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# IAAE INTERCONFERENCE SYMPOSIUM CONGRESO REGIONAL DE ECONOMÍA AGRARIA

1st Latin-American Workshop on Productivity and Efficiency

## **Higher breaks for the development: Change in the price volatility on agro-products in the chilean market between ten years**

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21 / 04 / 2023

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# CHILEAN CASE

1. The work is a continuity of the last two congress of agrarian economist in Chile (2019, 2022) and conduct some stylized facts to the progress on the PhD's program.
2. The interest of this study is to advance in the building of a structure macro-micro to Chilean Case in the a series of the consumer price index (CPI) (Ministry of Economy, Chile) and the trade public data for Chile by the Food and Agriculture Organization of the United Nations (FAO) between 2011 and 2021.
3. The study is exploratory studies, hypotheses are not formulated, because they focus on little-studied topics. Its purpose with a *spearman correlation* is to evaluate the relationship that exists between two or more variables, concepts or categories, in a particular context.
4. The conclusion of previous presentation was that when the producer price rises (FAO), the urban market prices (CPI) also rise, not being the opposite. This would imply an asymmetry in local opportunities in urban markets.



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# INTRODUCTION

1. Friedman (**1977**): growing volatility of price increases translated into inflation (sustained over time) would make the economy less efficient, by introducing frictions in the markets, which create a gap between the relative prices that prevail in the economy and those determined only by the market forces in the absence of volatility.
2. Ploeg van der et al (**2002**): a new paradigm of rural development is related a combination of factors that operate in a hierarchical and specialized manner could improve the profitability of producers. The same authors in the **2012** highlighted the need to provide new responses to rural development in the face of reduced profitability and increased volatility.
3. Anderson, K. et al. (**2012**) emphasize that the change in food prices has effects on the agri-food system as a result of the different structures of substitution and displacement relationships that are triggered. The main conclusion is that discretionary intervention on the terms of trade (to protect) can bring more adverse effects on the local economy, as a result of efficiency.
4. Stability is essential for food security, affecting the budget of the houses (ODEPA, **2023**).

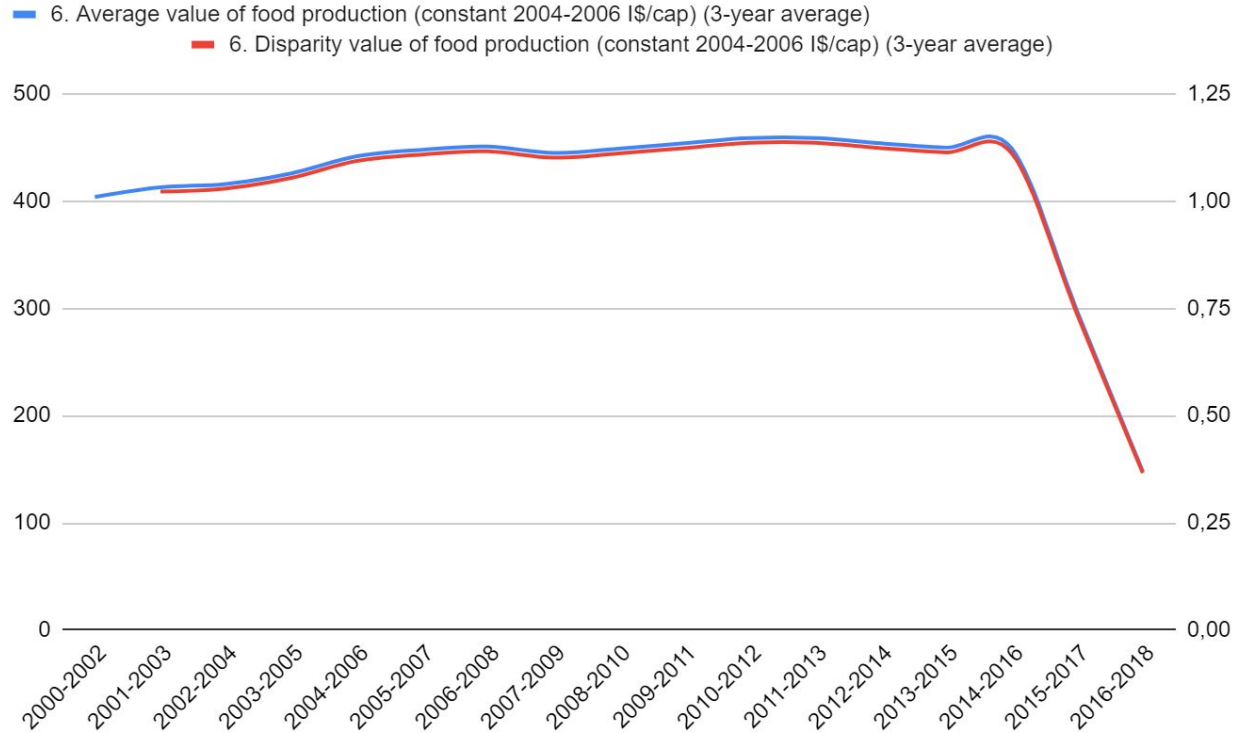
# FAOSTAT DATA



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## Food value chain (FVC): value of net food production



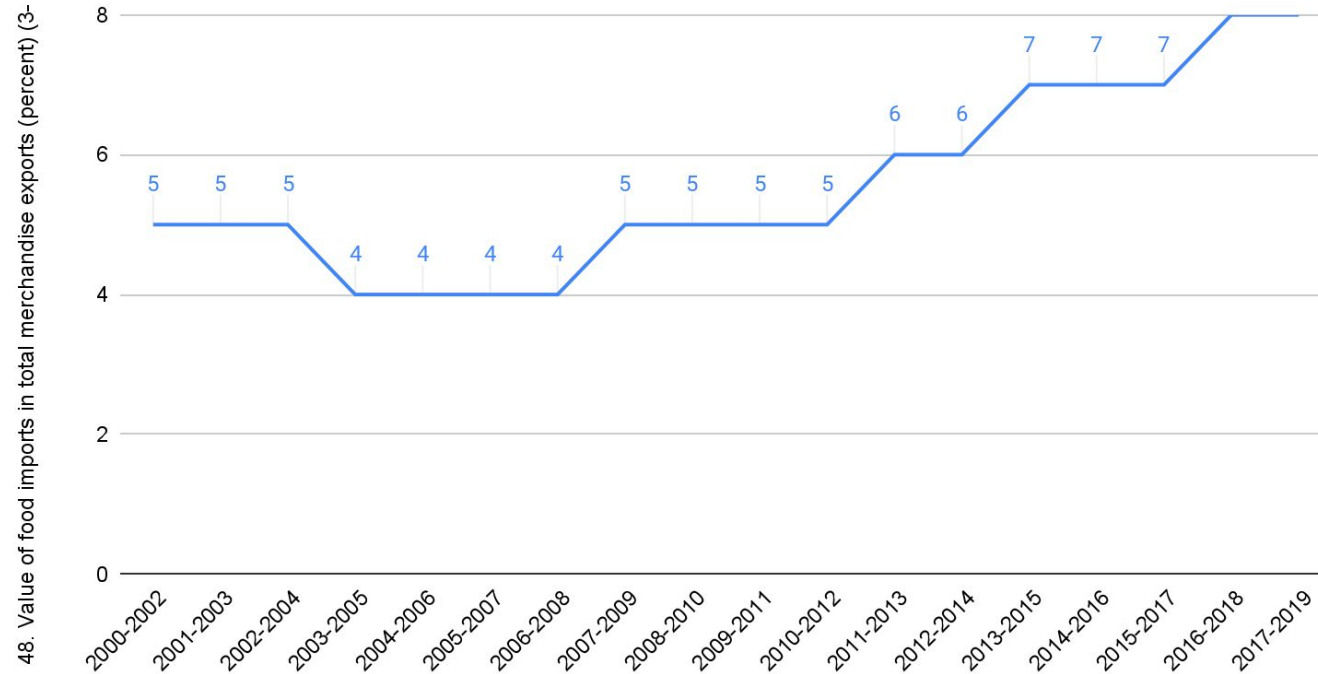
# FAOSTAT DATA



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48. Value of food imports in total merchandise exports (percent) (3-year average) frente a Year



