, Least Developed Countries, 1996-2012 (normalized by 1996 value)
Value Relative to Base Year
0
1
2
3
4
5
6
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Sum of Kcal - Export
Sum of Kcal - Import
Sum of gFat - Export
Sum of gFat - Import
Sum of gProtein - Export

Figure 10: Composition of One Dollar of World Food/Ag Imports, 1996-2013

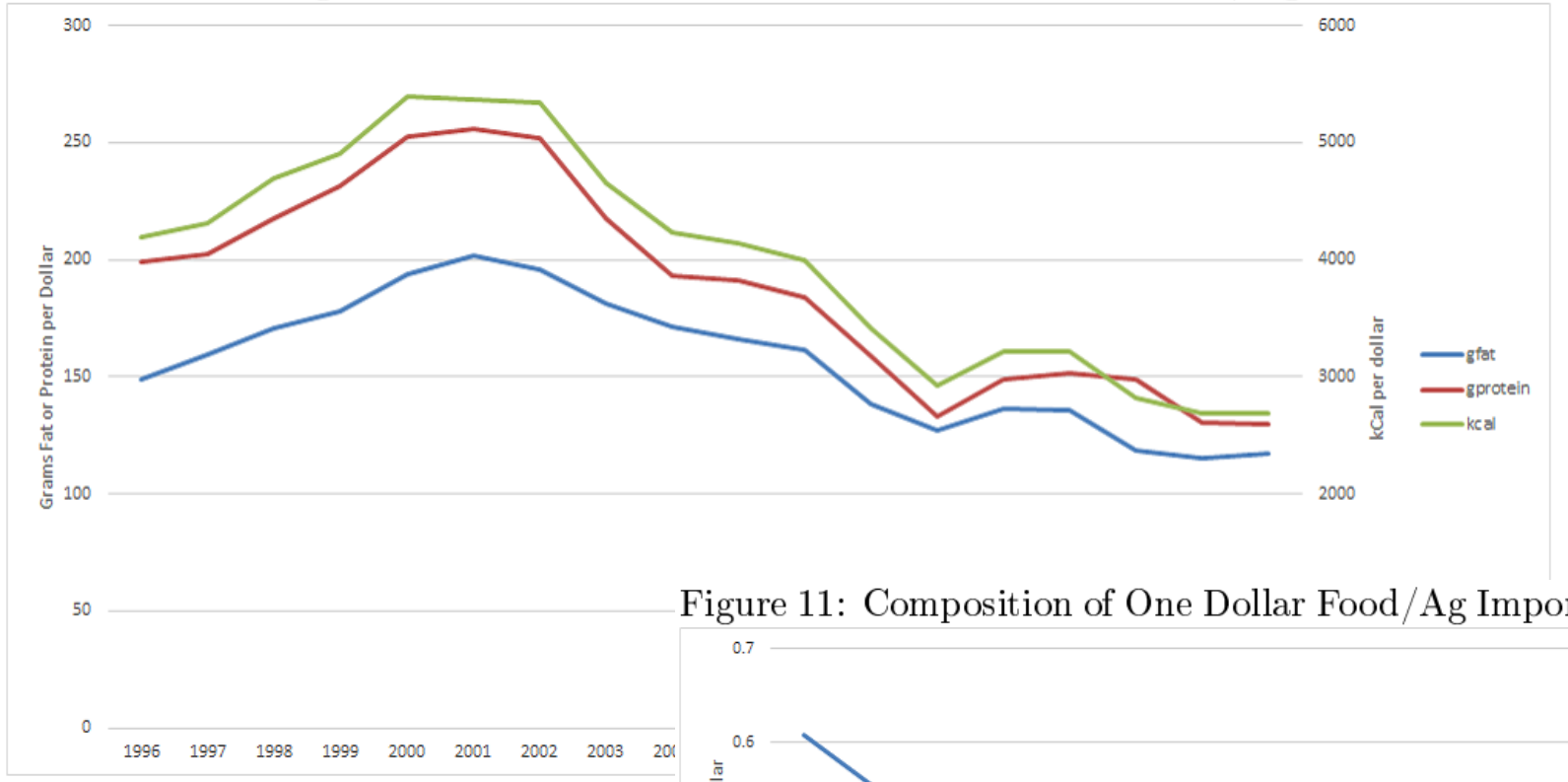


Figure 11: Composition of One Dollar Food/Ag Imports, Ratio of United States relative to World, 1996-2013

