EVALUATING THE CHANGING COMPARATIVE ADVANTAGE PATTERNS AND EXPORT SPECIALIZATION OF EAST JAVA PROVINCE (INDONE-SIA)

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ABSTRACT

East Java (JATIM), the second largest province in Indonesia in terms of pop-ulation and GDP contribution had experienced 50 percent of export growth from 2007 to 2013. The changes were not only in value but in composition and destination, meaning that a change in the pattern of exports of JATIM and export performance was observed in the seven years of analysis. This study looks at those changes from the point of view of comparative advan-tage and export specialization. JATIM kept 55 percent of their competitive industries since 2007 as the backbone of their exports, losing the other 45 percent, while allowing the creation of new industries. The gains in new industries are higher than the losses indicating that relocation of resourc-es and the change of focus is bringing benefits to the province. Dynamic changes had occurred among commodities –gains and losses in compar-ative advantage and export specialization-, some presumed to be driven by commodity prices while others are more related to global integration.

Keywords: Revealed Comparative Advantage, Trade Balance, Factor Inten-sities, Products Mapping, International Trade.

JEL: F00; F10; F14

Introduction

East Java (JATIM) is the second largest province in Indonesia in terms of population (nearly 37 million people) and contribution to national economy (more than 7% of GDP). Since the last decade, JATIM was able to keep economic growth above national average, and more recently even above top provinces as West Java and Jakarta which are the traditional top drivers of growth in the country. JATIM's economy is mainly supported by the service sector (trade, hotels and restaurants) that represent more than 31%, and manufacturing as it second largest sector with more than 26% in 2013.

A strong increase in commodity prices and high demand from neighboring China and East Asian countries had boosted exports in the region by nearly 50%, from US$ 10.35 billion in 2007 to US$15.47 billion in 2013. However, in the last couple of years, the composition of GDP and exports of East Java was certainly being challenged by the drop of commodity prices

and shrinking world demand. These changes created reverse effects in industry structure, policy focus, and a certain dependency on few commodities. In fact, in 2011, exports reached almost US$18.25 billion (80% above the 2007 levels) but soon after dropped to US$15.47 billion.

The increase in exports (2007 to 2013) was mainly pushed by few commodity groups such as vegetable oils (grew by 872%), machinery and transport equipment (more than 400%), crude materials (non fuels, 306%), food & live animals (107%), and beverage and tobacco (100%). Manufactured products that represented almost 40% of total exports on 2007 declined by almost 15% in value by 2013.

Main export partners also experienced a change. In 2007, ASEAN countries absorbed almost 30% of JATIM exports, but the share dropped by less than 20% in 2013. On the other hand, imports experienced an important increase within manufacturing industries (machinery and transportation, manufacturing goods, miscellaneous manufactured articles, etc.).

These changes in export-import composition, destination and volumes signal a change in the comparative advantage of East Java and a change on patterns, shifting from being mainly a manufactured goods exporter to a more natural resource based region (food, vegetable oils, crude materials, organic chemicals, tobacco, etc.) and manufacturing related to natural resources (paper, furniture, rubber, etc.).

There are also several new industries flourishing from machinery and transportation equipment sector, signaling the introduction of JATIM into new global supply chains. All these, together with the openness and integration experienced in JATIM suggest a dynamic change in comparative advantage in the second largest province of Indonesia.

This study looks at the changes in the pattern of trade in East Java from 2007-2013, shifts in patterns at sector/industry level, shifts in specialization from one industry to another, strengthening or losing of comparative advantage and specialization, tendencies towards specialization or diversification, changes in trade composition, and to observed if integration moves towards regional or extra-regional integration. It looks at comparative advantage both from the optic of value as well as in factors (labor, technology, resources, etc.)