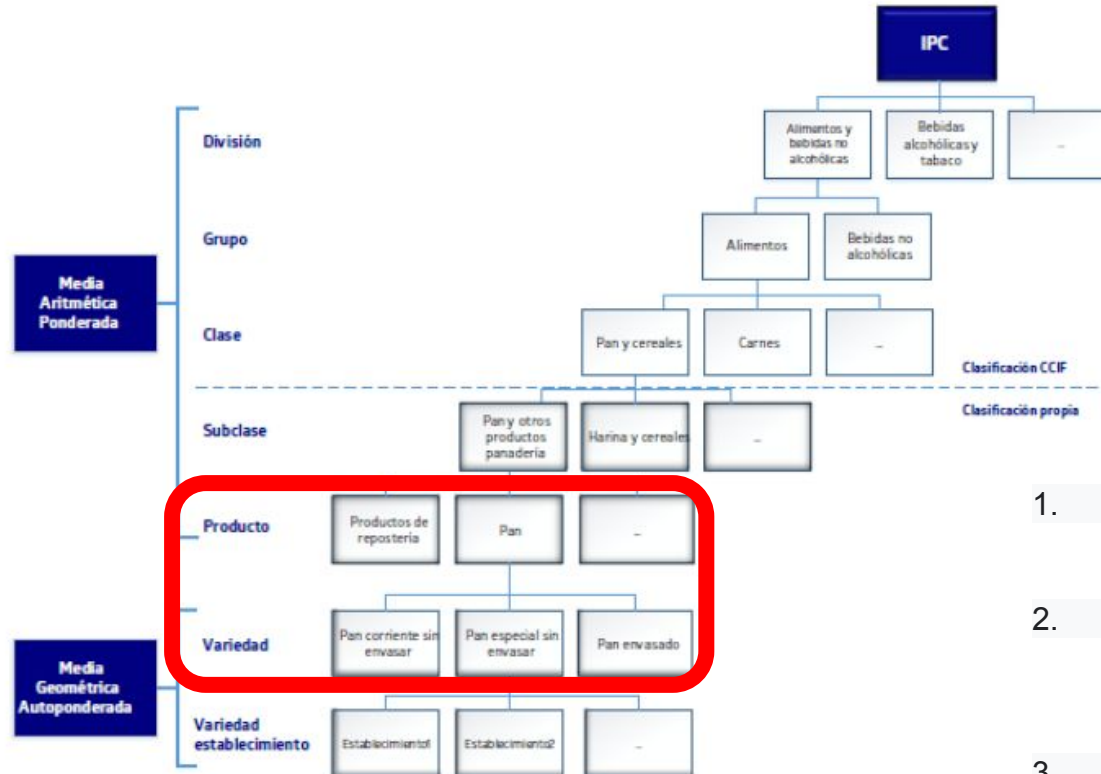
Loss of  
intern  
dynamic

# STRUCTURE OF THE CPI AGGREGATION



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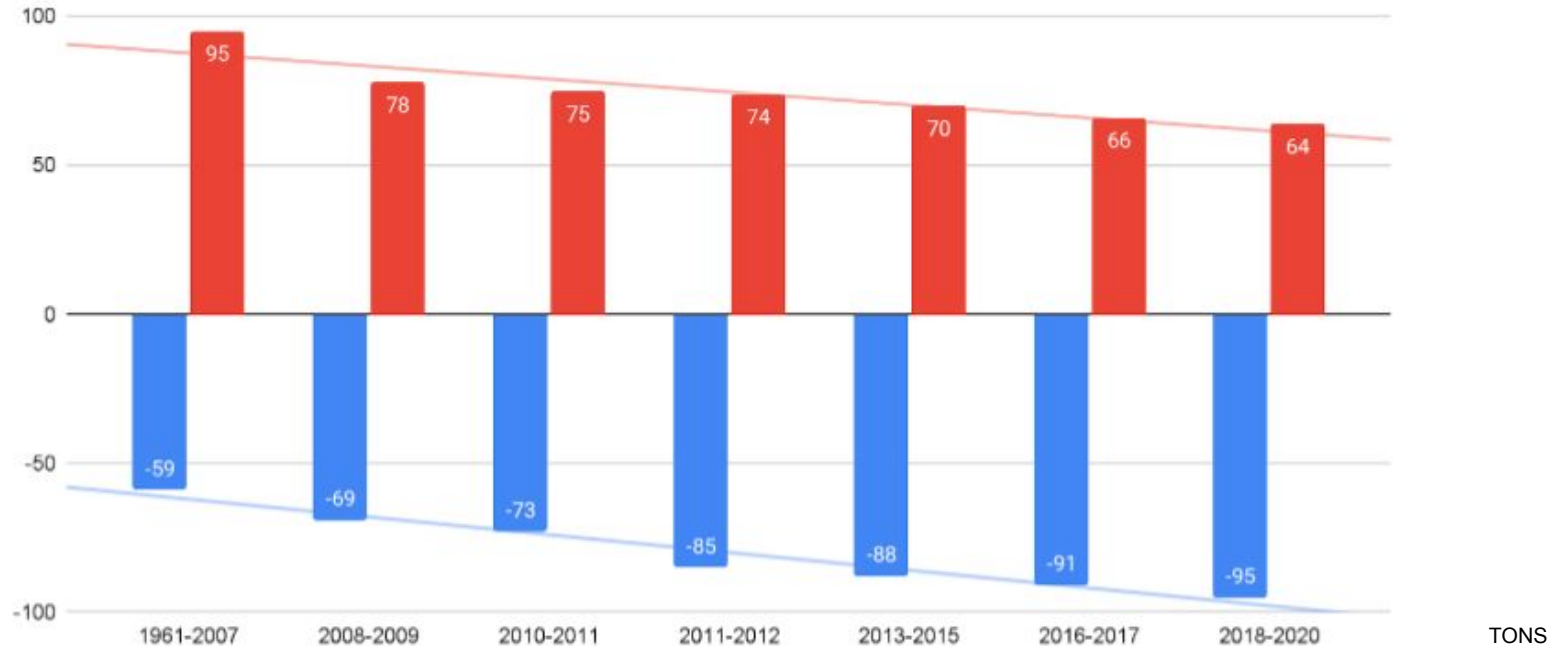
1. 227 products are obtained. (Big basket to representative diet) (I.E. USDA data have these logic)
2. INE: The main source of prices are supermarkets, fairs, and other smaller urban establishments. However, they are mostly supermarket prices.
3. An equivalent to 1=cc/ml/gr is obtained.