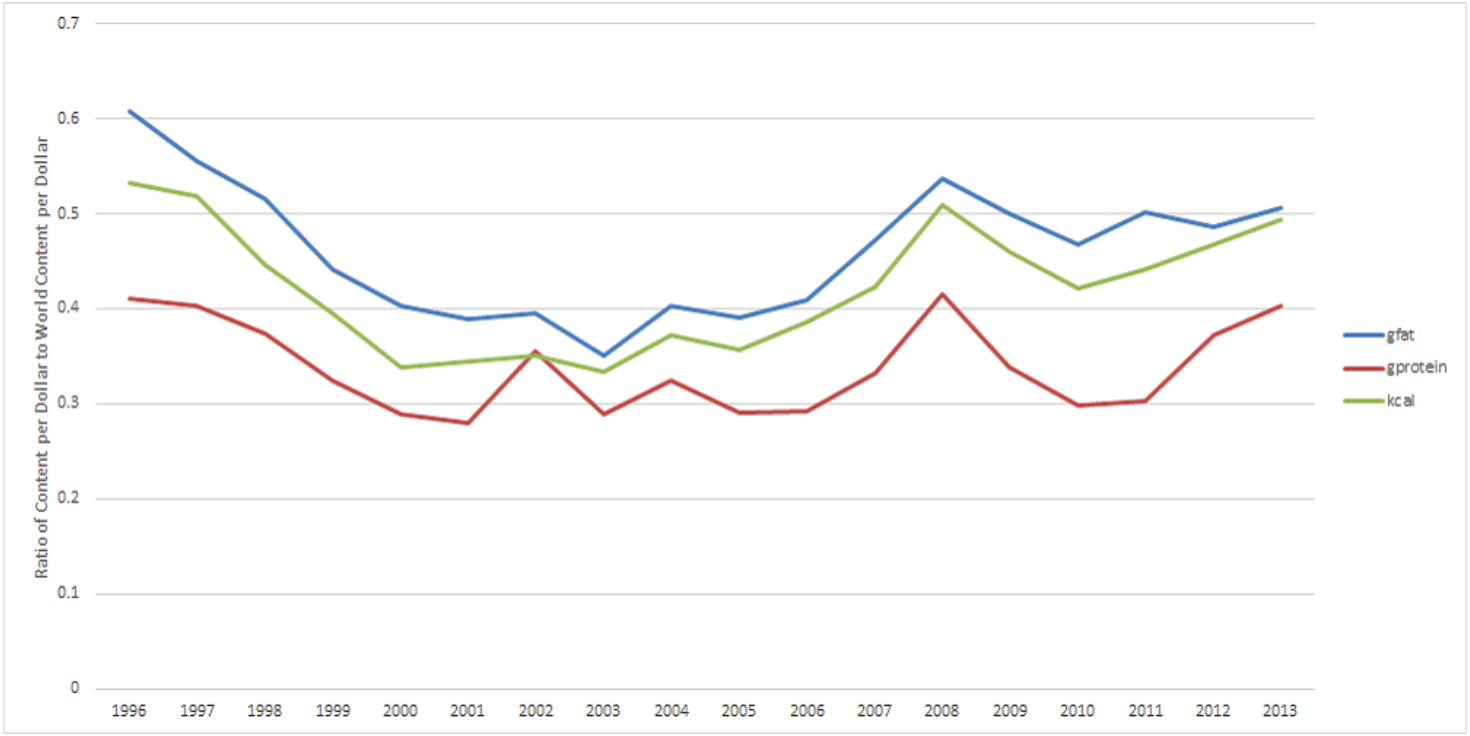
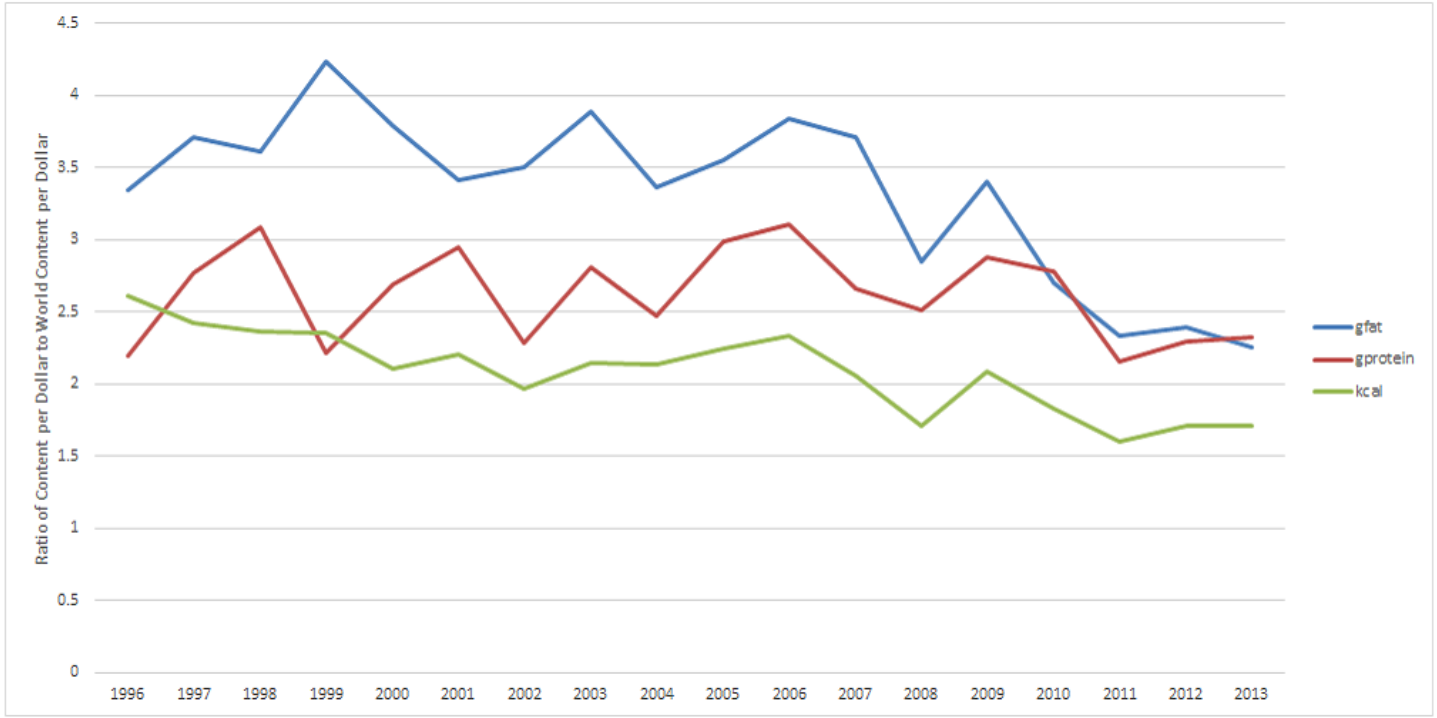
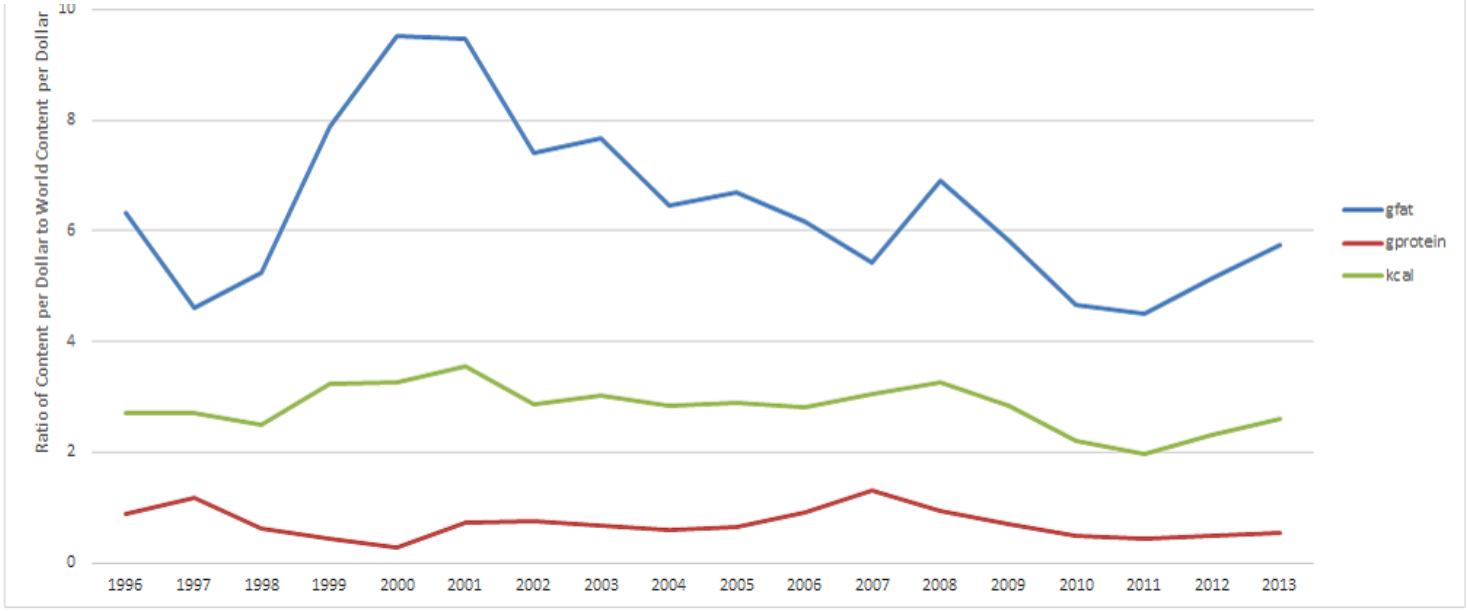