Literature review

Various Empirical Approaches On Comparative Advantage

A number of empirical studies on comparative advantage center their attention in the transformations produced in trade performance by changes in comparative advantage and new trade policies. Yue and Hua (2002), found that a shift in comparative advantage to labor intensive industries in China together with several adjustments in supply side supported a strong economic growth and improvement in export performance. Carolan, Singh, and Talati (1998) observed that a shift in composition of trade and comparative advantage on the US-East Asia trade was mainly supported by change in factor proportions, technological transfers, product cycle and other economic forces.[1] Krause (1987) concluded that a change in composition of trade and improvements in comparative advantage were important drivers in the trade expansion in Asian Pacific countries. Benders and Li (2002) found strong evidence of Southeast Asian and Latin-American countries gaining comparative advantage and improving trade performance versus East Asian countries, who even though kept comparative advantage in strategic groups of products, they lost their advantage in several other commodity groups

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[1] Transport costs; tariffs or quantitative trade restrictions; greater specialization due to economies of scale; or "a successful combination of import substitution followed by export promotion"

during 60's and 90's.

In a similar line of research, several studies focus on how changes in comparative advantage when accompanied by other factors can create impacts on trade patterns. In Korea, Lee (1995), concluded that a mix of effort: transferring resources from low marginal labor productivity to higher productive sectors, supporting specialization in new industries, and a strong backing from institutions supported a change in comparative advantage in the country. Uchida and Cook (2005) in analyzing technological capability and specialization and the impact in trade of East Asian countries observed that country's technological capability and specialization reflect its trade specialization, influencing competitiveness.

Some empirical studies focus on testing whether changes in trade performance and trade pattern are due to improvement in factor-proportions or productivity differentials. Amoroso, Chiquiar and Ramos-Francia (2011) looked at interactions of factor endowments, intensities, and industry fixed effects among developing countries finding factor-proportions to have twice as much power in determining export patterns -Heckscher–Ohlin view- than productivity differentials –Ricardian view-. Balassa and Noland (1988) showed how after fifteen years of significant differences in human capital and R&D between Japan and USA, a shift in comparative advantage in Japan pushed its pattern of trade towards high-tech industries, matching the pattern of specialization with USA, however differing in scope of competition. Chenery and Keesing (1981) observed trends towards similar patterns of trade among industrialized and developing economies, showing how developing ones are switching more into capital-intensive and skill intensive goods, breaking traditional patterns of roles in trade, previously limited in primary industries or low-tech. Echevarria (2008) suggests that in the long term, comparative advantage is determined by how total factor productivity (TFP) differs between countries, suggesting that TFP determines why developing countries main exports are primary products versus more advanced manufacturing products from advanced countries.

Liberalization, integration, and industrialization are also widely discussed as a channel for export expansion and a way to improve comparative advantage. Balassa (1986) observed intra-industry trade as positively correlated with economic development, size of domestic markets, and openness. Das (2009) found that trade integration, share of manufacturing exports in total exports, technology intensiveness, as well as variety-seeking demand patterns may also foster intra-industry trade and trade volume. Oladipo and Vasquez (2009) noted "structural changes that occurred due to trade liberalization were conducive to improve the positive effect of exports on growth in Mexico". Baldwin (2011) addresses the rapid economic growth of developing countries as the result of joining a supply chain which made industrialization less complex and faster (new industrialization path) through the offshoring from rich-nation technology and the low-wage labor of Less Advanced Economies. De Hoyos and Lacovone (2013) found that liberalization in NAFTA helps to enlarge knowledge by increasing their contacts with foreign buyers, decrease learning externalities, improve productivity, economies of scale, and gives incentives to innovate.

Cases of failure in policy are also widely analyzed (Chow, 1990; Lutz, 1987). They found that policy directed towards substitution or complementarity does not have much effect on shifting comparative advantage.

The large number of academic research on comparative advantages supports that changes in patterns and performance are due to both demand and supply side, both at domestic and international markets (Widodo, 2009), both in factor-intensities and productivity differentials. However, different evidences show how diverse could be the effects depending on how factors and policies interact with each other.

These empirical studies as well as the basics of international trade theory presented allows to posit that the different changes in supply and demand side on domestic and international markets, the mix of trade policy, the adjustment in the allocation of resources together with other factors –internal and external- could influence and determine in some degree the comparative advantage of countries, its export performance and its trade pattern.