# FAOSTAT: CHILEAN COMMERCIAL POSITION



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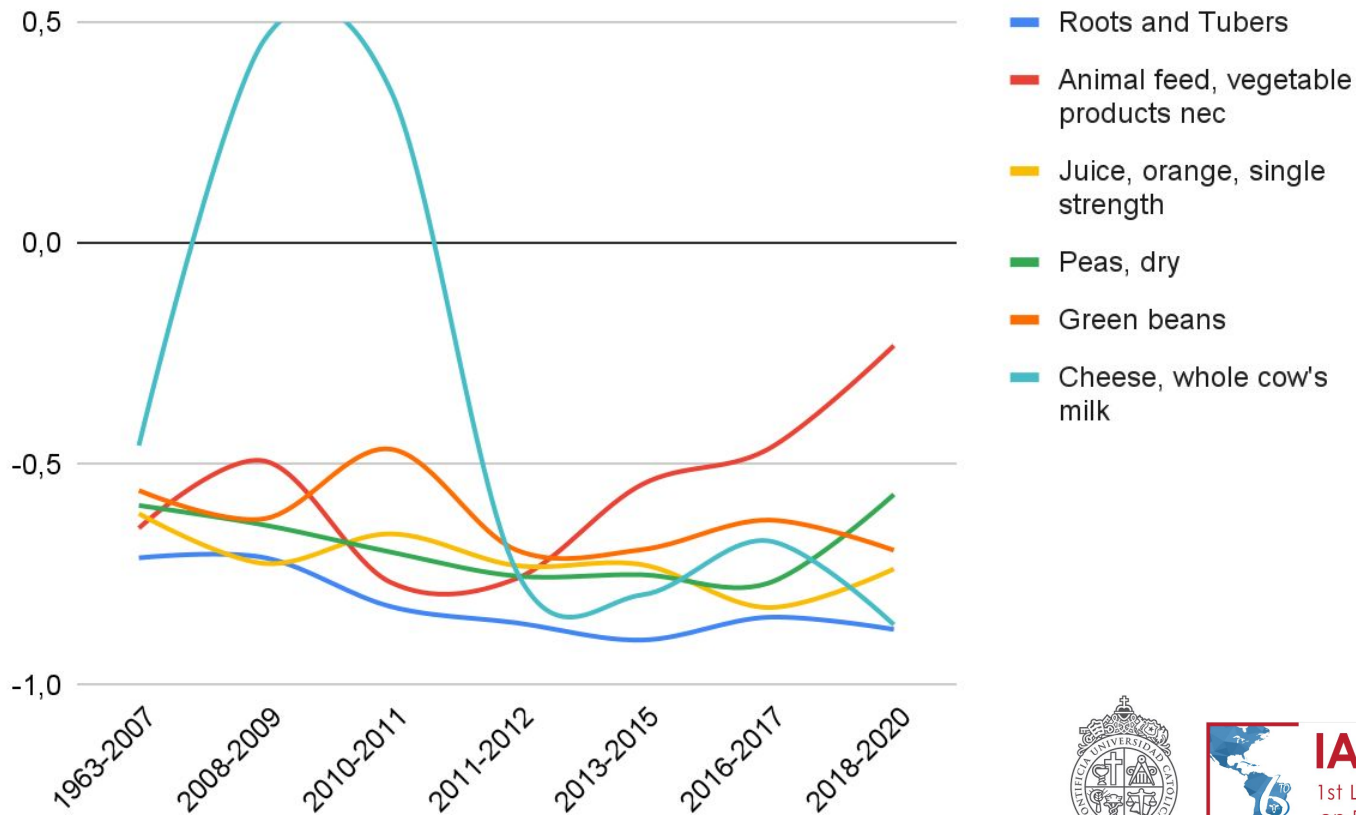
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Number of products and foods according to commercial position. In red number of products or foods in a net import position in the period. In blue number of products or foods in a net export position in the period.



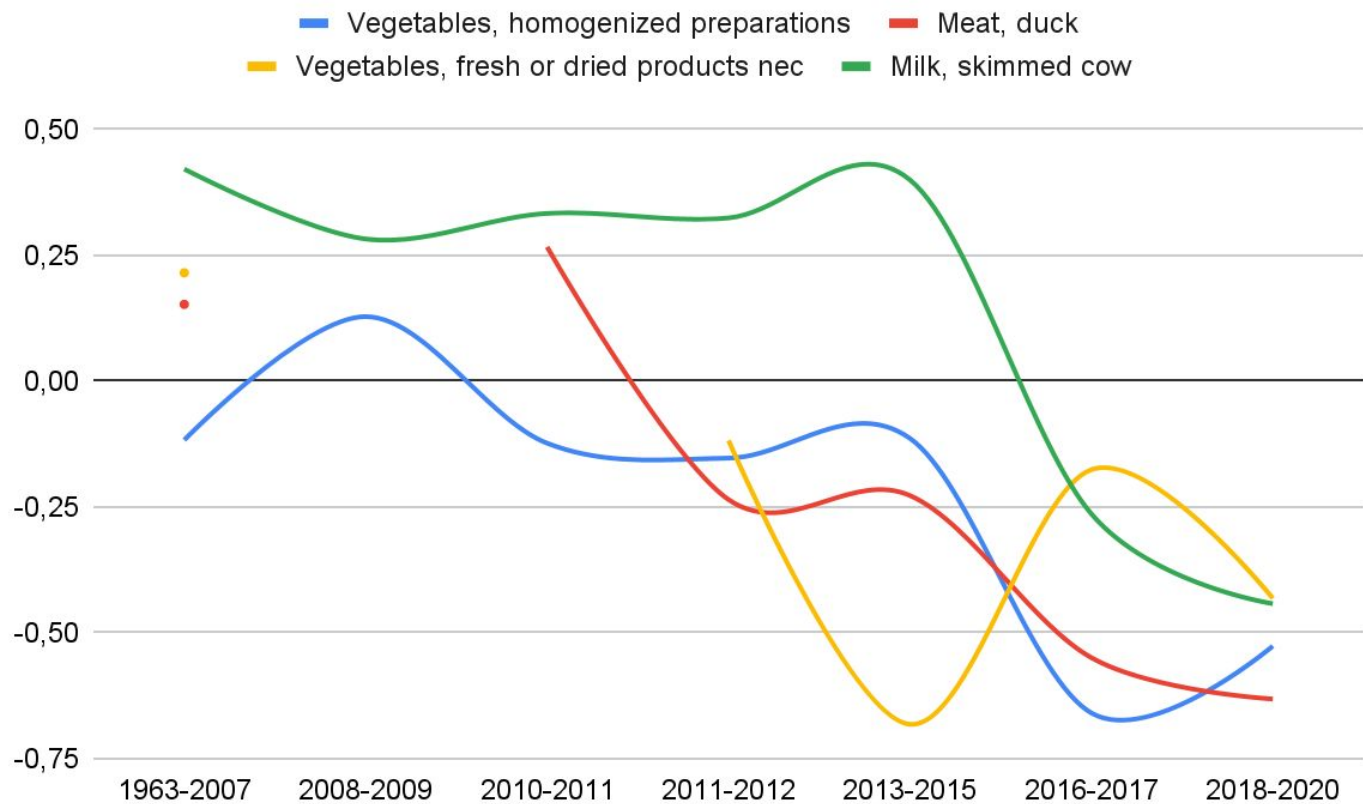
**1: 100% of the tons in trade balance are export // -1: 100% of the tons in trade balance are imports**