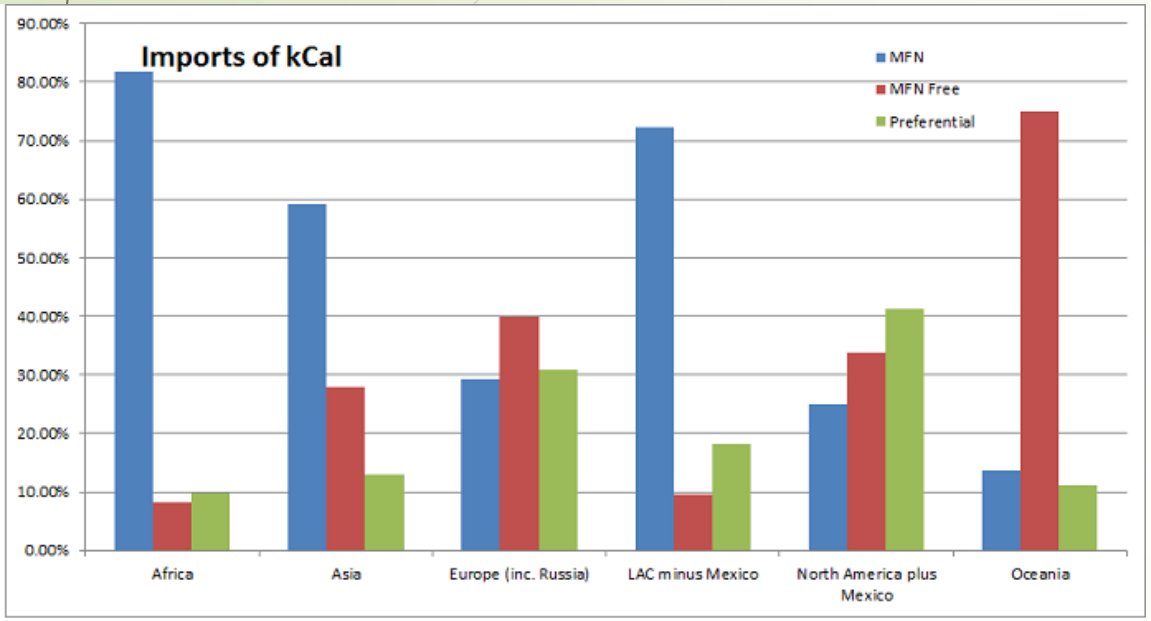
Figure 14: Composition of One Dollar Food/Ag Imports, Ratio of China relative to World, 1996-2013