As noted by Esquivias and Heriqbaldi (2013) improvements in capital, labor, and technology can affect the level of specialization, productivity and better resource relocation leading the country to reach higher levels of scale that will result in larger output and lower costs. The reduction on costs will allow the creation of price differentials that increases the volumes of exports and then supports economic growth through balance of trade, and accumulation in the quality and intensity of the factors of production. It is expected that under these positive changes, investment and business environment will attract more resources and support capital, labor and technology.

Methodology

The theoretical and empirical debate on the competitiveness of a country seen in various studies looks at different indicators. A good number of them uses Revealed Comparative Advantage (RCA), factors affecting changes in RCA and RCA relationship with the use of indicators of industrial specialization, Balassa and Noland (1988), Benders and Li (2002), Oelgemöller (2012), Lee (1995), Carolan, Singh, and Talati (1998), Das (2009), Yue and Hua(2002), Widodo (2009), among others.

To address the problems and the assumptions on the change of comparative advantage, the present study makes use of two variables expressed as Revealed Comparative Advantage (RCA) indexes and Trade Balance Index (TBI) on the basis of exports to the whole world for 2007 - 2013 to identify trends in East Java (JATIM) exports. Data from SITC Rev 3 at the sector level (1 digit) and commodity level (5 digit) were used.

The computation of comparative advantage is based on RCA index developed by Balassa (1965). The index denotes "the relative export performance of a country in particular commodities". The advantages of the trading countries are based both in cost factors as well as in other non-price factors. RCA indexes are obtained by dividing a country's share in the exports of a given commodity category by the share in the world exports.

$$RCA_{ij} = \frac{E_{i,j}/E_{tot,j}}{E_{i,world}/E_{tot,world}} \qquad (1)$$

RCA_{ij} : country's j revealed comparative advantage index for commodity group i; E_{ij} stands for exports of commodity i by exporter j; E_{tot} means total merchandise exports –not including services-. The values of the index vary from 0 to infinity ($RCA_{ij} \geq 0$). RCA_{ij} greater than one means that country i has comparative advantage in group of products j and vice versa.

Revealed Symmetric Comparative Advantage (RSCA) index developed by Dalum and Laursen (1998) will be used so as to facilitate comparison analysis. RSCA is based on RCA with a "simple decreasing monotonic transformation" (Widodo, 2009) formulated as:

$$RSCA_{ij} = (RCA_{ij} - 1)/(RCA_{ij} + 1) \qquad (2)$$

With this adjustment, the values of $RSCA_{ij}$ index will take values in the range of minus one to one (-1 ≤ $RSCA_{ij}$ ≤ 1). Values of $RSCA_{ij}$ above zero implies a comparative advantage of country i in group of commodities j. $RSCA_{ij}$ below zero implies a comparative disadvantage of country i in group of commodities j.

Trade Balance Index (TBI) helps to identify the export position of a country for a group

of products, showing if the country has specialization in export (as net-exporter) or in import (as net-importer). The assumptions of this index are taken from the empirical research of Lafay (1992). The Index obtained from TBI may indicate if a specific commodity contributesto the domestic economy (surplus), or if it is a negative (deficit). TBI is formulated as:

$$TBI_{ij} = (X_{ij} - m_{ij}) / (X_{ij} + m_{ij}) \qquad (3)$$

TBI_{ij} Trade Balance Index of country i for group of products j ; X_{ij} Exports of group of products j by country i ; m_{ij} Imports of group of products j by country i

The values of the TBI index will range from -1 to 1. The TBI will equal -1 if a country only imports (net-importer) and 1 if only exports (net-exporter).

All computations of RCA indexes are conducted at commodity level (5 digit SITC). For the purpose of analysis, results are often aggregated at sector level (1 digit) as well as industry level (2-digit), allowing aggrupation of commodities that could help policy making. Several data arrangements are undertaking to capture inter-temporal variations both in comparative advantage and trade specialization –ranking of RCA, shifting from non-RCA to RCA, trends in composition of trade, etc.

Finally, the factor intensity analysis is undertaken to identify the structural changes in factor endowments based on four groups: High Skill – Technology Intensive (HS–TI), Labor Intensive–Technology Intensive (LI–TI), Low Skill - Technology Intensive (LS –TI), and Medium Skill - Technology Intensive (MS – TI).