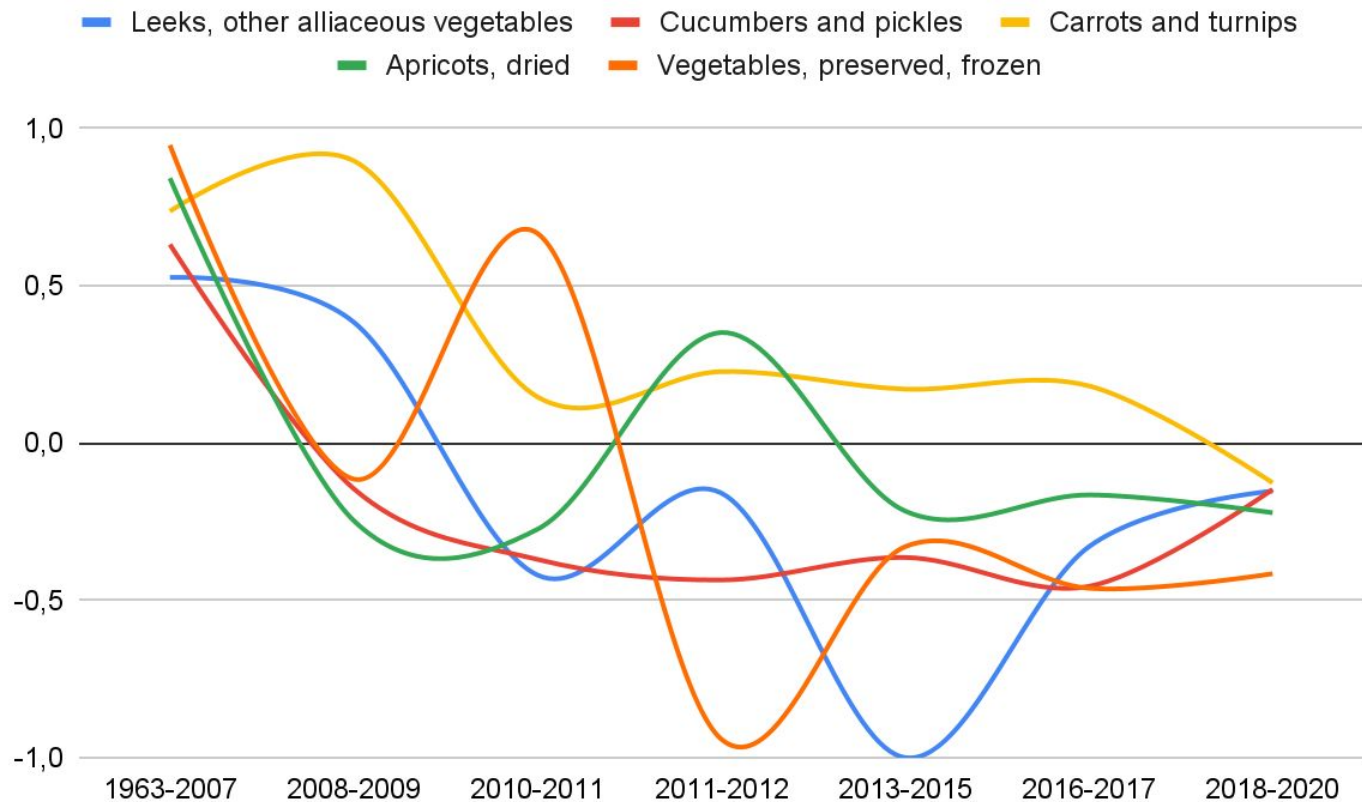
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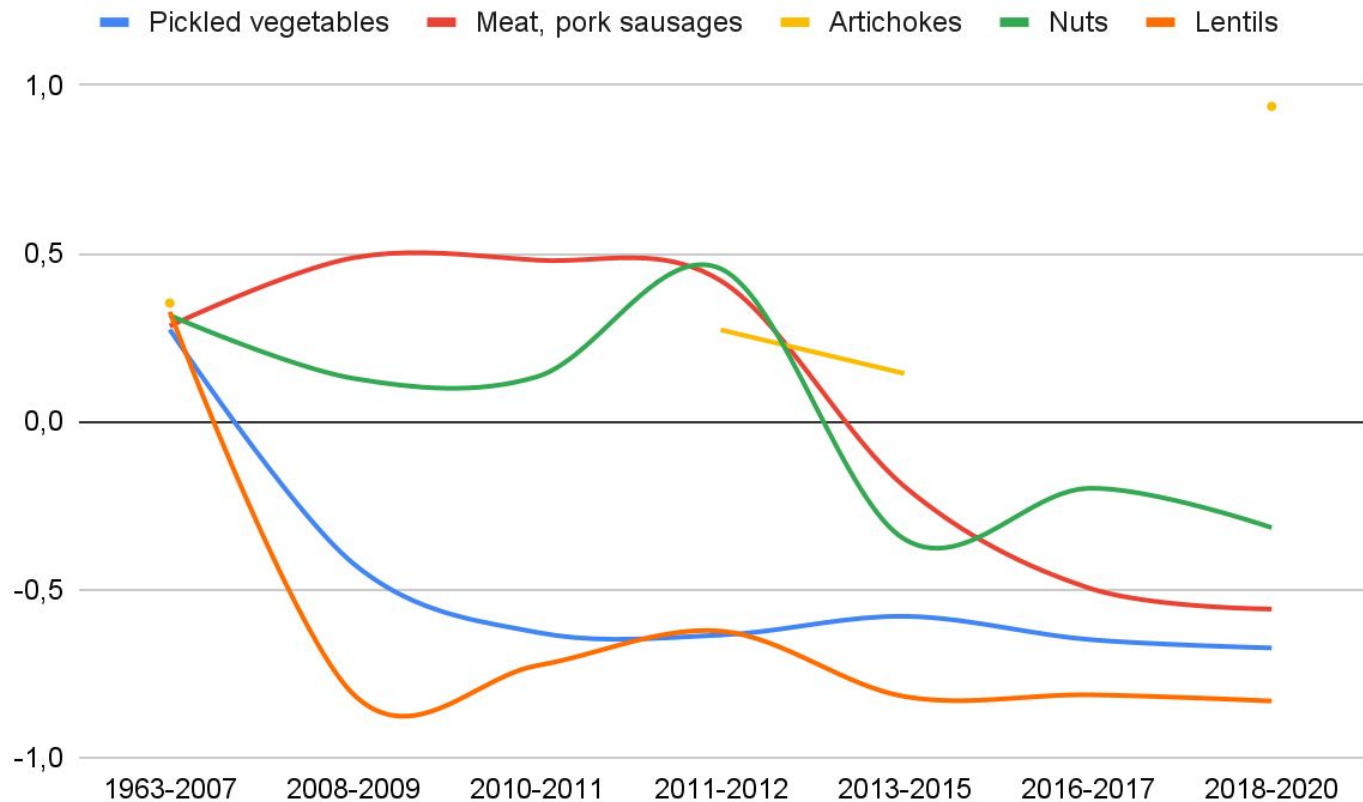
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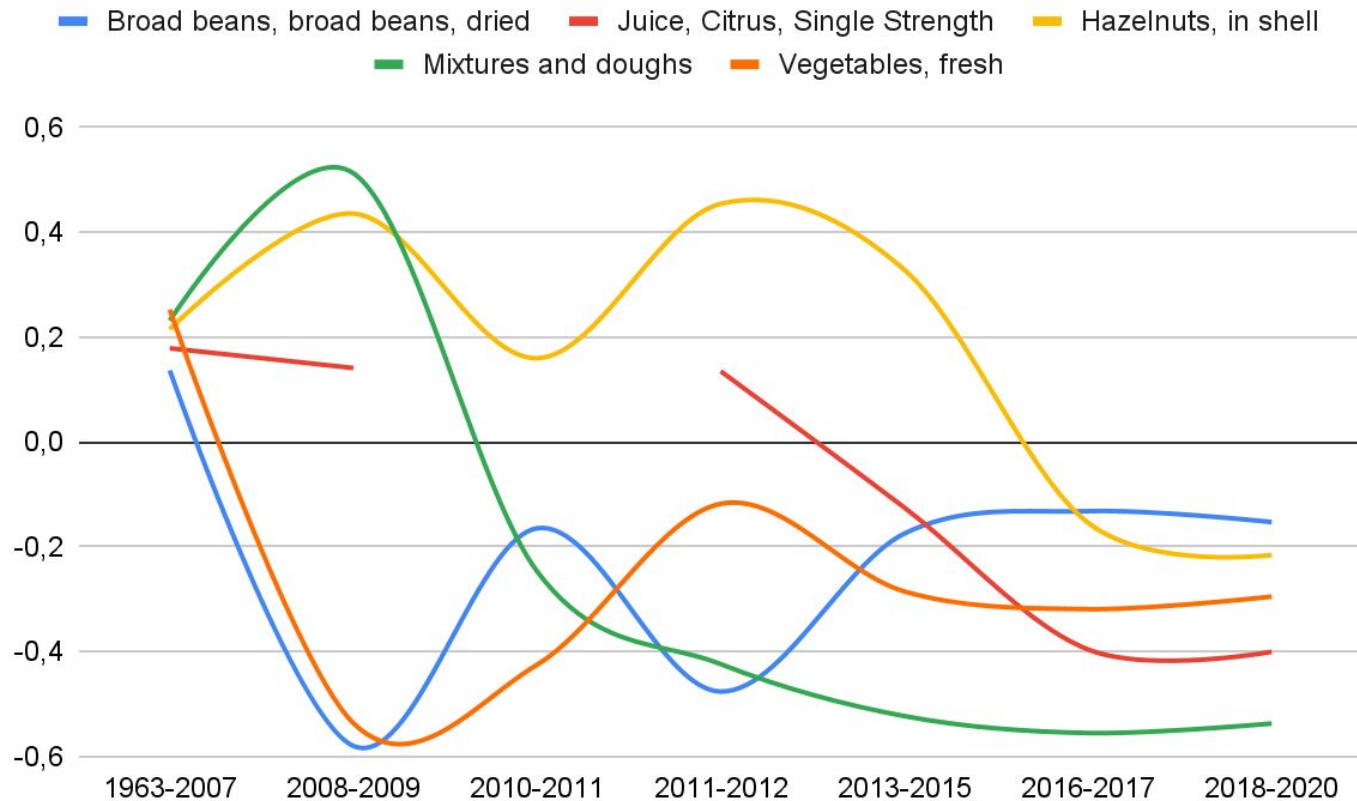
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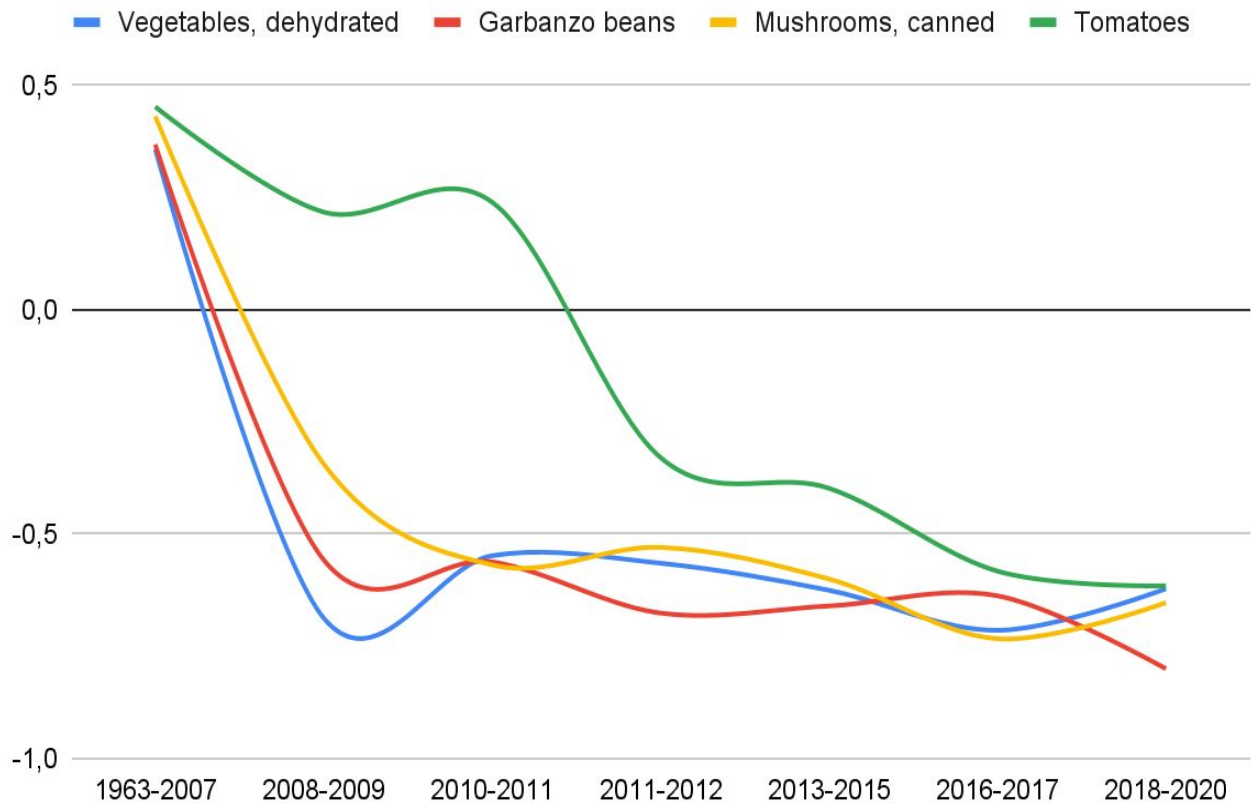
