Discovering the Philippines' Potential Export Portfolio through the Product Space: Some Products and Ways Forward

Connie B. Dacuycuy and Ramonette Serafica

Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

RESEARCH OBJECTIVE

Identify potential commodities that the PH can produce to improve the sophistication of its export basket

NIP: transform manufacturing industry

MRP: manufacturing sector to shift to high value added investments.

MANUFACTURING RESURGENCE PROGRAM

SR:

Maintain competitiveness of industries with RCA,

Strengthen emerging products

Rebuild existing capacity of industries

MR:

Shift to high value added activities,

Investments in upstream or core sectors,

Link and integrate industries within the economy

LR:

Globally competitive manufacturing industry

Strong forward and backward linkages

Hub for regional and global production networks

STRUCTURAL TRANSFORMATION

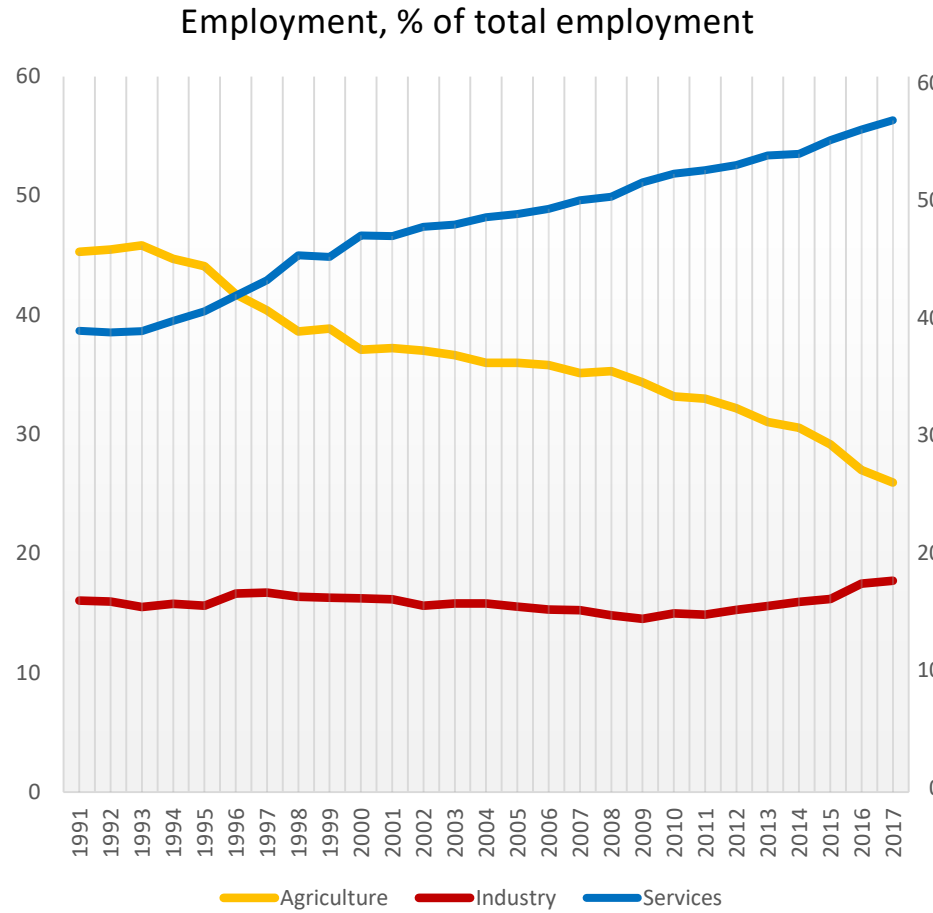
The decline in the shares of agricultural value added (in GDP) and employment (in total employment) is a key aspect of economic development (Syrquin, 2008).