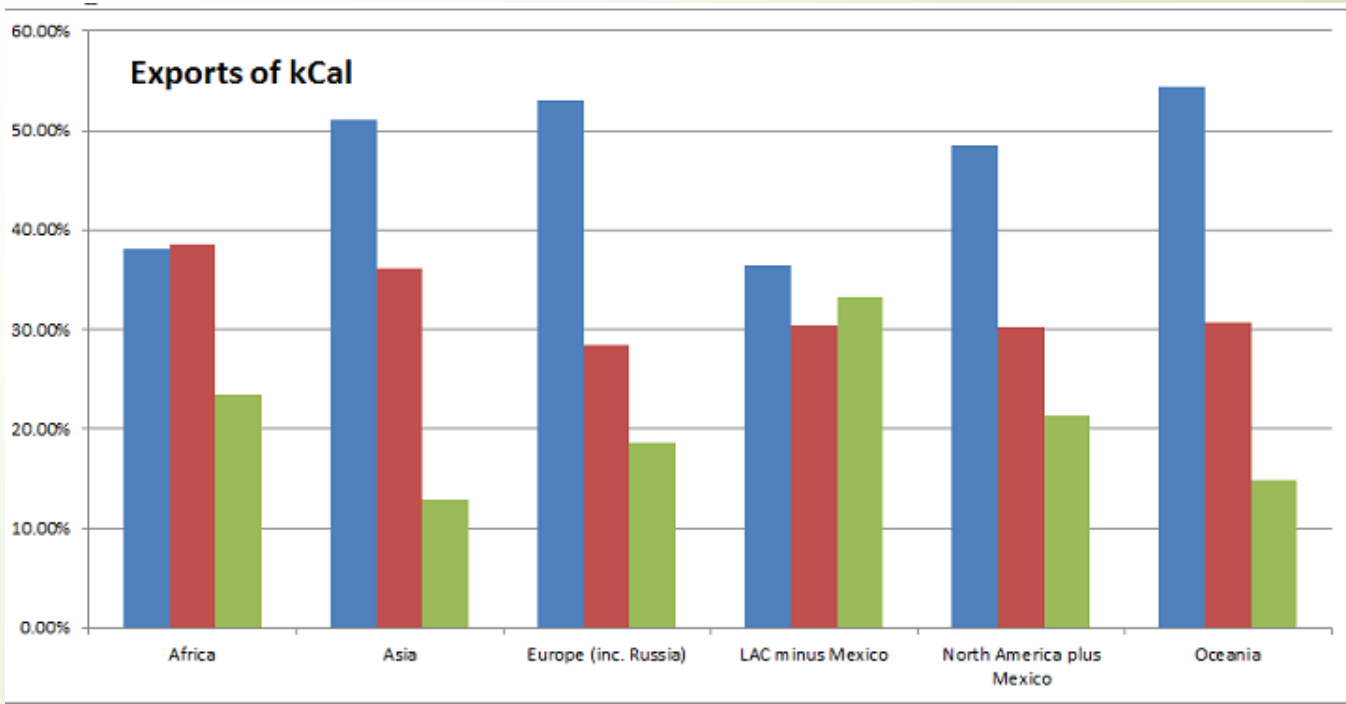


s, Ratio of India relative to World, 1996-201

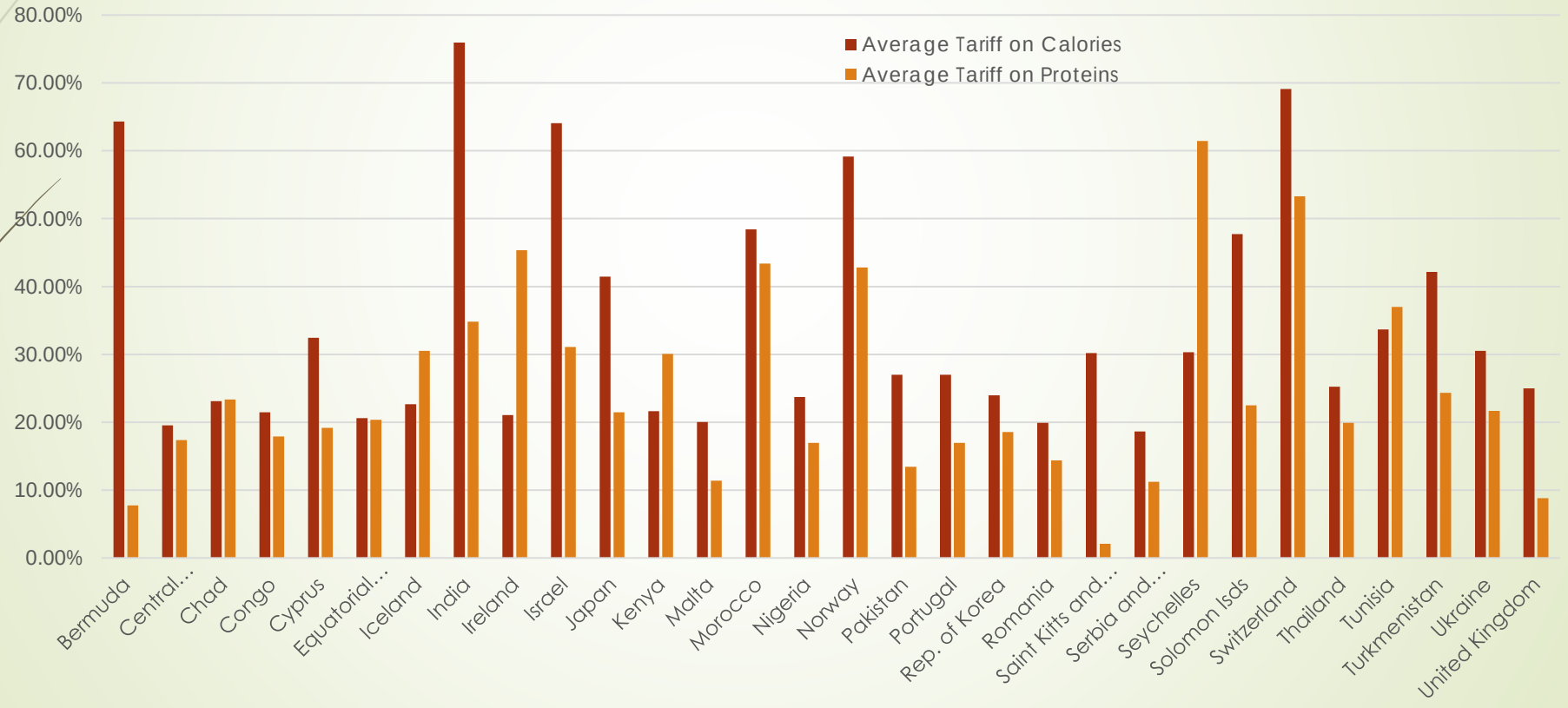


Trade flows by Trade regime





Import tariffs on food products: a heavy burden for the poor



Source: Deason and Laborde (2010)

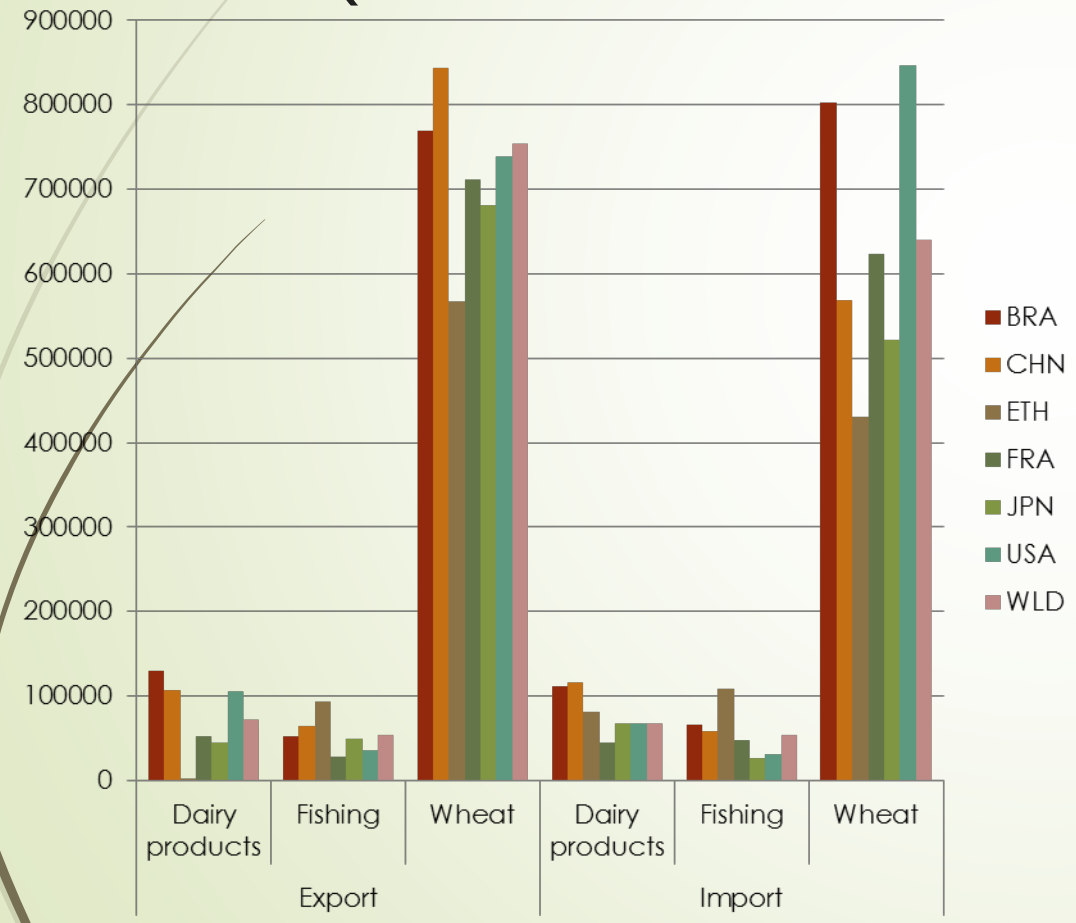
Bilateral trade: the role of alternative metrics