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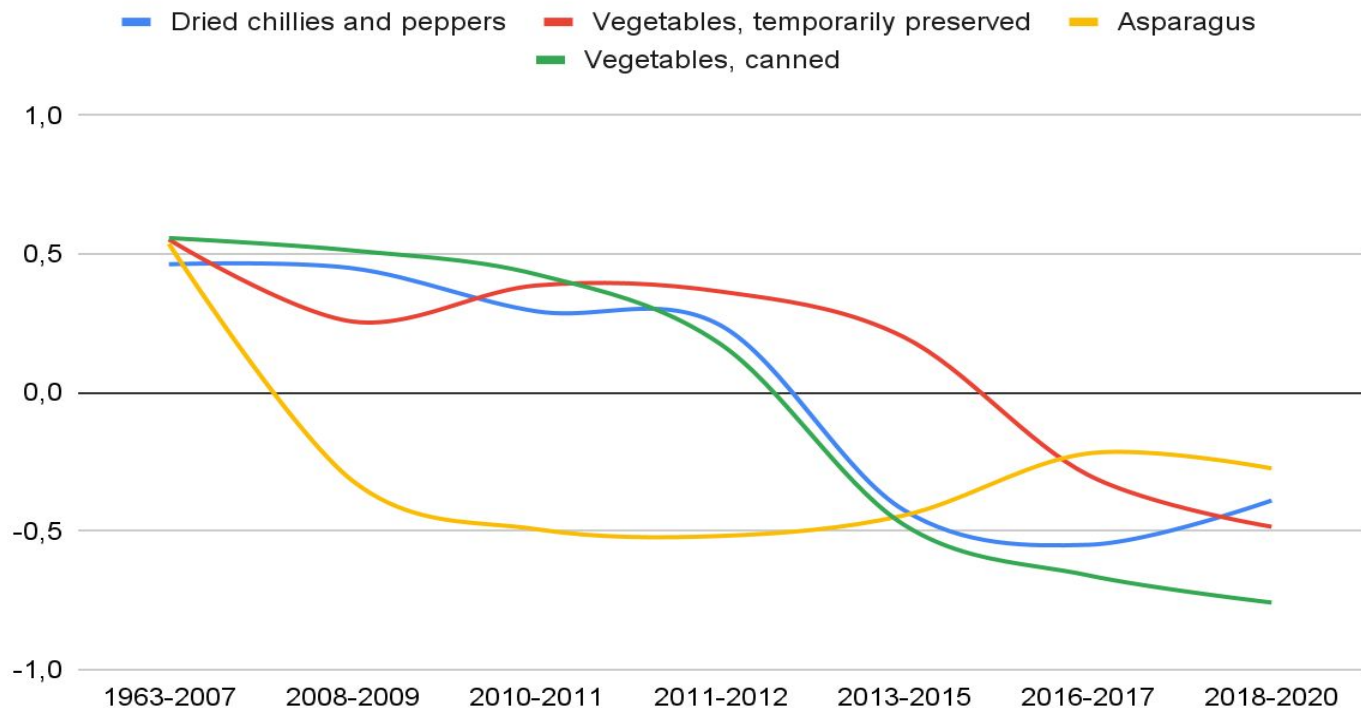
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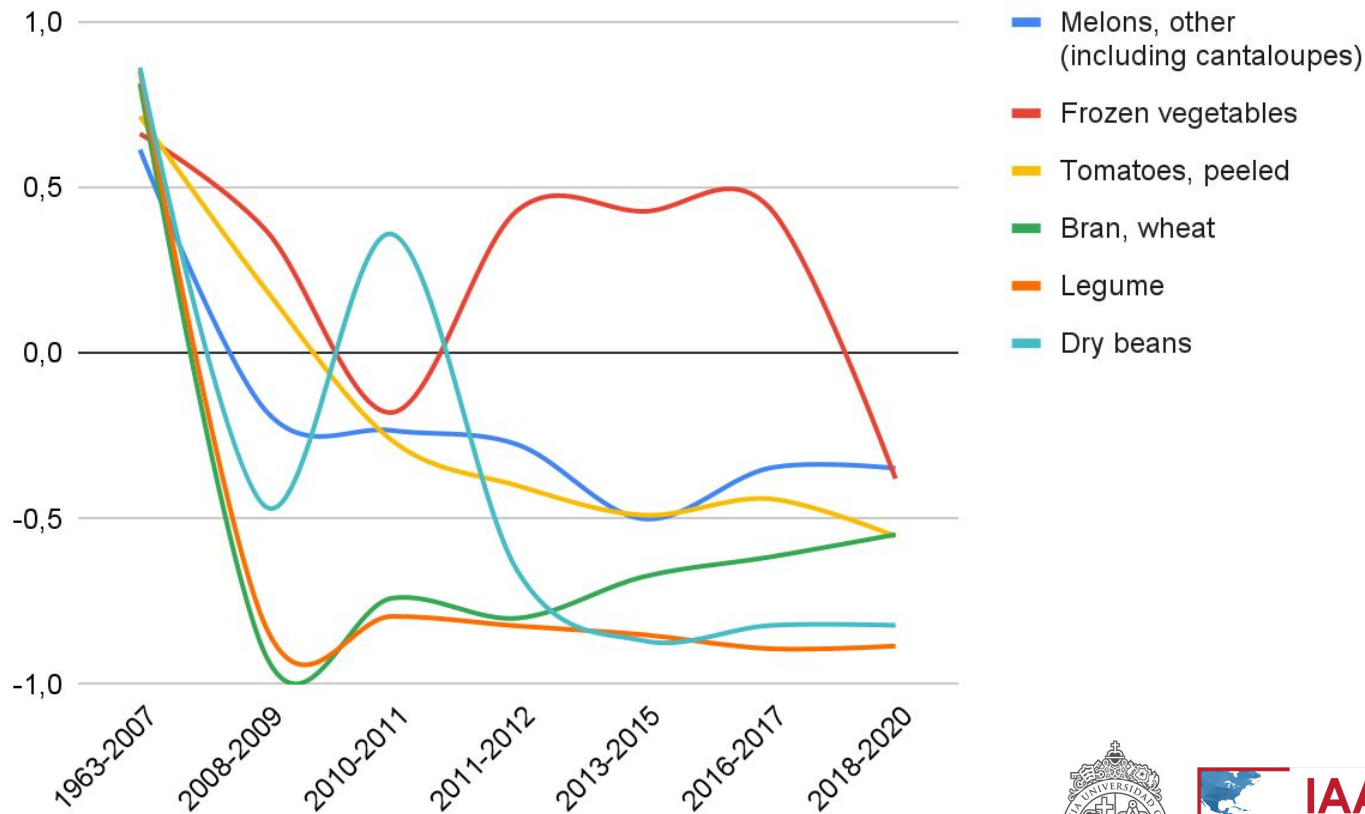
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# ANNUAL AVERAGE PRICE (CPI)

