



INTERNATIONAL FOOD
POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty

“Price transmission from international agricultural commodity markets to domestic food prices in Latin America and Asia”

Workshop: Food Price Volatility and Food Security
Center for Development Research University of Bonn
January 2013

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Outline

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2. Methodology
3. Asia
 - DATA Asia
 - Results
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 - DATA LAC
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5. Final comments

1. Introduction

- This work was originally motivated by the 2007-08 food crisis, when international wheat and corn prices x 2 and rice prices x 3 in 12 months
- At the time we wanted to understand how much of the variation in international prices was transmitted to domestic food prices and ultimately what was the impact of that on households' welfare, especially for the poor
- Here I'm presenting the price transmission analysis of two studies:
 - “Price transmission from international agricultural commodity markets to domestic food prices: The case of Bangladesh, Pakistan and Vietnam”
 - “Assessing Impact of Increased Global Food Prices on the Poor in Selected Latin American Countries”

2. Methodology

1. Price levels and growth rate of prices (first differences)
 - Price series are $I(1)$ all over the place → econometric analysis with growth rates
2. Transmission effects might take more than one period or they may come with time lags.
3. Other factors might affect domestic prices (exchange rate).
4. Different transmission effects depending on domestic location (cities)
5. Different transmission effects depending on domestic food (impact on wheat flour, bread, pasta, etc.)

2. Methodology

- We use available historical monthly price time series
- Four different types of analysis in comparing prices of a given international commodity with a related domestic food price.
 1. Graphical representation (12-month growth rate)
 2. Focus on food crisis period: 12-month growth rates, on a quarterly basis, for years 2006–2008.
 3. Correlation analysis (A more formal concept of co-movement).
 - Price series in levels (affected by a common trend)
 - Growth rates (Not affected by a common trend)

2. Methodology

4. Econometric approach: moving average first-difference regression models (Rigobon 2008)

$$d \ln(P_t) = \alpha_0 + \beta_0 d \ln(P_t^*) + \dots + \beta_5 d \ln(P_{t-5}^*) + \gamma_0 d \ln(E_t) + \dots + \gamma_5 d \ln(E_{t-5}) + \varepsilon_t \quad \varepsilon_t \sim iid$$

- P_t : domestic price in local currency in period t
- P_t^* : international prices in US dollars in period t
- E_t : exchange rate in period t

- Price transmission elasticity = $\sum_{i=0}^5 \beta_i$

3. ASIA - DATA

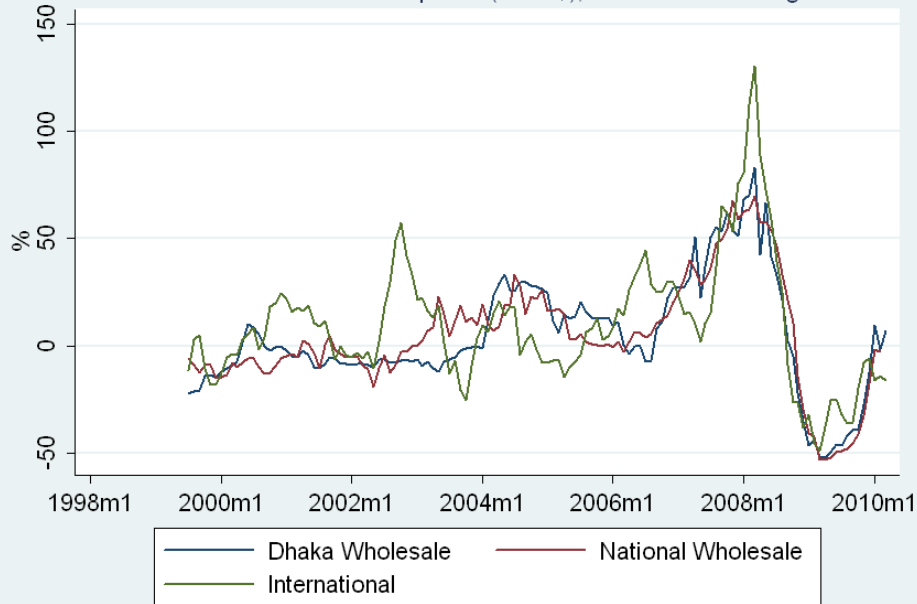
- Countries: Bangladesh, Pakistan and Vietnam
- International prices: monthly, from the International Commodity Price Database of the Food and Agriculture Organization (FAO)
 - Wheat US No.2, Hard Red Winter, US Fob Gulf,
 - Rice White Broken Rice, Thai A1 Super, Fob Bangkok.
- Domestic prices
 - FAO - Global Information and Early Warning System (Bangladesh, Pakistan)
 - General Statistics Office of Vietnam
- Exchange rates: International Monetary Fund (IMF).