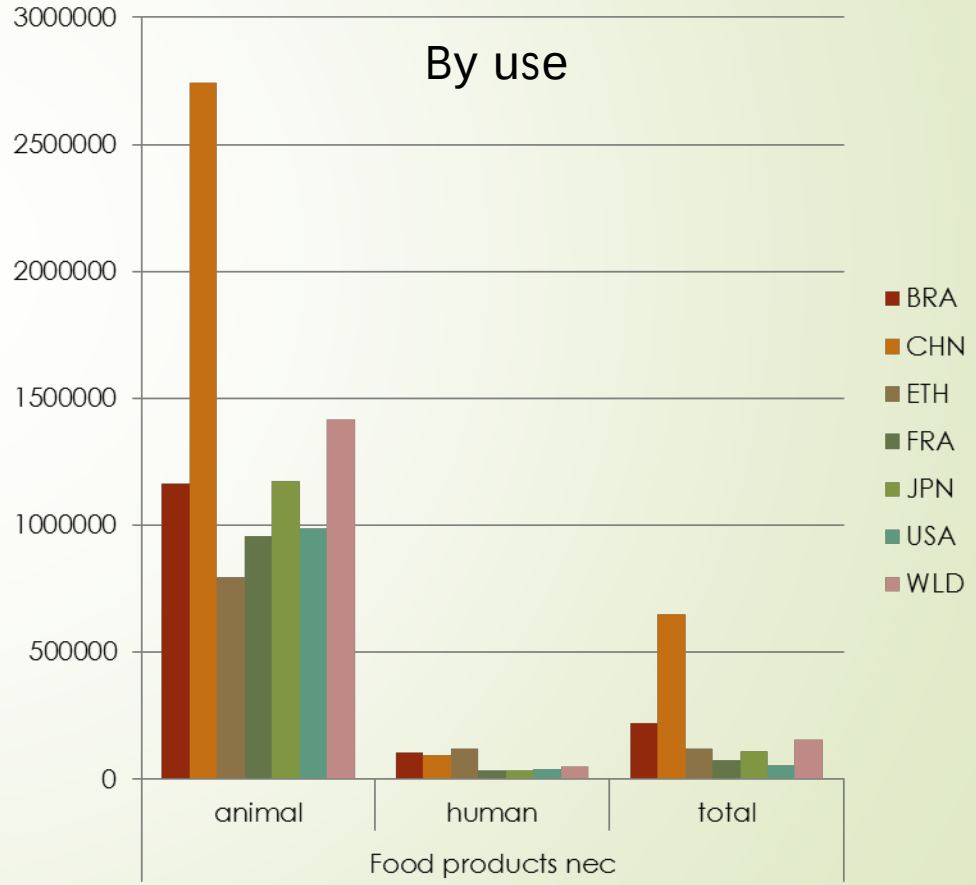
African Imports	Africa	Asia	Europe	LAC	NorthAmerica	Oceania
Dollars (value)						
1990-1995	**6.77%**	17.26%	37.90%	9.96%	24.79%	3.31%
2002-2007	**12.39%**	19.81%	35.23%	15.97%	13.68%	2.93%
kCal						
1990-1995	**3.09%**	14.23%	23.81%	10.44%	44.81%	3.62%
2002-2007	**7.05%**	20.38%	27.06%	19.45%	21.63%	4.43%

African Exports	Africa	Asia	Europe	LAC	NorthAmerica	Oceania
Dollars (value)						
1990-1995	**7.99%**	16.79%	67.32%	0.61%	6.95%	0.34%
2002-2007	**15.15%**	14.86%	62.51%	0.53%	6.10%	0.84%
kCal						
1990-1995	**13.80%**	26.20%	49.96%	2.99%	6.59%	0.46%
2002-2007	**31.41%**	29.21%	34.03%	0.92%	4.19%	0.23%

Bouet and al. (2014)

Implications for modeling
e.g. Protein contents of $1000 of trade flows (GTAP sectors, 2004)





Food Diversity and concentration

	Average Number of Products				Herfindahl-Hirshman Index Product Space			
	# Products		# Exporters		Proteins		Calories	
	1998-2000	2011-2013	1998-2000	2011-2013	1998-2000	2011-2013	1998-2000	2011-2013
Afghanistan	97	397	1.5	3.7	0.731	0.428	0.516	0.263
Argentina	514	429	5.3	4.8	0.402	0.064	0.201	0.067
Australia	548	546	10.4	15.7	0.129	0.041	0.054	0.021
Brazil	540	502	6.4	7.4	0.338	0.309	0.341	0.262
China	575	558	9.4	14.5	0.371	0.733	0.132	0.270
Ghana	310	491	3.0	7.1	0.234	0.088	0.187	0.093
Guatemala	491	495	3.9	4.7	0.173	0.139	0.134	0.132
Malawi	221	359	1.7	2.2	0.207	0.268	0.160	0.180
Mali	250	309	3.0	3.7	0.137	0.244	0.146	0.187
Paraguay	379	369	3.0	3.7	0.209	0.158	0.135	0.056
United States of America	601	585	20.9	24.9	0.035	0.030	0.026	0.024
Uzbekistan	230	299	2.5	3.2	0.498	0.364	0.370	0.263

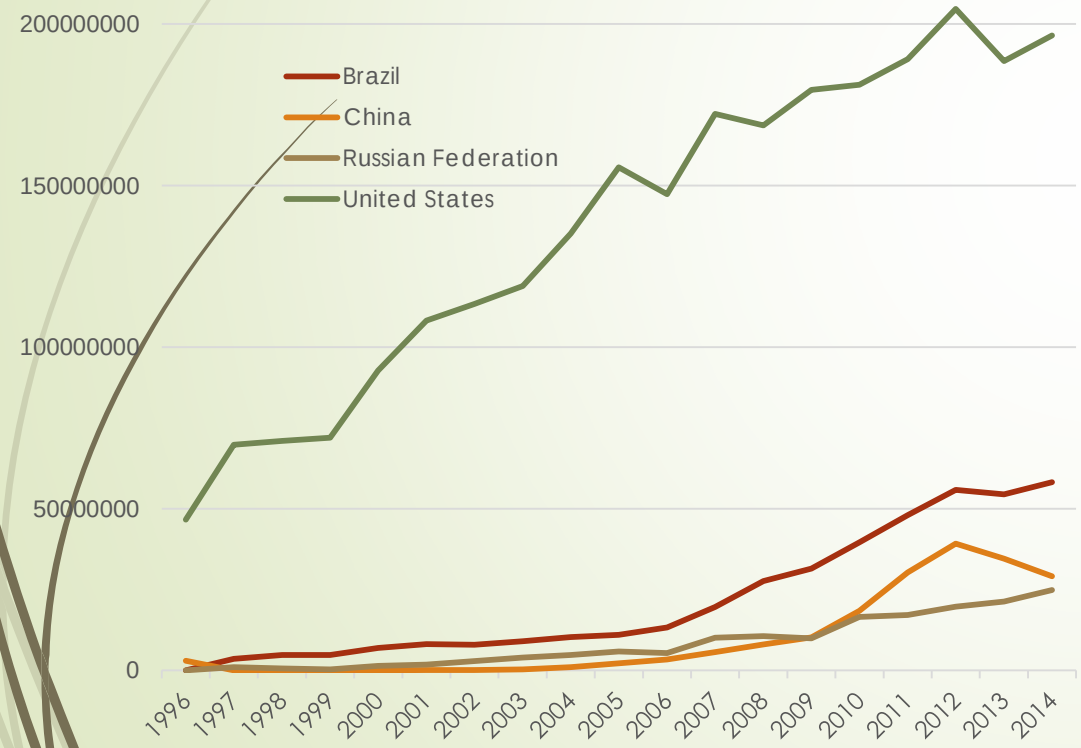
Laborde and Deason (2015)