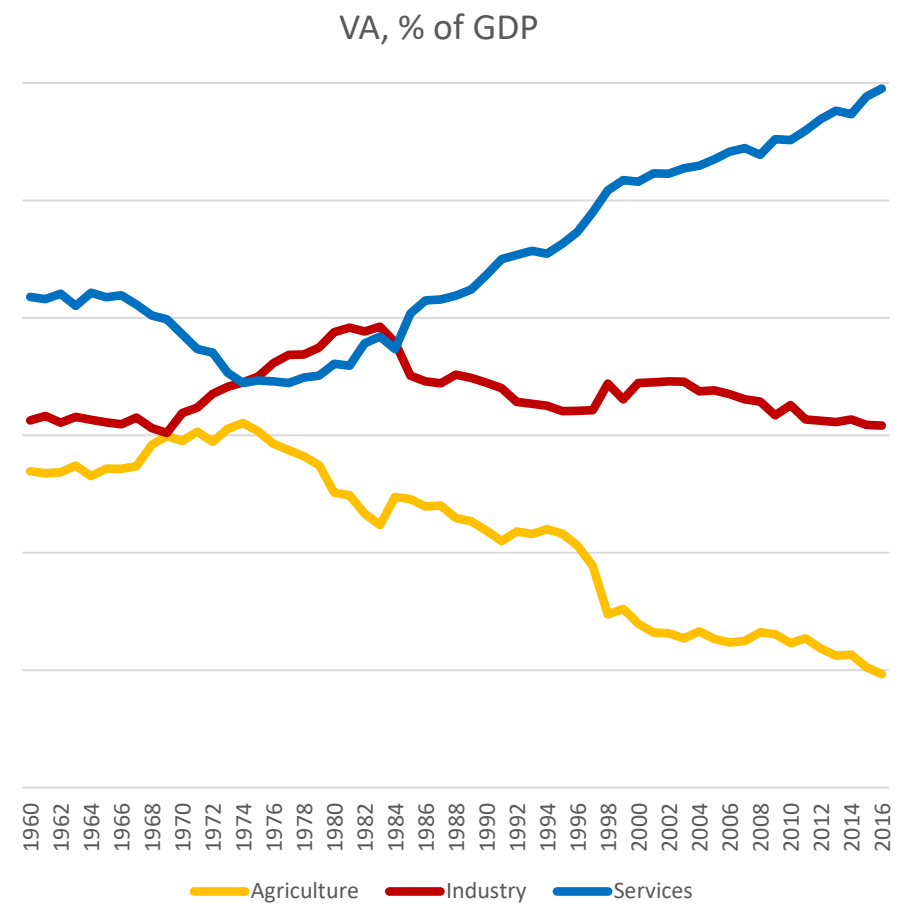
AGRICULTURE-**INDUSTRY**-SERVICES

Learning/innovation takes place

Not the case in the PH.

Premature aging (Fabella and Fabella 2012)





Share of agricultural employment: 26%; developed economies: below 5%

Productivity issues in agriculture sector

Services highest in employment and VA share

EMPIRICAL STRATEGY

Use metrics from **product space** (Hausmann, Hidalgo and MIT people)

Visual representation of how close the goods are to each other, **proximity**

Has started from the concept of **cost discovery process** of firms

Cost discovery generates positive externalities when new firms join the production of the new good.

Dissipate profits and firms will innovate (e.g. push the country's production and technological boundaries outward)

EMPIRICAL STRATEGY

A country has a productive structure that is defined by **capabilities** (infrastructures, human capital, institutions).

Each good embodies in it capabilities, which in turn, defines **product sophistication**.

Countries with many set of capabilities

-can produce goods that are sophisticated

-have productive structures that can accommodate diversification into even more sophisticated products.

WHY PRODUCT SPACE?

Hecksher-Ohlin: country's pattern of specialization is dictated by its abundant resources.

1. **Goods have different consequences in economic performance.**

Specializing in some goods will bring higher growth than specializing in others (Hausmann and Hidalgo 2007).

2. More **diversified countries tend to export products that are on average less ubiquitous** (Hausmann and Hidalgo 2011).

METRICS: SOPHISTICATION INDEX

RCA: $M_{cp} = 1 \; if \; R_{cp} > R*$

Diversity: measure that conveys the number of products a country makes:

$$k_c = \sum_p M_{cp}$$

Ubiquity: measure that conveys the number of countries that export a product**:**

$$k_p = \sum_c M_{cp}$$

Product sophistication: $$PRODY_p = \frac{1}{k_p} \sum_c M_{cp} * k_c$$

- an index that measures a product's sophistication
- to quantify the process of cost discovery, Hausmann et al (2007) assume that each exported good has a productivity level to represent the units of output generated by an investment of a given size

METRICS: PROXIMITY INDEX

Representation of the idea that the closeness of goods is defined by their production requisites.

$$\phi_{pp'} = \frac{\sum_{c} M_{cp} M_{cp'}}{\max(k_p, k_{p'})}$$

17 countries export wine, 24 export grapes and 11 export both, all with RCA>1, the proximity between wine and grapes is 11/24