3. ASIA - DATA

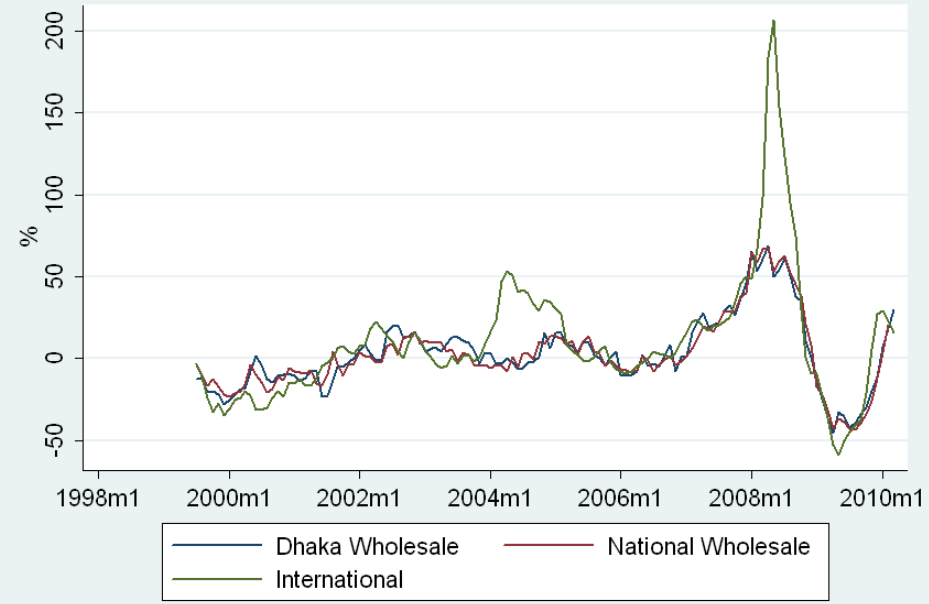
Country	Commodities	Cities	Period
Bangladesh	Wheat (wholesale) Rice (wholesale)	Dhaka National	1998m7 – 2010m3
Pakistan	Wheat Wheat flour Rice basmati Rice irri	Karachi Lahore Multan Peshawar Quetta	2006m1 – 2010m3
Vietnam	Rice Wheat flour	Hanoi Son La Da Nang HCMC Dak Lak Lam Dong Tien Giang Dong Thap Can Tho	2001m1 – 2008m12

3. Results: Bangladesh

BANGLADESH: Wheat prices (in US\$), 12-months % change



BANGLADESH: Rice prices (in US\$), 12-months % change



3. Results: Bangladesh

Bangladesh: Price transmission elasticities

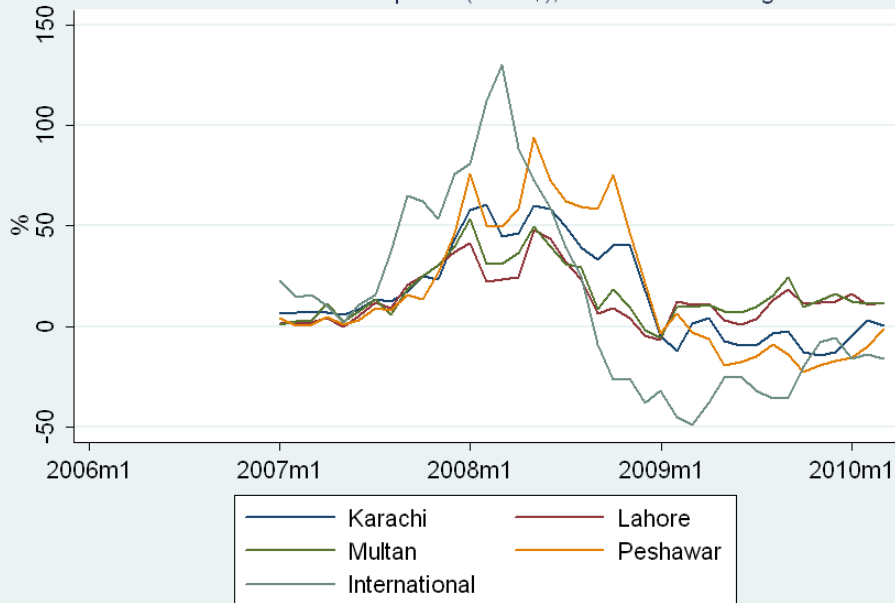
	Transmission elasticity	Standard error	Significance level
Wheat			
Dhaka, wholesale	0.583880	0.136560	0.000038
National, wholesale	0.700098	0.120119	0.000000