Fish and Fish products: a booming market

Based on COMTRADE data

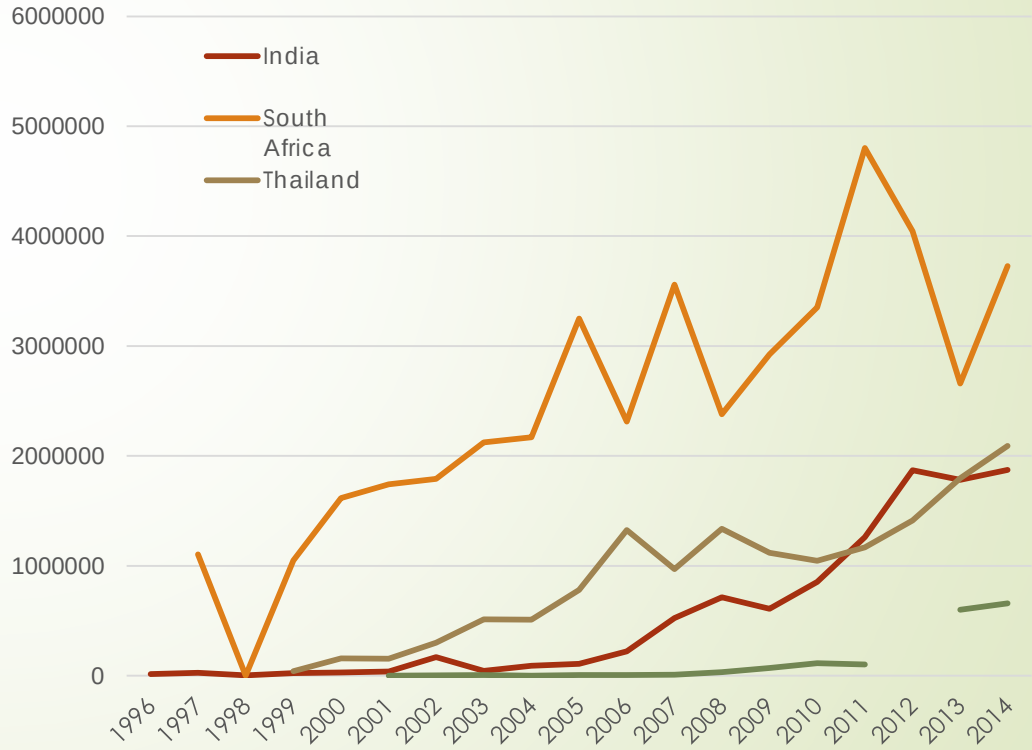
The Mediterranean Diet: Virgin Olive Oil imports

US and Emerging countries (Kg)



Based on COMTRADE data

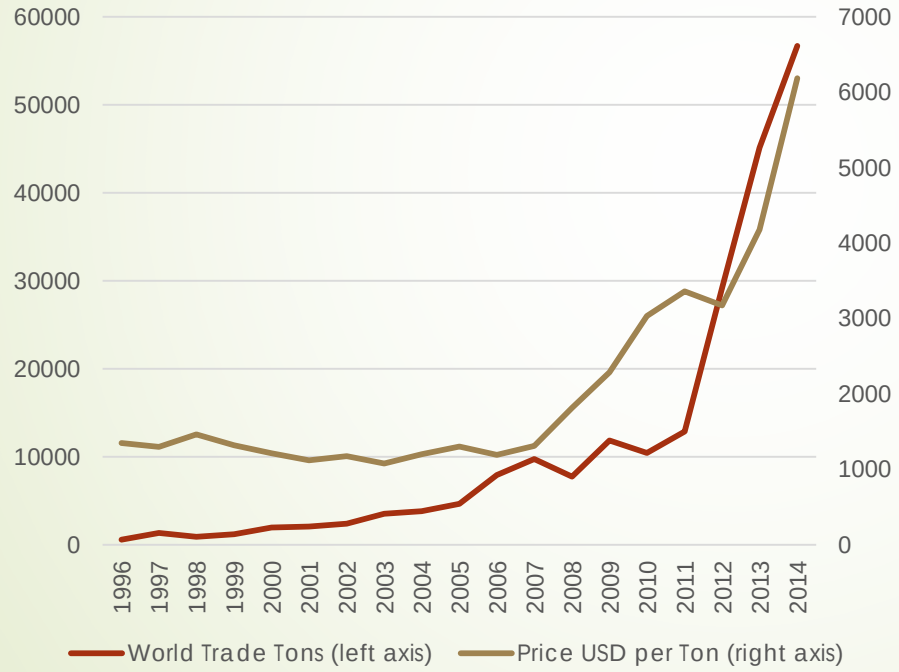
New Comers (Kg)