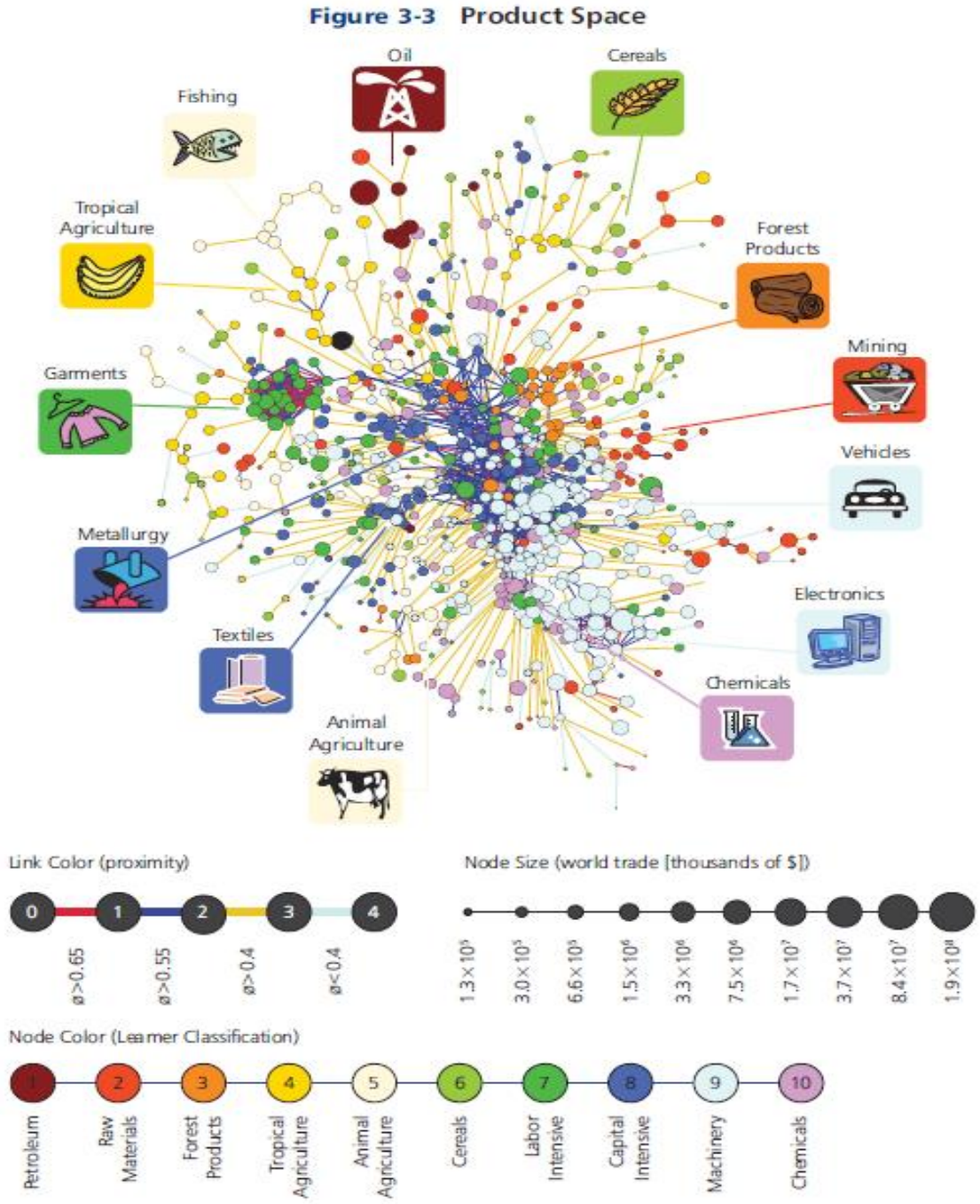
Horizontal specialization between **products sharing similar production structure is less costly** to produce.

footwear to textiles vs footwear to electronics

Related to the cluster of products found in Leamer (1984).

Proximity measure is an outcomes-based approach

No a priori assumptions on how goods are going to be related.



Source: Hidalgo et al., 2007.

Periphery: regions where goods are sparsely connected with each other. Goods have low PRODY, labor intensive-goods like garments, cereals and tropical agriculture.