Bangladesh: Price transmission elasticities

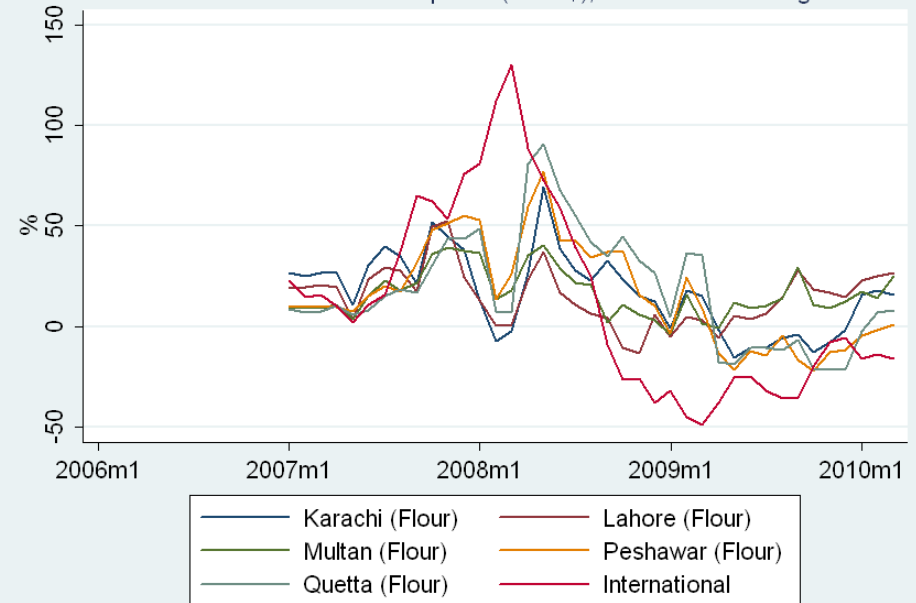
	Transmission elasticity	Standard error	Significance level
Rice			
Dhaka, wholesale	0.438651	0.113837	0.000187
National, wholesale	0.425959	0.105925	0.000101