Based on COMTRADE data

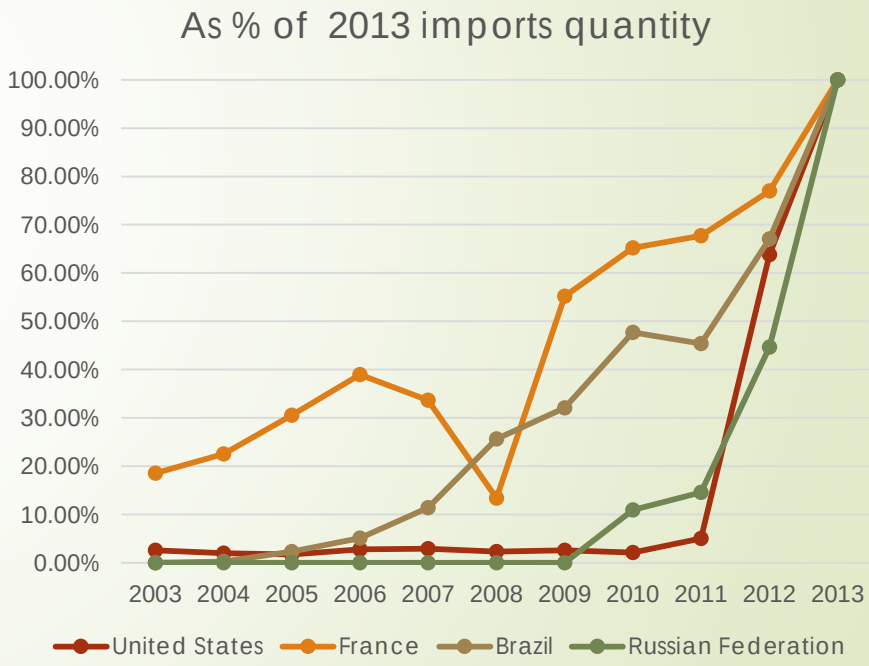
Quinoa

A booming global markets



Based on COMTRADE data

New demand: driven by the most advanced economies



Based on COMTRADE data

Assessing the gains from increased diversity

- Assessing the gains from increased diversity in International Trade
  - Could we use Feenstra (1994), Broda and Wenstein (2006)?
    - Goods defined on tariff schedule structure, varieties on origin
  - Several issues
    - Definition of products and varieties
    - Value of elasticity of substitution
      - Across products
      - Across origins (see Laborde, Salvaticci and Pina, 2014): Armington at the tariff line lower in average for agriculture compared to industry
      - Large gains?

Some simulations

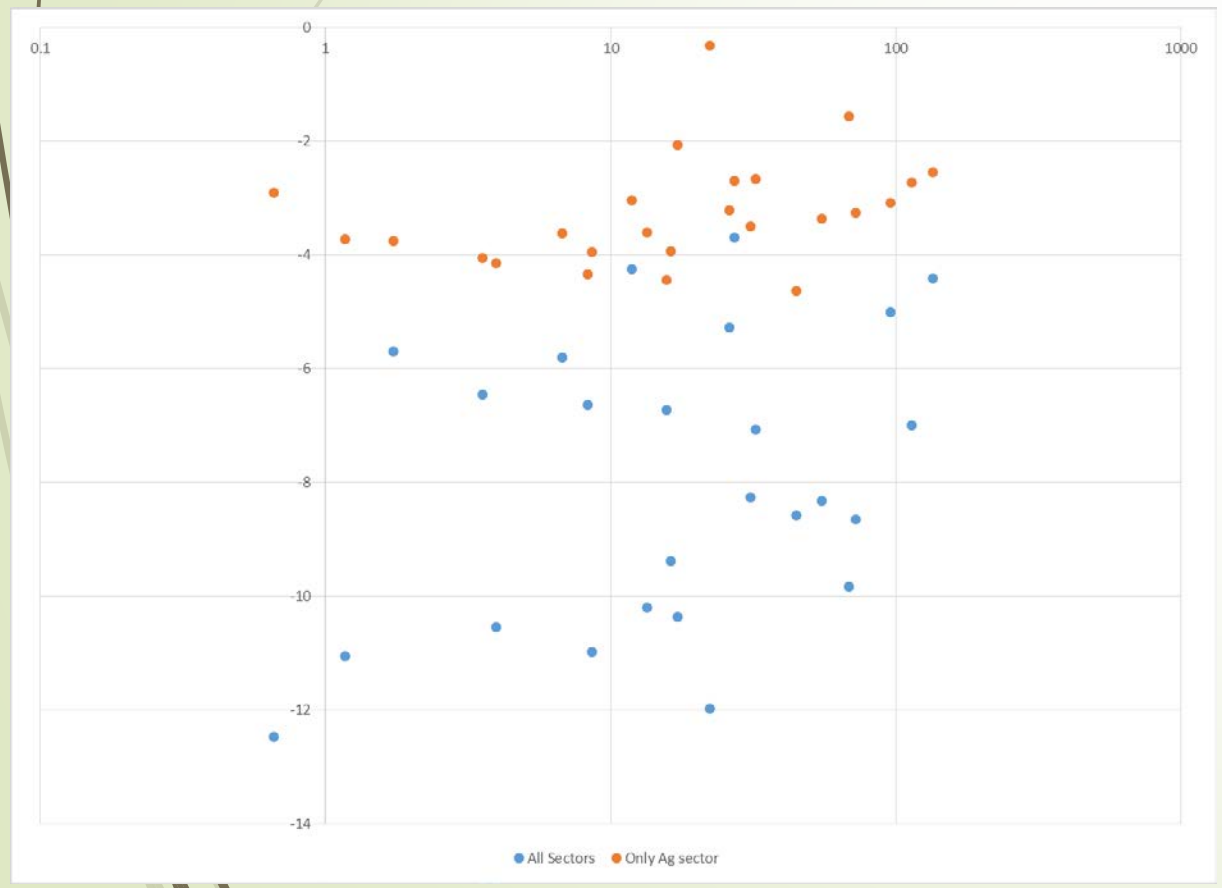
Simulating some reduction in trade flows

- MIRAGE-HH framework (Bouet and al.): Global CGE with bottom up household disaggregation
  - Capture HH income dynamics and consequences, but also government income
  - Price effects