Core: regions where goods are densely connected to many products. High PRODY such as machinery and high-technology manufactured goods

The export portfolio of wealthier countries is mostly found in the denser regions of the product space while that of the developing economies is mostly found in the periphery

Implications for developing economies: 1) there are few sophisticated products that these economies can potentially diversify into. **2)** need to undertake significant transformation in their production structure

Table 3: 2014 Top and bottom 5 products in the world, first and fifth quintile of $PRODY_{world}$

	PRODY		PRODY
Bottom 5, first quintile		**Top 5, first quintile**	
Lighter refill fuels (pack < 300 cc)	90	Men, boys garments, of material, not knit	791
Petroleum oils, oils from bituminous minerals, crude	185	Ceramic statuettes, ornamental articles, not porcelai	791
Cocoa beans, whole or broken, raw or roasted	259	Sanitary articles of paper, sanitary towels, diapers	790
Natural gas, liquefied	269	Nitrogen	790
Gum Arabic	289	Zinc dust	790
Bottom 5, fifth quintile		**Top 5, fifth quintile**	
Filament lamps, except ultraviolet or infra-red	1200	Recorded gramophone records	2332
Hand pumps not designed to measure flow	1200	Quartzite, crude or roughly trimmed	2332
Granules of pig iron or spiegeleisen	1200	Transcribing machines	2332
Rubber tube, pipe or hose not reinforced, no fittings	1200	Cobalt chloride	2332
Rubber articles, inflatable, vulcanized rubber	1200	Turntables with automatic record changing mechanism	2332

Source: Authors' computation using 2014 COMTRADE HS 1992 at the 6-digit disaggregation. The average PRODY of products in the world market is around **1001** . PRODY in the first quintile is between 90-790, second quintile is between 791-937, third quintile is 938-1063, fourth quintile is 1064-1199, and the fifth quintile is between 1200 -2332.

	Share to total exports, 1995	PRODY	MRCA
Parts and accessories of data processing equipment ne	5.55	729	1
Computer data storage units	4.9	831	
Coconut (copra) oil crude	4.7	312	
Bananas, including plantains, fresh or dried	3.18	403	
Monolithic integrated circuits, digital	2.37	833	
Copper cathodes and sections of cathodes unwrought	2.35	644	
Transmit-receive apparatus for radio, TV, etc.	2.02	853	1
Ignition/other wiring sets for vehicles/aircraft/ship	1.75	806	
Shrimps and prawns, frozen	1.57	488	
Copper ores and concentrates	1.5	493	1
Iron ore, concentrate, not iron pyrites, agglomerated	1.3	477	
Radio reception apparatus	1.25	1089	1
Transistors, except photosensitive, < 1 watt	1.23	927	1
Monolithic integrated circuits, except digital	1.21	896	1
Tuna, skipjack, bonito, prepared/preserved, not mince	1.19	459	
Cameras for 35 mm roll film except single lens reflex	1.12	1550	1
Pineapples, otherwise prepared or preserved 1	1.07	586	
Mens, boys trousers & shorts, of cotton, not knit	1.01	624	
[Sum] [[Average]]	[39]	[[722]]	

		PRODY	MRCA
	share, 2005	prody	
Monolithic integrated circuits, digital	22.46	833	1
Monolithic integrated circuits, except digital	10.11	896	1
Computer data storage units	7.43	831	
Parts and accessories of data processing equipment ne	6.75	729	1
Hybrid integrated circuits	4.2	697	
Ignition/other wiring sets for vehicles/aircraft/ship	1.47	806	
Bananas, including plantains, fresh or dried	1.34	403	
Static converters, nes	1.33	1002	
Transistors, except photosensitive, > 1 watt	1.05	740	1
[Sum] [[Average]]	[56]	[[771]]	
	share, 2014	prody	
Monolithic integrated circuits, except digital	16.59	896	1
Computer data storage units	6.56	831	
Parts and accessories of data processing equipment ne	5.07	729	1
Nickel ores and concentrates	3.74	706	
Bananas, including plantains, fresh or dried	2.36	403	
Ignition/other wiring sets for vehicles/aircraft/ship	2.29	806	
Electronic integrated circuits/microassemblies, nes	2.22	685	
Static converters	2.09	1002	
Photosensitive/photovoltaic/LED semiconductor devices	1.69	1098	1
Transistors, except photosensitive, > 1 watt	1.47	740	1
Computer input or output units	1.32	858	
Parts of line telephone/telegraph equipment, nes	1.09	960	1
Cruise ships, excursion boats, ferry boats	1.09	1021	
Copper ores and concentrates	1.01	493	1
[Sum] [[Average]]	[49]	[[802]]	