3. Results: Pakistan - wheat

PAKISTAN: Wheat prices (in US\$), 12-months % change

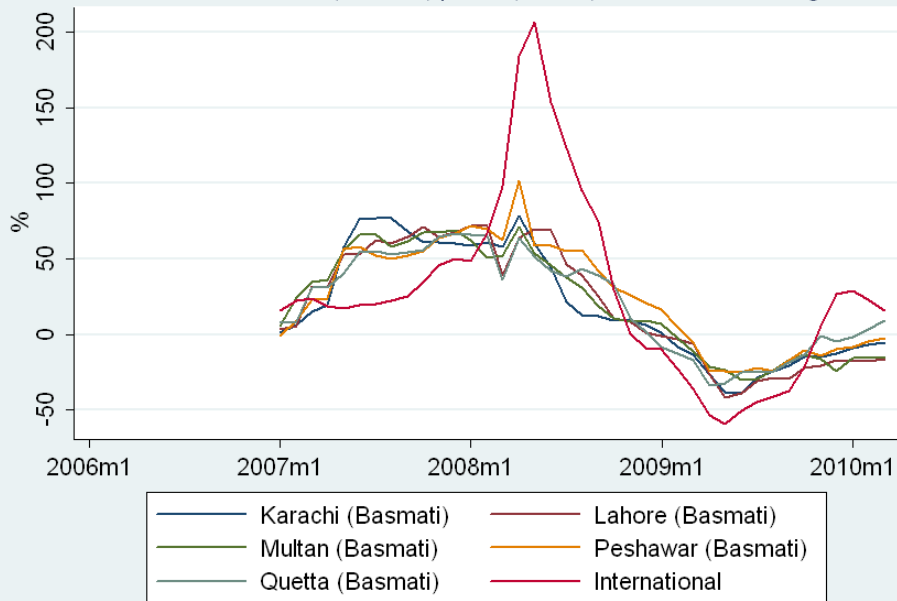


PAKISTAN: Wheat flour prices (in US\$), 12-months % change

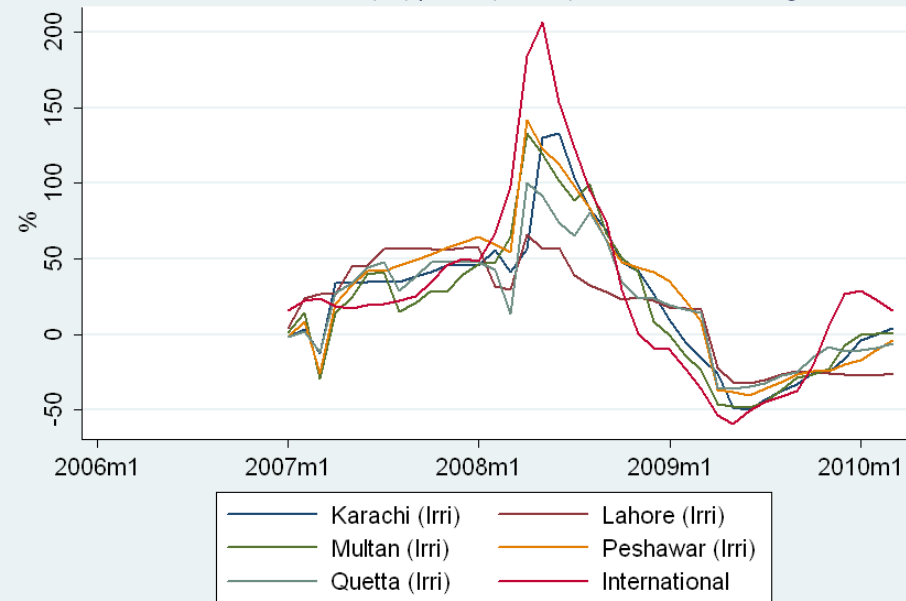


3. Results: Pakistan - rice

PAKISTAN: Rice (Basmati) prices (in US\$), 12-months % change



PAKISTAN: Rice (Irri) prices (in US\$), 12-months % change



3. Results: Pakistan

Pakistan: Price transmission elasticities

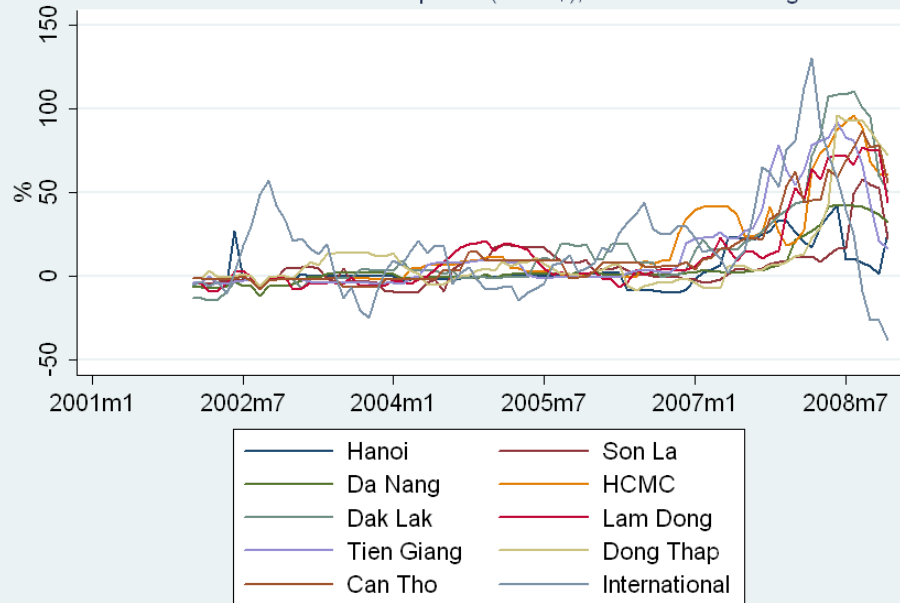
	Transmission elasticity	Standard error	Significance level
Wheat			
Karachi, retail	0.5014	0.1955	0.0152
Lahore, retail	0.2836	0.1971	0.1598
Multan, retail	0.3550	0.1838	0.0623
Peshawar, retail	0.8220	0.2807	0.0062
Karachi flour retail	-0.3353	0.3397	0.3311
Lahore, flour retail	-0.2591	0.3444	0.4575
Multan, flour retail	0.0081	0.2262	0.9715
Peshawar, flour, retail	0.3137	0.2795	0.2700
Quetta, flour, retail	0.0039	0.3984	0.9923