TEN YEAR SERIE Nov-Dec-January



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## PRODUCTS

### FLOUR AND PASTA

PASTA\_SPAGHETTI\_N°5  
BREAD\_HALLULLA\_CURRENT WHEAT  
BREAD\_MARRAQUETA\_CURRENT WHEAT  
WHEAT FLOUR  
PASTA\_SPIRAL  
PASTA\_TIE

### GRAIN

RICEGRADE2  
RICEGRADE1

### VEGETABLES, TUBERS AND SPECIES

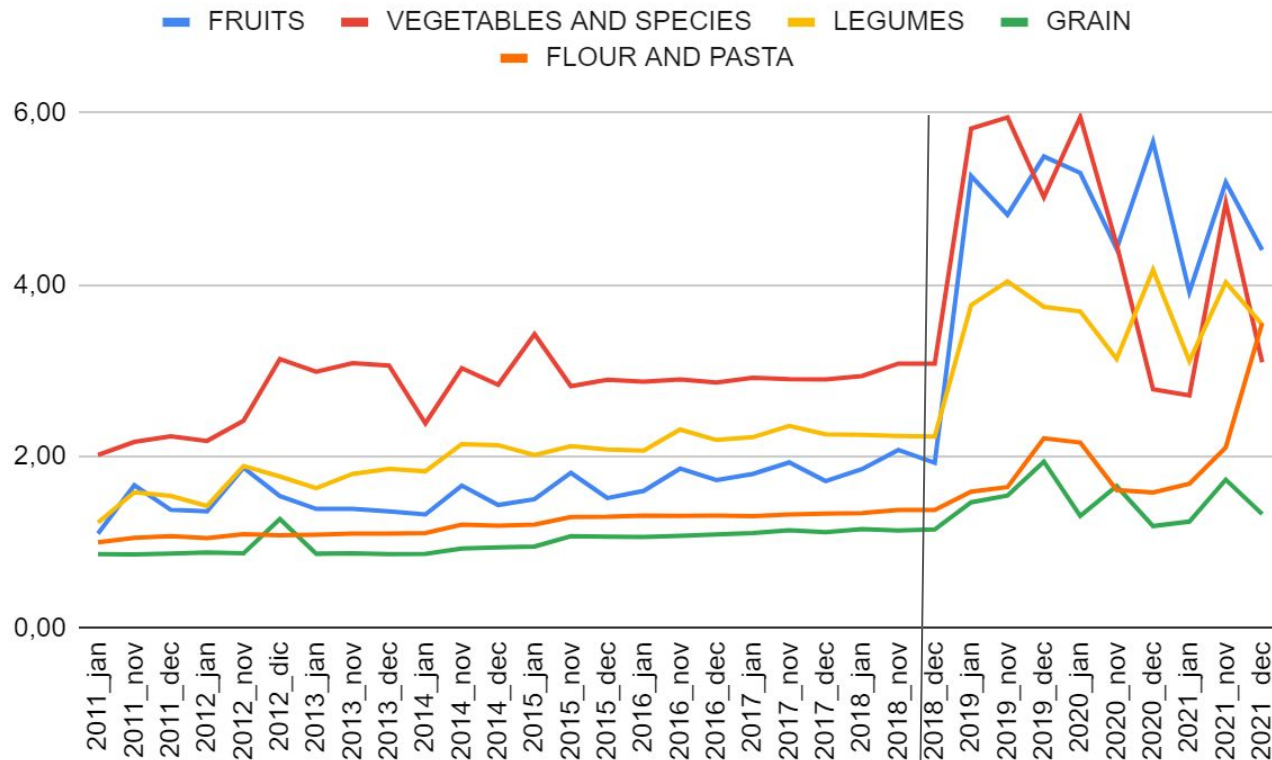
ITALIAN\_SQUASH  
CARROT  
CUCUMBER  
POTATOES  
CANNED\_PALM HEARTS  
SPINACH  
ONION  
BEET  
OLIVE  
ORÉGANO