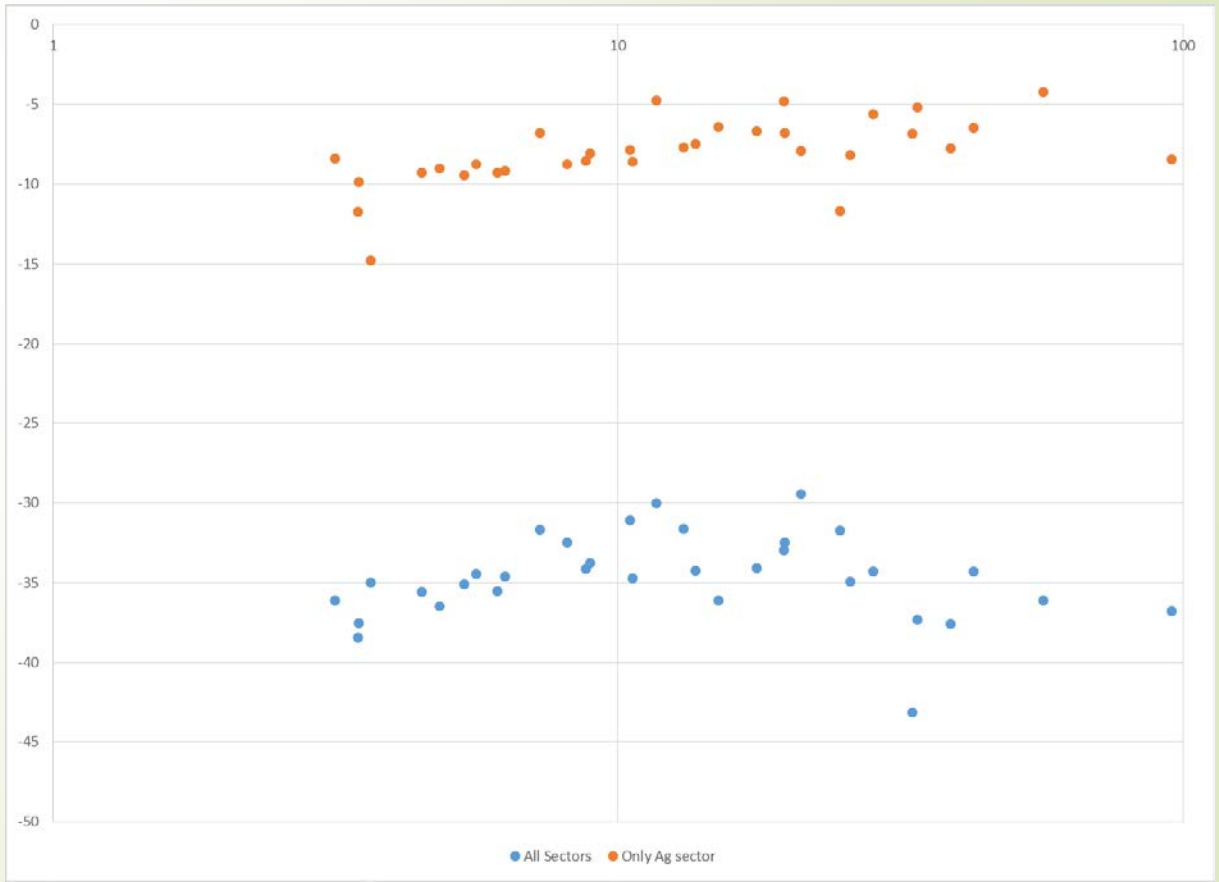
- Scenario: increases in non policy trade costs to reduce international trade share in global production to early 70's level
  - Scenario A: all products
  - Scenario B: Only agriculture

Impact of food consumption
(household ranked by log income per capita)

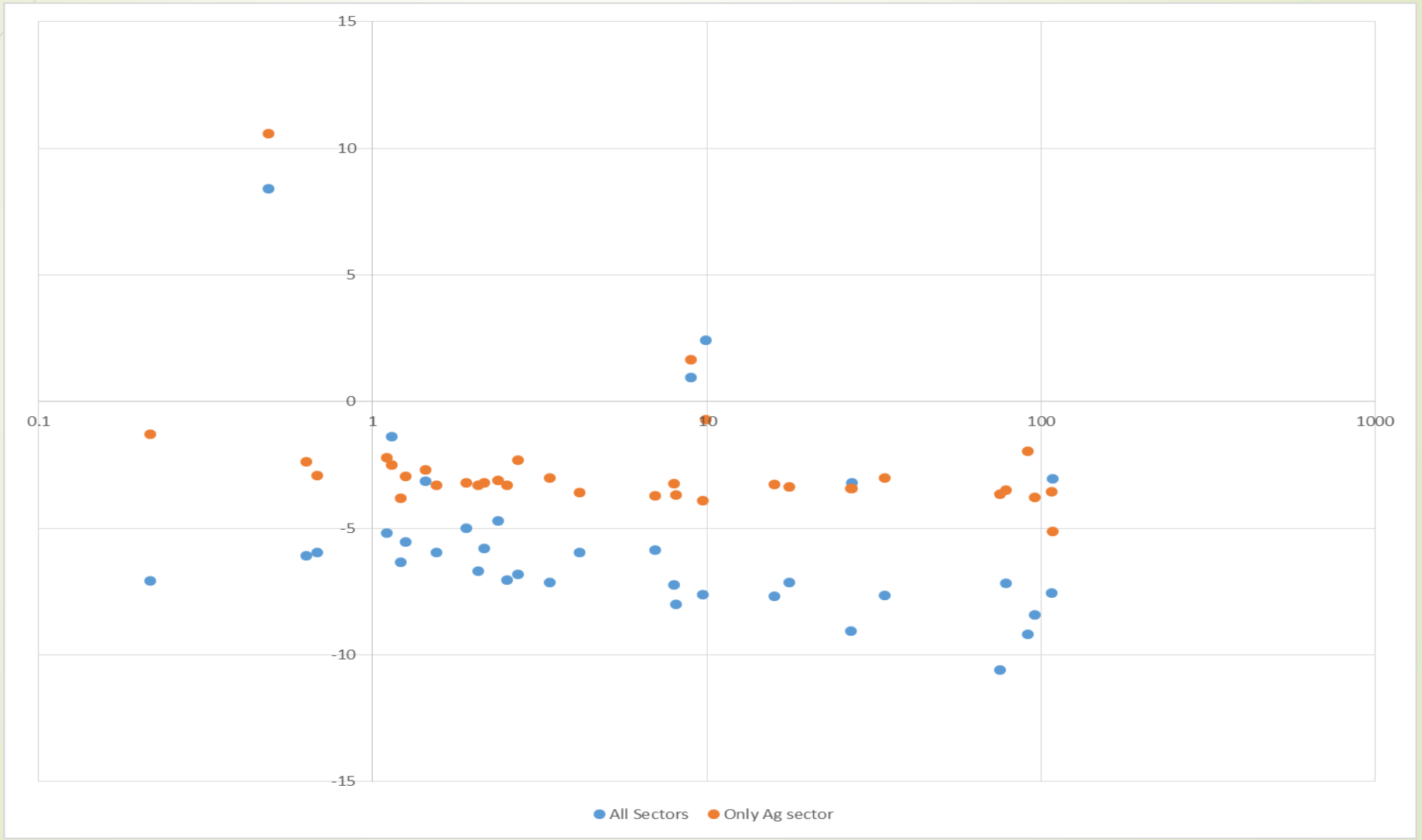
Pakistan



Vietnam



Tanzania



Conclusions

- Food Security is a (global) public good and Trade is a global public good;
- Providing global public goods require cooperative policies among countries;
- Food Security can not be reduced to self sufficiency;
- Challenges to come with direct evidences
- International trade as a necessary but not sufficient condition