Pakistan: Price transmission elasticities

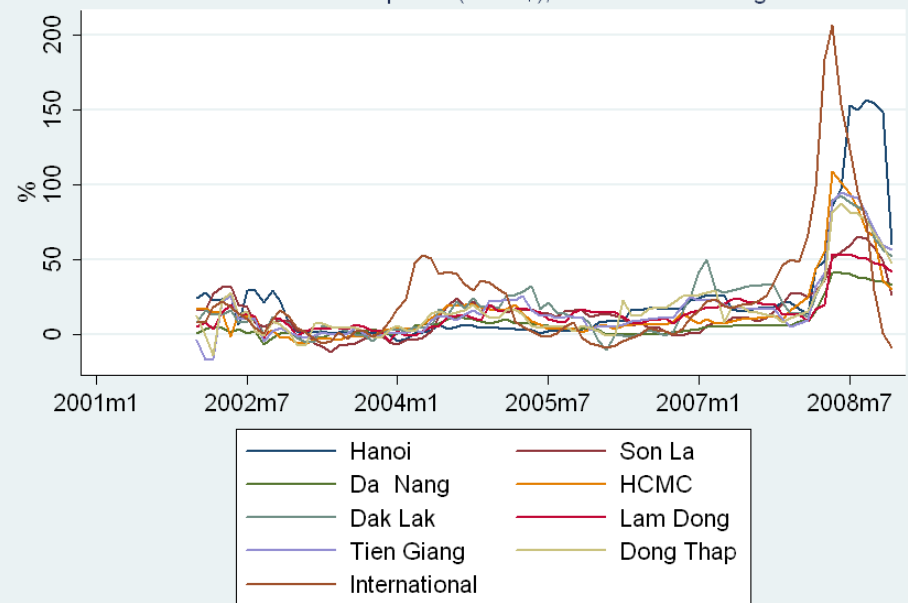
	Transmission elasticity	Standard error	Significance level
Rice			
Karachi, basmati, retail	0.4014	0.2821	0.1645
Lahore, basmati, retail	0.5327	0.2533	0.0434
Multan, basmati, retail	0.4840	0.2146	0.0311
Peshawar, basmati, retail	0.6232	0.2230	0.0087
Quetta, basmati, retail	0.4679	0.2059	0.0299
Karachi, irri, retail	0.5350	0.2377	0.0314
Lahore, irri, retail	0.6488	0.2391	0.0106
Multan, irri, retail	0.7906	0.2620	0.0050
Peshawar, irri, retail	1.0042	0.2604	0.0005
Quetta, irri, retail	0.7092	0.3703	0.0644

3. Results: Vietnam

VIETNAM: Wheat flour prices (in US\$), 12-months % change



VIETNAM: Rice prices (in US\$), 12-months % change



3. Results: Vietnam

Vietnam: Price transmission elasticities

	Transmission elasticity	Standard error	Significance level
Wheat			
Hanoi	-0.2505	0.1746	0.1554
Son La	0.0746	0.1300	0.5677
Da Nang	0.1224	0.0513	0.0194
HCMC	0.2923	0.1143	0.0125
Dak Lak	0.2143	0.1203	0.0788
Lam Dong	0.2000	0.1026	0.0548
Tien Giang	0.3575	0.0923	0.0002
Dong Thap	-0.0054	0.1305	0.9674
Can Tho	0.0988	0.0988	0.3207

Vietnam: Price transmission elasticities

	Transmission elasticity	Standard error	Significance level
Rice			
Hanoi	0.9093	0.1750	0.0000
Son La	0.3897	0.1155	0.0012
Da Nang	0.2550	0.0473	0.0000
HCMC	0.5602	0.0895	0.0000
Dak Lak	0.4992	0.1403	0.0006
Lam Dong	0.2869	0.0891	0.0019
Tien Giang	0.4733	0.1036	0.0000
Dong Thap	0.2638	0.1194	0.0301

3. ASIA. Summary of findings

- For large international price shocks transmission (co-movement) is evident. Evidence suggests that during food crisis (2007-2008) domestic prices responded in all three countries and almost all cities.
- For larger time horizons (moderate price fluctuations) transmission effects are also present but less evident.
- Transmission effects are heterogeneous across countries, across products and across cities within a country
- In Bangladesh, there is high transmission elasticity for both rice and wheat. This transmission is stronger for wheat (0.7) than for rice (0.43)

3. ASIA. Summary of findings

- In Pakistan high transmission for rice (both irri and basmati) : range 0.53–1.0. Wheat transmission is on average lower, and more variation across cities: in the range 0 - 0.82. No transmission for wheat flour
- In Vietnam: positive rice transmission in the range 0.3 - 0.9. For wheat flour, transmission effects are lower (only positive in 5 out of 9 cities ranging from 0.12 to 0.35)

4. DATA - LAC

- Países en LAC:

- México
- Guatemala
- El Salvador
- Honduras
- Nicaragua
- Costa Rica
- Panamá
- República Dominicana
- Ecuador
- Perú



