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Agricultural Price Volatility and International Investment Decisions in the Food Processing Industry

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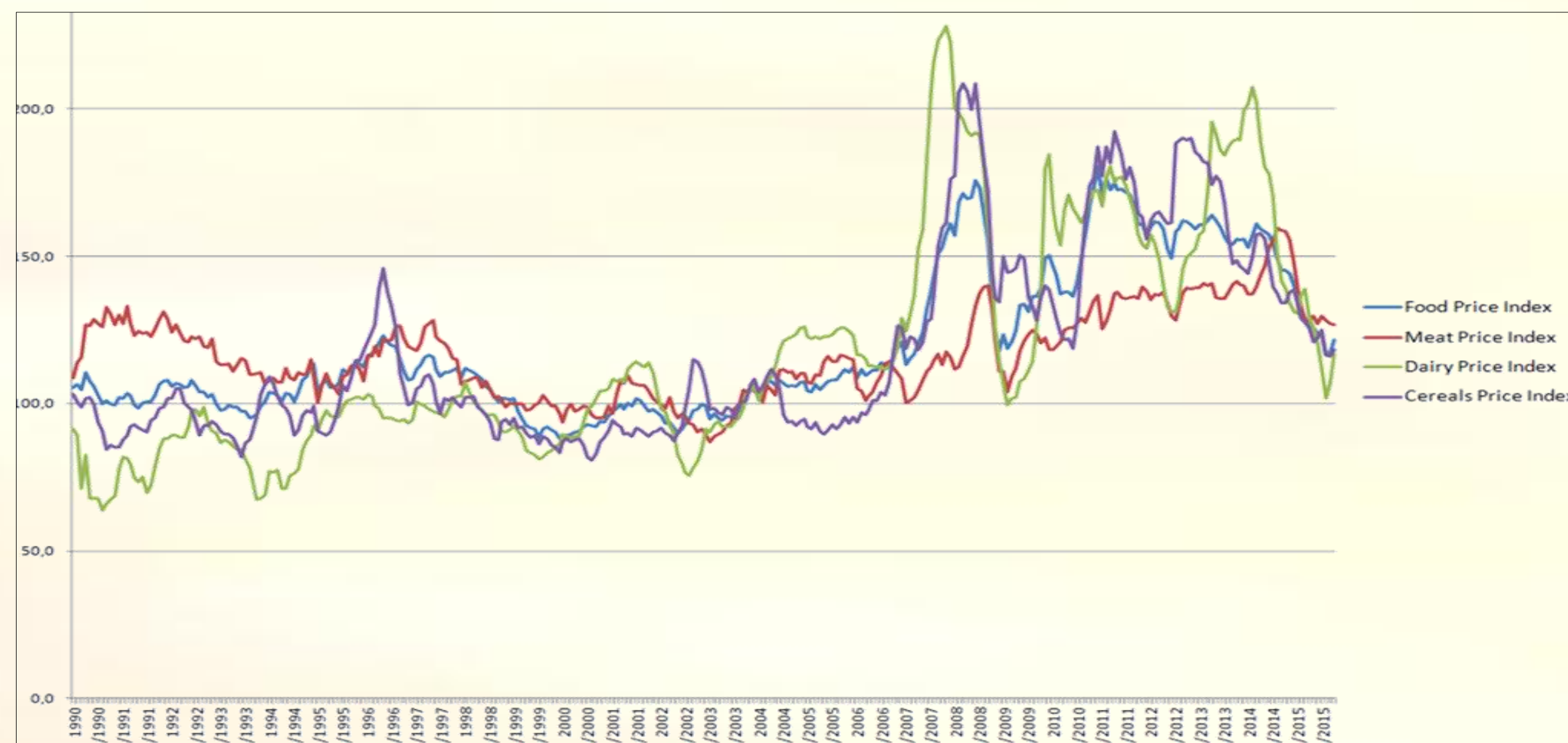
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Introduction

- Agricultural market risk is one of the **biggest challenges** facing agricultural value chain, and food processors in particular.

Fig1: Evolution of agricultural producer price indice



Motivation

- The effect of production risk on FDI in agri-food industry is not obvious at first sight.
- Agricultural market price volatility is a **country-specific** feature → comparative advantage.

$$s_t = \frac{1}{4} \sqrt{\sum_{i=1}^5 (x_{t-i} - \bar{x})^2}$$

Volatility measure for selected countries 1997-2012			
Country	Mean	Min	Max
China	10,17	4,65	20,07
United States	8,73	4,39	14,19
United Kingdom	8,40	2,87	11,26
Canada	7,95	4,32	12,77
Mexico	7,82	1,97	20,52
Netherlands	6,74	4,53	9,22
France	6,69	3,63	10,98
Italy	4,37	1,58	7,44
Japan	4,31	1,48	5,98

Objective

- The effects of agricultural price/yield volatility on the international fragmentation of food value chain merits more attention. **The objective is to analyze the impact of the uncertainty of the agricultural market on the evolution of FDI in the agri-food industry.**