### LEGUMES

LENTIL\_5\_6MM  
CANNED\_PEA  
FROZEN\_PEA  
BEANS\_GREEN  
BEANS\_GRANADO

### FRUITS

GREEN\_GRAPE\_SULTANINA  
UVA\_REDGLOBE  
TOMATOES  
WATERMELON  
GRAPEFRUIT  
BANANA  
CANNED\_PINEAPPLE  
PEAR  
AVOCADO\_HASS  
AVOCADO\_STRONG  
GREEN APPLE  
RED APPLE  
LEMON  
KIWI  
STRAWBERRY  
PEACH\_PRISCO



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## GROUPS: Fruits//Bread, flour and pasta//Vegetables, spices//Legumes//Cereal grains

** p(0.05) * p(0.10)	Fruits	Bread, flour and pasta	Vegetables, spices	Legumes	Cereal grains
Fruits	1.000				
Bread, flour and pasta	0.9429**	1.000			
Vegetables, spices	0.9429**	0.8857**	1.000		
Legumes	0.9429**	1.000**	0.8857**	1.000	
Cereal grains	0.9429**	0.8857**	1.000**	0.8857**	1.000

Fruits (22)	Vegetables, spices (23)	Legumes (7)
Custard apple	Chard	Turtle Beans
Plum	Lettuce	Brussels sprout
Damascus	Olive	Lentils
Peach	Garlic	Chickpeas
Strawberry	Artichoke	Garbanzo beans
Cherry	Celery	Black Beans
Kiwi	Beetroot	Green beans
Mango	Broccoli	
Apple	Onion	
Cantaloupe	chives	
Orange	Mushroom	
Avocado	Natural corn	
Sweet Cucumber	Cauliflower	
Pear	Asparagus	
Pineapple	Canned hearts of palm	
Banana	Penca	
Grapefruit	Peppers	
Watermelon	Cabbage	
Tomatoes	Carrot	
Grape	Squash Sweet Potato	
Lemon	Italian Squash	
Prickly pears	Yucca	

# Legumes



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		Frijoles Tortuga	Coles De Bruselas	Lentejas	Garbanzos	Frijoles de Garbanzos	Frijoles Negros	Judías Verdes
	** p(0.05) * p(0.10)	Turtle Beans	Brussels sprout	Lentils	Chickpeas	Garbanzo beans	Black Beans	Green beans
Frijoles Tortuga	Turtle Beans	1.000						
Coles De Bruselas	Brussels sprout	0.6667	1.000					
Lentejas	Lentils	0.7714*	0.6667	1.000				
Garbanzos	Chickpeas	0.7247	0.9412**	0.7247	1.000			
Frijoles de Garbanzos	Garbanzo beans	1.000**	0.6667	0.7714*	0.7247	1.000		
Frijoles Negros	Black Beans	1.000**	0.6667	0.7714*	0.7247	1.000**	1.000	
Judías Verdes	Green beans	0.8286**	0.5798	0.9429**	0.6377	0.8286**	0.8286**	1.000

# RESULTS: Vegetables



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	Acelga	Lechuga	Aceituna	Ajo	Alcachofa	Apio	Remolacha	Brócoli	Cebolla	Cebollino	Champiñón	Maíz natural	Coliflor	Espárragos	Palmitos enlatados	Penca	Pimientos	Repollo	Zanahoria	Calabaza Camote	Calabaza italiana	Yuca	
" p(0.05) * p(0.10)	Chard	Lettece	Olive	Garlic	Artichoke	Celery	Beetroot	Broccoli	Onion	chives	Mushroom	Natural corn	Cauliflower	Asparagus	canned hearts of palm	Peaca	Peppers	Cabbage	Carrot	Squash Sweet Potato	Italian Squash	Yuca	
<b>Acelga</b>	<b>Chard</b>	1.000																					
<b>Lechuga</b>	<b>Lettece</b>	0.8854**	1.000																				
<b>Aceituna</b>	<b>Olive</b>	0.7590*	0.7407*	1.000																			
<b>Ajo</b>	<b>Garlic</b>	0.8804**	0.8332**	0.8857**	1.000																		
<b>Alcachofa</b>	<b>Artichoke</b>	0.8804**	0.8332**	0.7714*	0.7714*	1.000																	
<b>Apio</b>	<b>Celery</b>	0.9411**	0.9258**	0.6000	0.7714*	0.8857**	1.000																
<b>Remolacha</b>	<b>Beetroot</b>	0.8804**	0.9258**	0.7714*	0.9429**	0.8286**	0.8857**	1.000															
<b>Brócoli</b>	<b>Broccoli</b>	0.9411**	0.9258**	0.6000	0.7714*	0.8857**	1.000**	0.8857**	1.000														
<b>Cebolla</b>	<b>Onion</b>	0.770	0.8924**	0.8986**	0.9276**	0.7537*	0.7247	0.9276**	0.7247	1.000													
<b>Cebollino</b>	<b>chives</b>	0.750	0.9535**	0.7945*	0.7945*	0.7945*	0.7945*	0.8827**	0.7945*	0.9404**	1.000												
<b>Champiñón</b>	<b>Mushroom</b>	0.8804**	0.9258**	0.6000	0.7714*	0.6571	0.8857**	0.8286**	0.8857**	0.7537*	0.7945*	1.000											
<b>Maíz natural</b>	<b>Natural corn</b>	0.9411**	0.9258**	0.6571	0.8857**	0.7714*	0.9429**	0.9429**	0.9429**	0.8117**	0.7945*	0.9429**	1.000										
<b>Coliflor</b>	<b>Cauliflower</b>	0.7504*	0.8104*	0.8827**	0.7945*	0.6179	0.6179	0.7062	0.6179	0.8508**	0.8182**	0.7945*	0.7062	1.000									
<b>Espárragos</b>	<b>Asparagus</b>	0.698	0.9258**	0.7714*	0.7714*	0.6571	0.7143	0.8286**	0.7143	0.9276**	0.9710**	0.8286**	0.7714*	0.8827**	1.000								
<b>Palmitos enlatados</b>	<b>Canned hearts of palm</b>	0.9355**	0.8854**	0.6983	0.7590*	0.7590*	0.8804**	0.7590	0.8804**	0.7084	0.7504*	0.9411**	0.8804**	0.8442**	0.7590*	1.000							
<b>Penca</b>	<b>Peaca</b>	0.7590*	0.9258**	0.8286**	0.8857**	0.7714*	0.7714*	0.9429**	0.7714*	0.9856**	0.9710**	0.7714*	0.8286**	0.7945*	0.9429**	0.6983	1.000						
<b>Pimientos</b>	<b>Peppers</b>	0.9411**	0.7407*	0.8286**	0.8857**	0.7714*	0.7714*	0.7714*	0.7714*	0.7247	0.6179	0.7714*	0.8286**	0.7945*	0.6000	0.8804**	0.6571	1.000					
<b>Repollo</b>	<b>Cabbage</b>	0.7392*	0.7515*	0.9856**	0.8407**	0.7247	0.5798	0.5798	0.5798	0.8824**	0.8061*	0.6377	0.6377	0.9404**	0.8117**	0.7392*	0.8117**	0.8117**	1.000				
<b>Zanahoria</b>	<b>Carrot</b>	1.000**	0.8854**	0.7590*	0.8804**	0.8804**	0.9411**	0.9411**	0.9411**	0.7701*	0.7504*	0.8804**	0.9411**	0.7504*	0.6983	0.9355**	0.7590*	0.9411**	0.7392*	1.000			
<b>Calabaza Camote</b>	<b>Squash Sweet Potato</b>	0.8933**	0.9393**	0.5798	0.7247	0.7247	0.9276**	0.9276**	0.9276**	0.7206	0.8061*	0.9856**	0.9276**	0.7613*	0.8117**	0.9549**	0.7537*	0.7537**	0.6176	0.8933**	1.000		
<b>Calabaza italiana</b>	<b>Italian Squash</b>	0.9549**	0.8924**	0.6377	0.7537*	0.9276**	0.9856**	0.9856**	0.9856**	0.6912	0.7613*	0.8407**	0.8986**	0.6269	0.6667	0.8933**	0.7247	0.8117**	0.6176	0.9549**	0.8971**	1.000	
<b>Yuca</b>	<b>Yuca</b>	0.9549**	0.8924**	0.7247	0.9276**	0.7537*	0.8986**	0.8986**	0.8986**	0.8235**	0.7613*	0.9276**	0.9856**	0.7613*	0.7537*	0.8933**	0.8117**	0.8986**	0.7059	0.9549**	0.8971**	0.8676**	1.000