4. Data - LAC

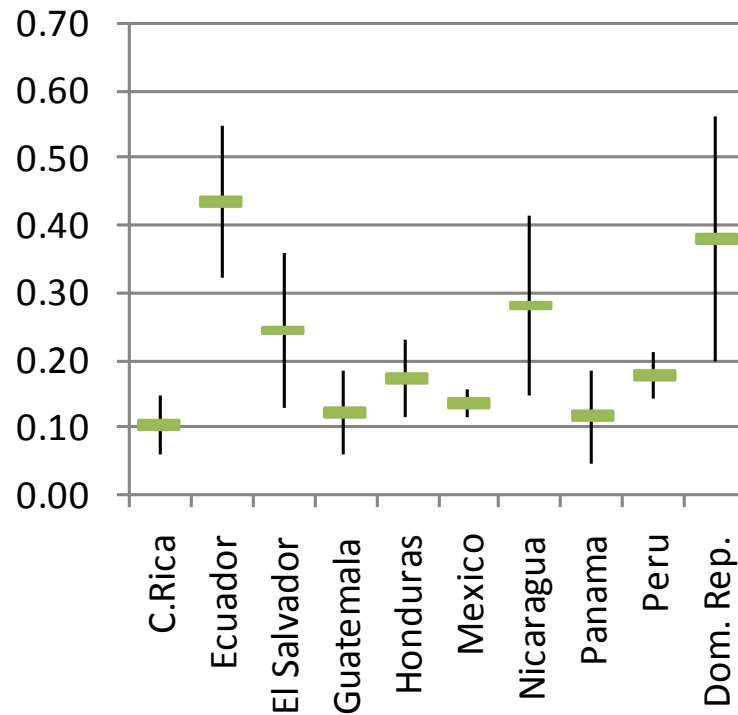
- International prices: monthly, from the International Commodity Price Database of the Food and Agriculture Organization (FAO)
 - U.S. Gulf of Mexico, No. 2 yellow **corn**
 - U.S. Gulf of Mexico No. 2 soft red winter **wheat**
 - Thai A1 white broken **rice** at Bangkok
- Exchange rates: International Monetary Fund (IMF).
- Domestic prices: monthly series from national Bureau of Statistics

	Mexico	Guatemala	El Salvador	Honduras	Nicaragua
wheat related	sweet_bread white_bread bread_decaja cookies other_cookies wheat_flour pastry	bread pasta pastry	bread bread_sweet macaroni crackers	bread_loaf bread_semitas spaghetti crackers wheat_flour	bread bread_loaf bread_loaf_sliced spaghetti crackers cookies wheat_flour candy_polvoron
corn related	tortillas corn corn_flour	tortillas corn corn_flour corn_milling	tortillas corn	tortillas corn cornflakes	tortillas corn corn_flour cornflakes
rice related	rice	rice	rice	rice	rice
Period	1989m1 2008m10	2000m12 2008m4	1995m1 2008m3	2000m3 2008m3	2000m3 2008m3

	Costa Rica	Panama	Dominican R.	Ecuador	Peru
wheat related	bread bread_square bread_sweet crackers cookies wheat_flour	bread pasta crackers flour cereals	bread 1 bread 2 pasta spaghetti	bread bread_baguette pasta spaghetti cookies flour	bread_cereals_grains (price index)
corn related	tortillas corn_flour			corn	
rice related	rice	rice	rice rice selected rice premium	rice	
Period	2000m1 2008m4	2003m1 2008m3	2003m1 2008m3	2005m1 2008m10	1996m1 2008m9