Table 4: Descriptive statistics of the 2014 Philippines' exports

Quintile of $PRODY_{world}$	Number of products	Average PRODY of PHL exports	Share to total exports
All products			
1	**972**	**646**	**35.63**
2	**971**	**871**	**36.92**
3	972	1001	17.81
4	971	1127	7.38
5	971	1364	2.26
Export portfolio (RCA>1, export share>= 1%)			
1	**250**	**653**	**30.39**
2	**172**	**871**	**35.12**
3	144	999	15.47
4	90	1128	5.41
5	64	1353	1.41

Source: Authors' computation using 2014 COMTRADE HS 1992 at the 6-digit disaggregation.

Selection Strategy for potential diversification in the short-run

Product *j* is close to product *i* (2014 export portfolio)
proximityij≥0.5
65 products

Product *j* is more sophisticated than the existing exports
PRODYj>PRODYi
48 products

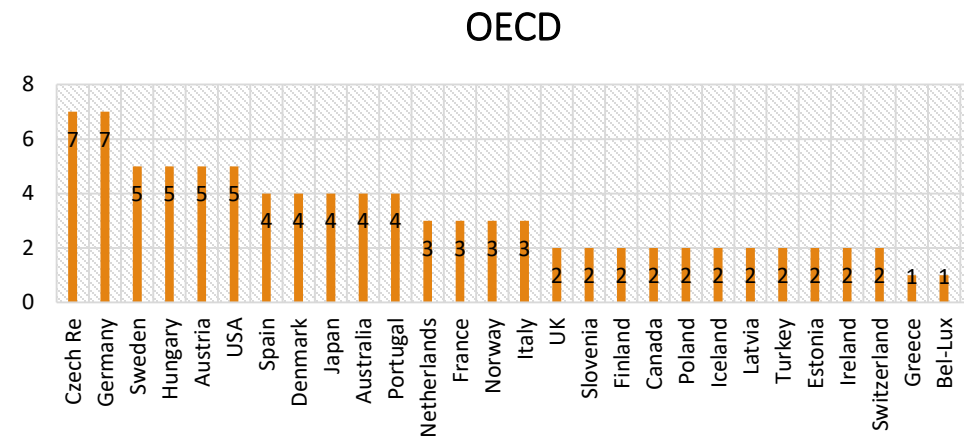
Product *j* is not import intensive
MRCA=0
28 products

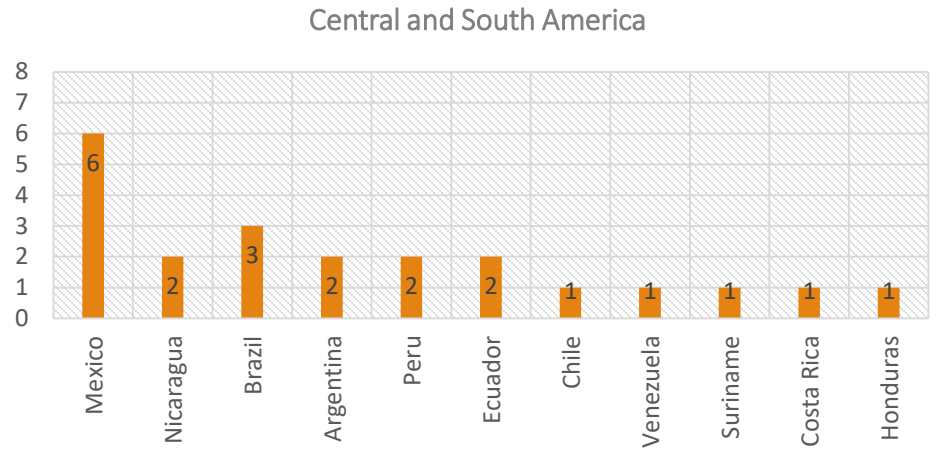
Short-run strategy 1: Product *j* has RCA but not yet substantially produced
$RCA = 1$ and $share_j \leq 0.5\%$
9 product *j*, $Average\ PRODY_j = 931$