# RESULTS: Fruits



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	Chirimoya	Ciruela	Damasco	Melocotón	Fresa	Cereza	Kiwi	Mango	Manzana	Melón	Naranja	Aguacate	Pepino dulce	Pera	Piña	Plátano	Pomelo	Sandía	Tomates	Uva	Limón	Tunas
**p(0.05)*p(0.10)	Cuterd apple	Plum	Damascus	Peach	Strawberry	Cherry	Kiwi	Mango	Apple	Cantaloupe	Orange	Avocado	Sweet Cucumber	Pear	Pineapple	Banana	Grapefruit	Watermelon	Tomato	Grape	Lemon	Prickly pear
Chirimoya	1.000																					
Ciruela	0.8407**	1.000																				
Damasco	0.0286	0.2609	1.000																			
Melocotón	0.5429	0.7247	0.8286**	1.000																		
Fresa	0.7590*	0.8933**	0.5161	0.8804**	1.000																	
Cereza	0.2571	0.5218	0.9429**	0.9429**	0.759*	1.000																
Kiwi	0.8286**	0.8407**	0.2571	0.7143	0.9411**	0.5429	1.000															
Mango	0.9411**	0.8933**	0.2732	0.6983	0.8065	0.4554	0.7590*	1.000														
Manzana	0.8286**	0.8407**	0.2571	0.7143	0.9411**	0.5429	1000**	0.7590*	1.000													
Melón	0.6667	0.8235**	0.5508	0.8986**	0.8933**	0.7537*	0.8407**	0.7084	0.8407**	1.000												
Naranja	0.7537*	0.9553**	0.4638	0.8117**	0.8933**	0.6667	0.7537*	0.8933**	0.7537*	0.7794*	1.000											
Aguacate	0.7143	0.6377	0.5429	0.8286**	0.8804**	0.7143	0.8857**	0.6983	0.8857**	0.8117**	0.6377	1.000										
Pepino dulce	0.6571	0.9276**	0.5429	0.8857**	0.9411**	0.7714*	0.8286**	0.7590*	0.8286**	0.9276**	0.9276**	0.7143	1.000									
Pera	0.3741	0.3769	0.3714	0.4857	0.2125	0.3143	0.0857	0.5161	0.0857	0.4926	0.4058	0.2000	0.3714	1.000								
Piña	0.0286	0.2609	1000**	0.8286**	0.5161	0.9429**	0.2571	0.2732	0.2571	0.5508	0.4638	0.5429	0.5429	0.3714	1.000							
Plátano	0.8857**	0.9856**	0.1429	0.6571	0.8804**	0.4286	0.8857**	0.8804**	0.8857**	0.8117**	0.8986**	0.6571	0.8857**	0.3143	0.1429	1.000						
Pomelo	0.7143	0.8986**	0.5429	0.8286**	0.8804**	0.7143	0.7143	0.8804**	0.7143	0.7247	0.9856**	0.6571	0.8857**	0.3714	0.5429	0.8286**	1.000					
Sandía	0.6983	0.7701*	0.6375	0.9411**	0.9355**	0.8197**	0.8804	0.7419*	0.8804**	0.9549**	0.7701*	0.9411**	0.8804**	0.3947	0.6375	0.753*	0.753+	1.000				
Tomates	0.6000	0.8407**	0.7143	0.9429**	0.9411**	0.8857**	0.7714*	0.7590*	0.7714*	0.8407**	0.9276**	0.7714*	0.9429**	0.3143	0.7143	0.7714*	0.9429**	0.8804**	1.000			
Uva	0.6571	0.7537*	0.6571	0.8857**	0.9411**	0.8286**	0.8286**	0.7590*	0.8286**	0.7537*	0.8407**	0.8857**	0.8286**	0.1429	0.6571	0.7143	0.8857**	0.8804**	0.9429**	1.000		
Limón	0.9429**	0.7247*	0.1429	0.6000	0.6983	0.3143	0.7714*	0.8804**	0.7714*	0.7247	0.6377	0.7714*	0.600	0.5429	0.1429	0.7714*	0.6000	0.753*	0.5429	0.6000	1.000	
Tunas	0.8857**	0.9856**	0.1429	0.6571	0.8804**	0.4286	0.8857**	0.8804**	0.8857**	0.8117**	0.8986**	0.6571	0.8857**	0.3143	0.1429	1000**	0.8286**	0.753*	0.7714*	0.7143	0.7714*	1.000

# DISCUSSION



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- The results show us a greater relation of monotonic in the price`s (greater probability of a general increase or decrease in a group), and that this group is also the one that has presented a greater volume of net imports in the last 10 years in an increasing way in the vegetables group (FAO).
- To a portfolio strategy we need to explore new ways towards sustainable intensification and decision making on crop sequencing diversification when affected by consumer price markets.
- The next phases are compare the prices (\$, U\$), X-M with ODEPA information in local and international commerce (Big and good basket but different to built a diet balance).



# DISCUSSION



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- The lower innovation could be due to a less diversified productive matrix, increasingly dependent on imports to supply at population, and with high volatility in local urban prices (CPI representative).
- Big breaks do not facilitate investment, it affects the profitability of crop biodiversity => crop rotation for a profitable portfolio strategy.
- Intense and less lasting price expansions are observed, with price cycles of high value, which makes it difficult for agents to make market decisions (Uncertainty).
- Study tipping points is key to financing for development (E. Pérez, 2013). It is important to relate short-term phenomena with long-term phenomena to see how managing the cycle can lead to changes in productive policy, investment to more sustained growth that leads to a convergence process.
- Higher breaks are harmful for development because discourages the productive investment (R. Ffrench-Davis, 2013).

# CONCLUSION



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1. The greater general volatility of recent years and the increase in the price level might imply inefficiencies (producer and consumer planning) in the agri-food system and its productivity (invest innovation) giving rise to a new stage for rural development and agro-products (Ploeg van der et al, 2002; 2012).
2. The descriptive analysis is still useful to view the change in the dynamics and the structural relation between agro products useful to building resilience policy economic and public policy strategies to resolve problems to consumers and the primary sectors. So further analysis of the combination of factors that operate in the time are required.



# RELATOR EXPOSITION CONTENT DAY



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- Spearman's correlation allows us to work with few data in time series, and where vulnerability can be observed in the urban price of the CPI series, INE in the spring-summer season.
- Local price cycles can be affected by different factors at the aggregate macro level, whether for example weather and international trade patterns appear in the domestic availability of markets.
- Given a strong asymmetry in food prices from the November-December period, it is observed that there is a high vulnerability in recent years, being even more evident in the group of fruits, vegetables, and legumes.
- Since December 2018, it has been observed that overall the agricultural products in vegetables, vegetables, and legumes have a positive and high price monotonicity coefficient, being higher than that of fruits. Given a general vulnerability in agricultural products, this implies that the diversification of productive portfolios presents disparate opportunities for local markets in urban territories depending on the group.

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