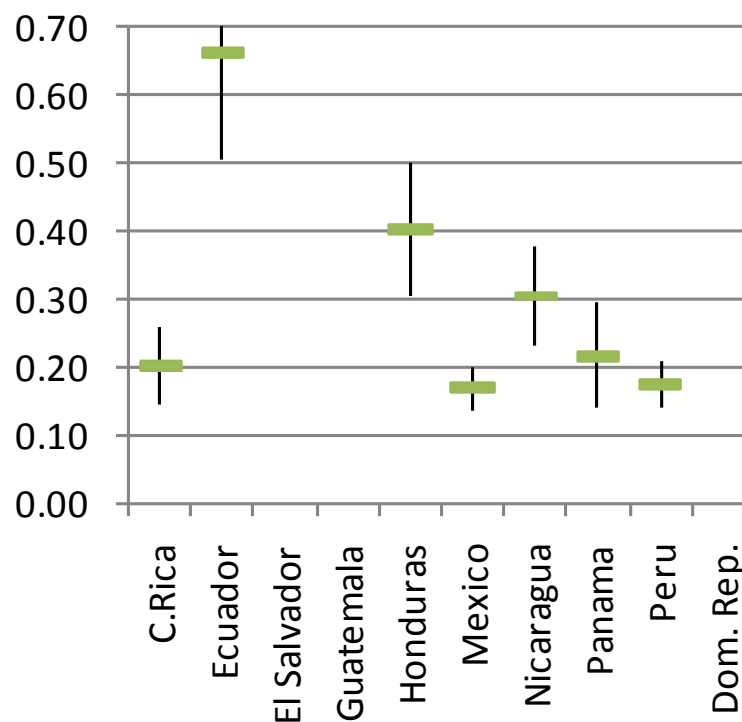
4. LAC Results - Wheat

LAC - Price transmission: int. wheat
to domestic bread



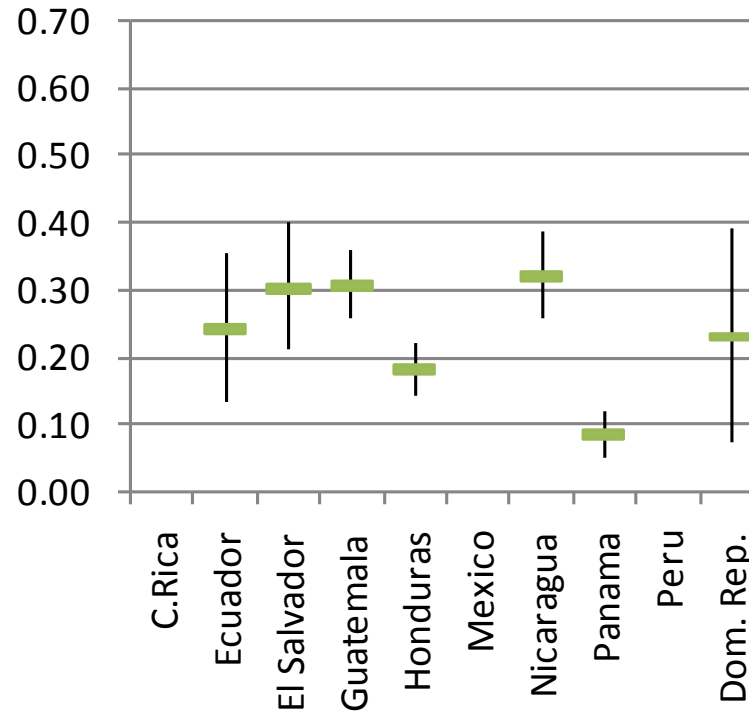
4. LAC Results – Wheat flour

LAC - Price transmission: int. wheat to domestic flour



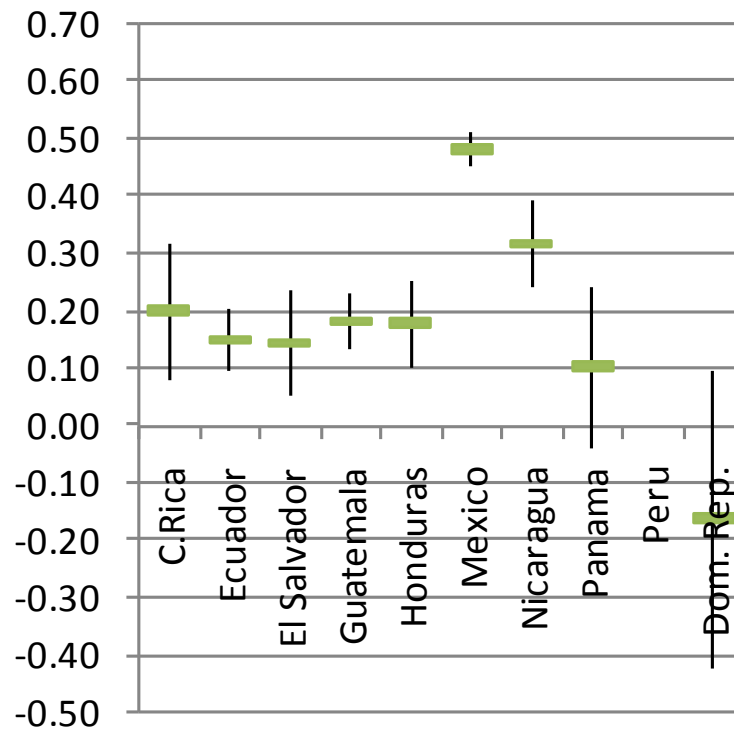
4. LAC Results - Pasta

LAC - Price transmission: int.
wheat to domestic pasta



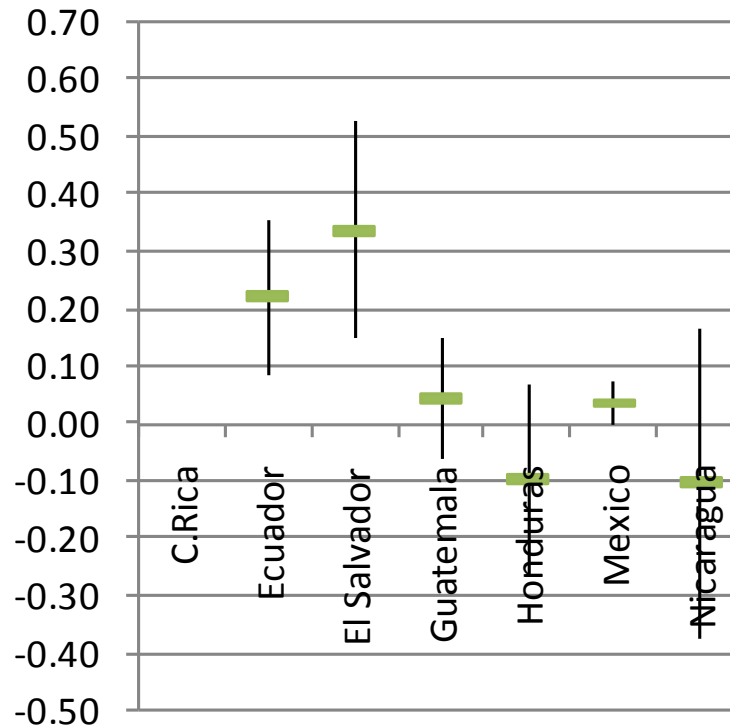
4. LAC Results - Rice

LAC Price transmission: int. rice to domestic rice



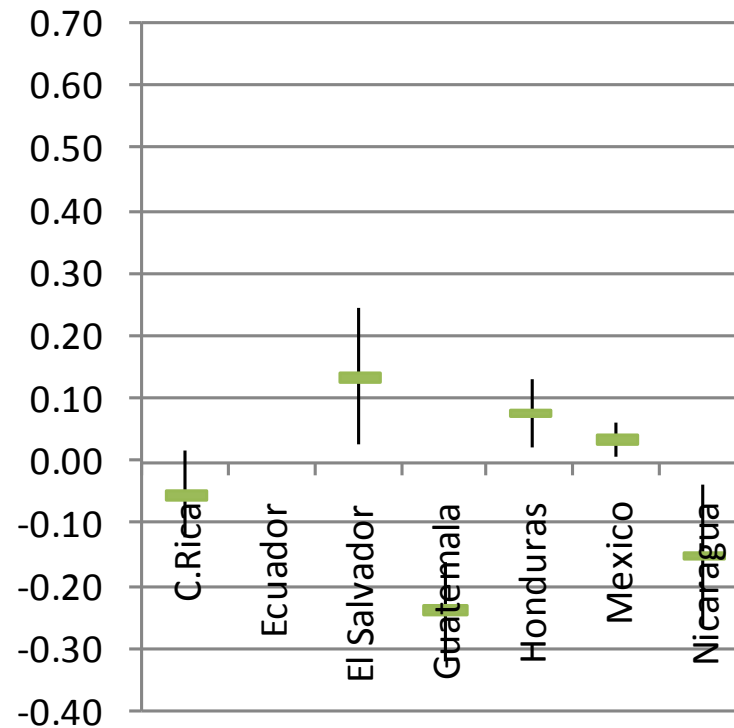
4. LAC Results - Corn

LAC - Price transmission: int. corn
to domestic corn



4. LAC Results - Tortillas

LAC - Price transmission: int. corn to domestic tortilla



4. LAC Summary of findings

- WHEAT:
 - Positive transmission elasticities in most countries for bread, wheat flour and pasta
 - Averages and min – max
 - Bread 0.20 (0.10, 0.45)
 - Wheat flour 0.30 (0.15, 0.65)
 - Pasta 0.24 (0.18, 0.32)
- RICE:
 - Other than Panama and DR Positive transmission elasticities
 - Averages and min – max
 - 0.18 (-0.15, 0.50)
- CORN:
 - Mostly none or very low transmission for corn and tortillas.

5. Final Price transmission. Summary of findings, final comments

- This presentation was about POSITIVE ECONOMICS: estimate the degree of transmission!
- NORMATIVE ECONOMICS:
 - Should we advocate for high or low price transmission?
 - Prices are key economic variables in a market economy for consumption and production decisions
 - As far as international prices summarize and respond to fundamentals we want high transmission to domestic prices?
 - Question is what to do if international prices do not respond to fundamentals?
 - Keep in mind that:
 - Price movements generate losers and winners
 - Policies to control prices are poorly targeted
 - Policies to protect vulnerable groups must be put in places (market economy won't prevent corner solutions)