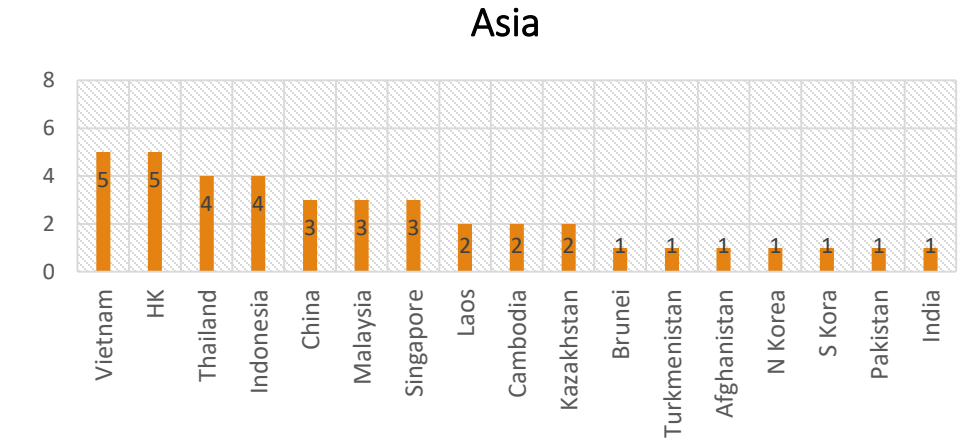
Short-run strategy 2: Product *j* has no RCA
RCA=0
17 product *j*, $Average\ PRODY_j = 1075$

Strategy 1: Products with RCA=1, close to the production structure of 2014 export basket	PRODY	Share to total exports (%)
Parts and accessories of revolution counters,	1127	
Speed indicators, tachometers, stroboscopes	1112	
Electrical resistors fixed, power capacity < 20 watt	1072	
Indicator panels incorporating electronic displays	1023	
Parts of printing machinery and ancillary equipment	1011	
Electrical boards, panels, , not equipped	1001	
Objective lenses	971	
Furniture parts	943	
Hybrid integrated circuits	697	
Strategy 2: Products with RCA=0, close to the production structure of the products in the export basket		
Wheels including parts/accessories for motor vehicles	1224	0.0292
Valves for oleohydraulic or pneumatic transmissions	1205	0.0517
Parts of industrial or laboratory furnaces/ovens	1183	0.0002
Woven fabric >85% nylon, polyamide, unbleached/bleached	1182	0.0001
Articles of iron or steel	1140	0.0630
Foil, copper alloy, backed, t < 0.15mm	1118	0.0001
Parts of sewing machines	1106	0.0017
Trailer/non-mechanically propelled vehicle parts	1085	0.0008
Electrical machines and apparatus	1057	0.1343
Doors, windows, frames of iron or steel	1043	0.0007
Weighing machine parts and weights of all kinds	1029	0.0004
Fittings for plastic tube, pipe or hose	1025	0.0099
Sheet , cellular of polymers of styrene	1016	0.0002
Plastic builders' ware	998	0.0230
Aluminum structures and parts, for construction	966	0.0250
Wooden pallets, box pallets and load boards	952	0.0016

Figure 6: Potential markets of the SR products







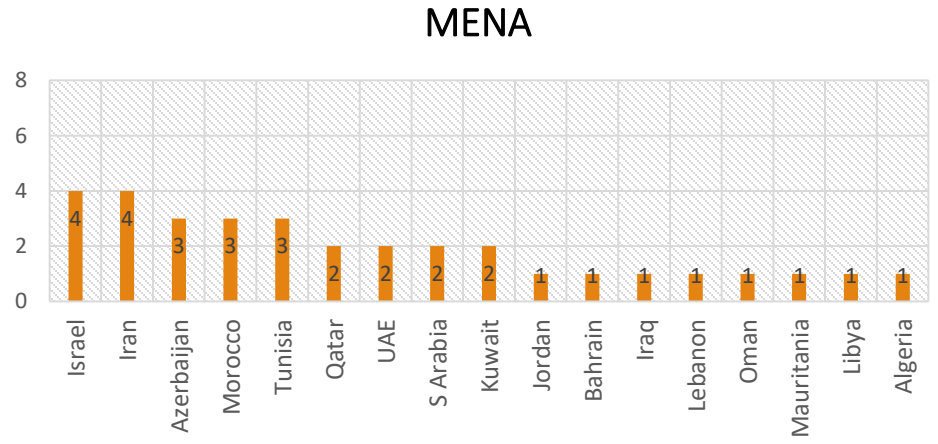


Table 9: 2014 Top and bottom 10 agricultural products in the world, first and fifth quintile of PRODY