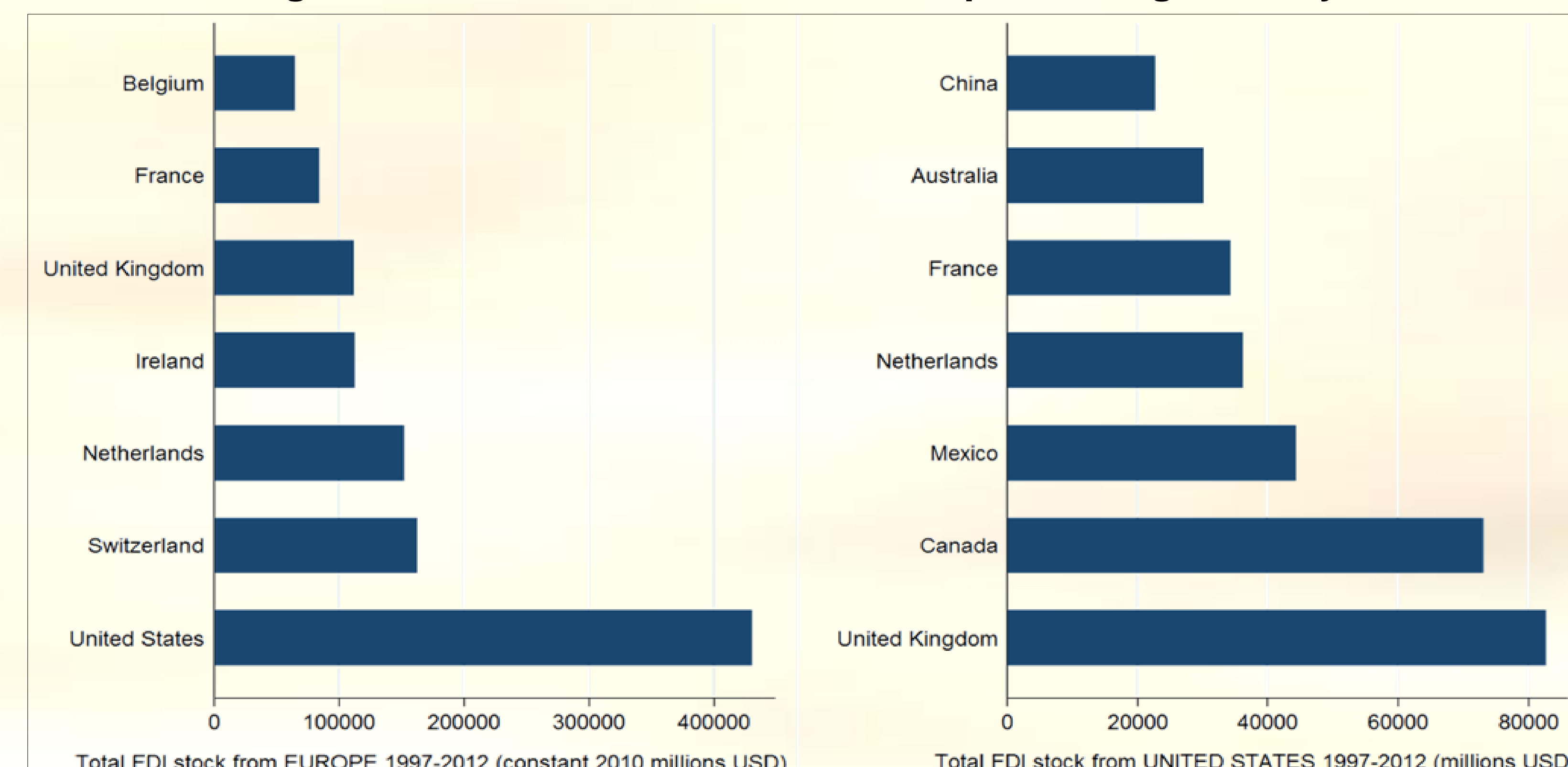
Empirical method and data sources

- **Model:** Fixed effects gravity model; Poisson-Pseudo Maximum Likelihood (PPML)

$$FDI_{ijt} = e^{\alpha_0 + \alpha_1 \log GDP_{it} + \alpha_1 \log GDP_{jt} + \alpha_3 \log DIST_{ij} + \dots + \beta_1 \log VOL_{it} + \beta_1 \log VOL_{jt} + \beta_3 \log VOL_{jt} * \log DIST_{ij}} \varepsilon_{ijt}$$

- **Data sources:** Bilateral data on FDI stocks in the manufacture of food, beverages and tobacco products from EUROSTAT and BEA. Others variables: GDP, distance, contiguity, common language, landlocked, GDP per capita, exchange rate, inflation from CEPII, World Bank, FAOSTAT, IMF etc...
- **Final database:** 1997-2012, 27 origin and 69 destination countries.

Fig2: Main destinations of FDI in food processing industry



Results

Regression results (main variables)	
Variables	Poisson
Log GDP Destination	0.728***
Log GDP Origin	1.090***
Log Distance	-1.932***
Log GDP per capita Destination	0.402**
Log GDP per capita Origin	3.530***
Common Language	1.167***
Log Volatility Origin	0.989***
Log Volatility Destination	-0.970***
Log Distance x Log Volatility Destination	0.501***

*(p<0.1), **(p<0.05), ***(p<0.01)

Results and discussions

- Agricultural uncertainty has a consequence on the appealing of a country as destination for FDI in food processing industry, as volatility differs across countries.
- We find that the positive impact of lower agricultural volatility in a foreign country on vertical (resp., horizontal) foreign investments is strengthened (resp. weakened) when trade costs are high.
- Our empirical results are more in favor to vertical disintegration of international investment in food industry.
- We find that if, ceteris paribus, agricultural prices volatility in Canada, China, United Kingdom and Mexico was as low as in France, US outward FDI stocks to those countries would increase by 15%, 12%, 7% and 4% respectively.

References

- Kleinert, J. and Toubal, F. (2010). Gravity for FDI. *Review of International Economics*, 18(1):1-13.
- Ramondo, N. and Rappoport, V. (2010). The role of multinational production in a risky environment. *Journal of International Economics*, 81(2):240-252.