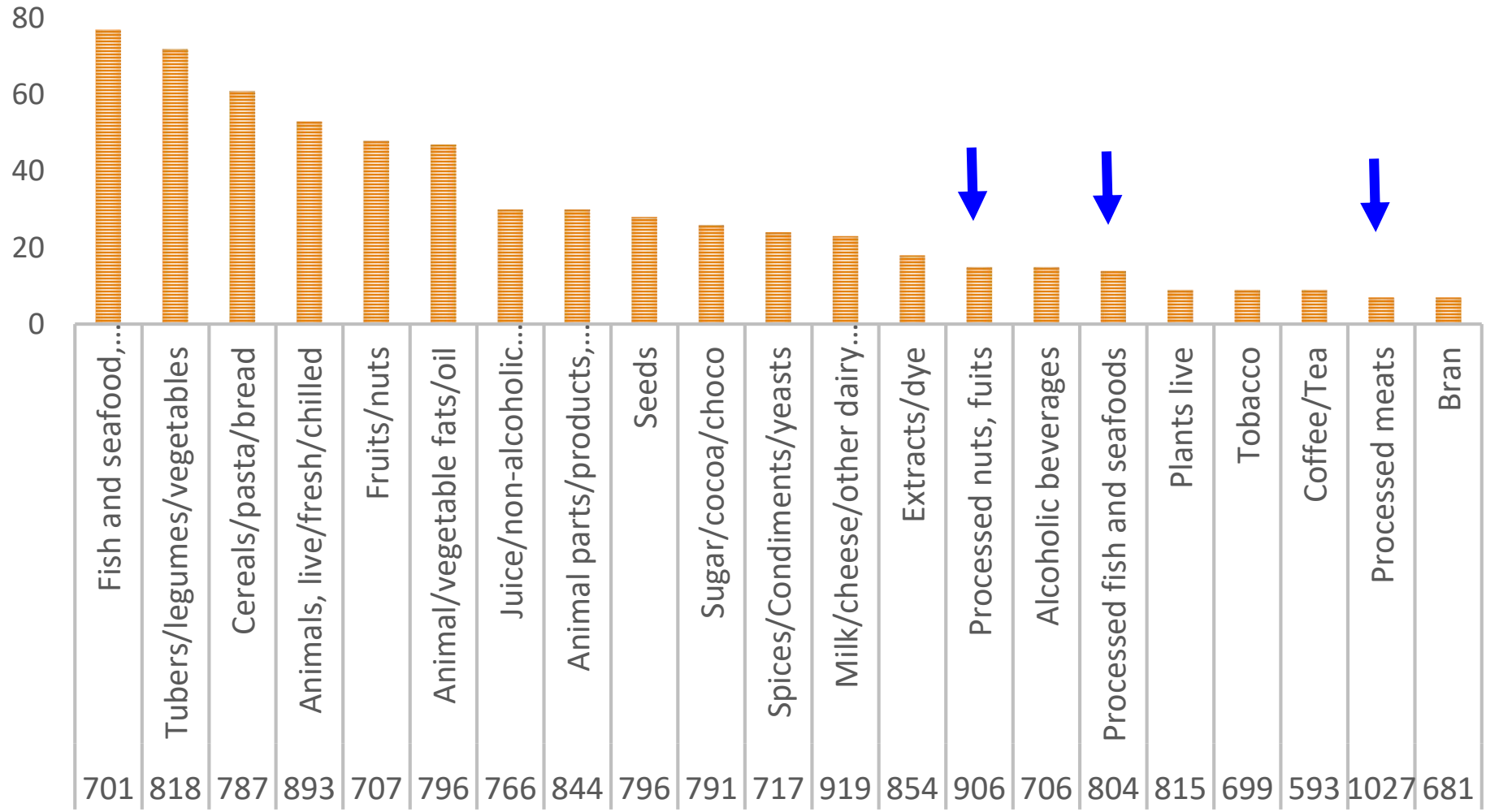
Bottom 5, first quintile	PRODY	Top 5, first quintile	PRODY
Cocoa beans, whole or broken, raw or roasted	259	Malt extract & limited cocoa pastry cooks products	780
Gum arabic	289	Bulbs, tubers, corms in growth, chicory plants	780
Coffee, not roasted, not decaffeinated	303	Animal products and domestic animal carcass (non-food	778
Coconut (copra) oil crude	312	Soya-bean oil-cake and other solid residues	778
Lobsters (Homarus) frozen	322	Nutmeg	777
Bottom 5, fifth quintile	**PRODY**	**Top 5, fifth quintile**	**PRODY**
Eggs, bird, not in shell not dried	1201	Cheese, blue-veined	1327
Poppy seeds	1202	Truffles, prepared or preserved, not in vinegar	1309
Swine cuts, fresh or chilled	1206	Egg yolks dried	1283
Residues of starch manufacture and similar residues	1210	Swine edible offal, fresh or chilled	1278
Fructose, chemically pure	1221	Bellies (streaky) of swine, salted, dried or smoked	1277

Source: Authors' computation using COMTRADE HS 1992 at the 6-digit disaggregation.

The average $PRODY_{world}$ is around 1001. PRODY in the first quintile is between 90-790, second quintile is between 791-937, third quintile is 938-1063, fourth quintile is 1064-119, and the fifth quintile is between 1200-2332.

AGRICULTURE:

Figure 14: Number of PH agricultural exports and average PRODY of agricultural exports in the world market, by category



Figures at the bottom are average *PRODY*. The average $PRODY_{agricultural\ products\ world}$ is around 790.

Table 12: Potential agricultural products for medium-run diversification

Short-run products	Potential medium-run products	importers
Cereals, rolled/flaked grains (913)	Turkey meat, offal prepared or preserved, except live (1083)	72
Fruit mixtures, otherwise prepared or preserved (998)	Strawberries, otherwise prepared or preserved (1127)	57
Glycerol (glycerine), crude and glycerol waters & lye (1017)	Turkey cuts & offal, except livers, frozen (1122)	88
	Swine hams & cuts thereof, prepared or preserved (1103)	71
	Swine carcasses and half carcasses, fresh or chilled (1050)	23
	Swine, live except pure-bred breeding > 50 kg (1256)	21
Locust beans and seeds (1010)	Olive oil, fractions, refined, not chemically modified (1019)	69
Tung oil or fractions not chemically modified (1526)	Woven twill >85% polyester + cotton, <170g/m2 printed (1526)	1

Table 13: Potential agricultural products for long-run diversification

Medium-run products	Potential long-run products	importers
Swine carcasses and half carcasses, fresh or chilled (1050)	Pig and poultry fat, unrendered (1054)	50
	Poultry cuts & offal, except livers, fresh or chilled (1160)	42
	Ammonium nitrate limestone etc mixes, pack >10 kg (1089)	36
Swine hams & cuts thereof, prepared or preserved (1103)	Bellies (streaky) of swine, salted, dried or smoked (1277)	73
Turkey meat, offal prepared or preserved, except live (1083)	Poultry cuts & offal, except livers, fresh or chilled (1160)	42

SUMMARY

The PH has a **long history** of trade liberalization efforts and market-oriented reforms.

Yet to see a genuine structural transformation

The average sophistication of PH export basket **barely improved** from 1995 to 2014.

Remained lower than the average sophistication content of exports in the world market.

SUMMARY: INDUSTRY

There are relatively sophisticated products in the 2014 PH export basket.

static converters, photosensitive/photovoltaic/LED semiconductor devices, parts of line telephone/telegraph equipment, electric capacitors, electronic printed circuits, and cruise ships/excursion boats/ferry boats

Some have forward linkages to goods with higher sophistication content.

SUMMARY: AGRICULTURE

The agricultural sector can diversify into the production of goods with higher sophistication content.

-**from primary to agroprocessing**

The identified products in the empirical exercises do not lead to the most sophisticated among the agricultural products in the world.

Offal, smoked bellies, cheese

TAKEAWAYS

-does not recommend to focus only on these goods

-assesses the country's prospects and opportunities for economic growth

-provides feasible options as starting points

-assess where the country stands and where the country can go

PH has prospects for structural transformation.

-well-thought-out policies, plans, and priorities set in motion.

-prioritize investments and to map out clear and deliberate multi-stakeholder action plans

Does not happen overnight!

JP: incentives to steel industry

SK: land redistribution

CH: attracted EPZ and forward linkages

RECOMMENDATIONS

Creating an enabling environment

-promote competition and innovation

-promote research and S&T

-improve the climate for export development

-improve existing trade relations and explore potential trade agreements

-improve connectivity: roads, ports

Enhancing industrial policies

share of services embodied in Philippine manufacturing exports is among the lowest in the region

-increase servicification

Focus on policy and regulatory reforms in services

process innovations are integrated into the various stages of good production.

Harnessing the potential of the agricultural sector

Build on the production structures of cereals, fruit mixtures, glycerol, and oils to produce agroprocessed goods.

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