Complementing the analysis of indexes, the "Product Mapping", Widodo (2009), is used to examine comparative advantage from the point of view of the domestic trade balance and the international competitiveness. With RSCA and TBI indexes, products are categorized into four groups A, B, C and D as depicted:

	RSCA < 0	RSCA > 0
TBI > 0	Group C: Comparative Disadvantage Net-exporter (RSCA<0 and TBI > 0)	Group A: Comparative Advantage Net-exporter (RSCA>0 and TBI > 0)
TBI < 0	Group D: Comparative Disadvantage Net-importer (RSCA<0 and TBI < 0)	Group B: Comparative Advantage Net-importer (RSCA>0 and TBI < 0)

Figure 1: Product Mapping Chart

Source: Widodo (2009)

Group A are those products that enjoy both comparative advantage and export- specialization; Group B products with comparative advantage but no export-specialization; Group C products with export-specialization but no comparative advantage; and Group D products with neither comparative advantage nor export-specialization.

Data

Data of Exports and Imports of East Java province (Indonesia) are collected from Badan Pusat Statistik Indonesia (BPS) at 5-digit level, based on Standard International Trade Classification

(SITC) Rev. 3. Data for the World -exports and imports- are collected from theUnited Nations Commodity Trade Statistics Database (UNCOMTRADE). Products are also classified according to their stage of production and factor intensities. That classification by UNCOMTRADE is used to analyze factor intensities.

Emperical Result

For a more systematic analysis, this section is divided into four parts. The first one focuses on the analysis of the revealed comparative advantage (RCA) and trade balance indexes (TBI). The second part analyzes inter-temporal variations in both indicators –RCA and TBI-, while the third corresponds to the use of product mapping as a tool of analysis. The last section –4- focuses on the analysis of factor intensity. The data is aggregated at sector level (10 main sectors[2]), industry level (66 industries) and commodity level (3,090 products).

In general terms, the highest contributors to JATIM exports (in terms of value) comes from machinery and transportation equipment sector (30%), followed by manufactured goods (13%), chemical products (12%), commodities nes (11%), miscellaneous manufactured articles (11%), and mineral fuels (10%).

Table 1: Total Exports by Sector and Main Industries, 2007-2013

Sector / Industry	Exports US$ (000) 2007	% share Exports -2007	Number of Commodities RCA_2007	Number of Commodities TBI_07	#RCA & TBI_07	Exports US$ (000) 2013	% share Exports -2013	Number of commodities RCA_2013	Number of commodities TBI_13	#RCA & TBI_13
Animal/veg oil/fat/wax	144,060	1%	7	30	6	1,400,434	9%	12	29	12
Fixed veg oils/fats	119,938	83%	2	6	3	1,102,759	79%	1	7	6
Others	24,122	17%	5	24	3	297,674	21%	11	22	6
Beverages and tobacco	210,599	2%	8	20	7	420,455	3%	9	9	5
Tobacco/ manufactures	206,811	98%	0	13	7	401,816	96%	1	5	4
Beverages	3,787	2%	8	7	0	18,639	4%	8	4	1
Chemicals/ products n.e.s	_1,999,689_	_19%_	_43_	_114_	_35_	2,020,729	13%	57	106	_40_
Organic chemicals	1,574,489	79%	4	12	13	1,100,628	54%	6	9	14
Perfume/ cosmetic/ cleansr	127,653	6%	1	4	5	328,261	16%	3	2	5
Others	297,547	15%	38	98	17	591,839	29%	48	95	21

[2]Food & live animals, Beverages and tobacco, Crude mater.ex food/fuel, Mineral fuel/lubricants, Animal/veg oil/fat/wax, Chemicals/products n.e.s, Manufactured goods, Machinery and Transp equipment, Miscellaneous manuf arts, and Commodities nes.

Sector / Industry	Exports US$ (000) 2007	% share Exports -2007	Number of Commodities RCA_2007	Number of Commodities TBI_07	#RCA & TBI_07	Exports US$ (000) 2013	% share Exports -2013	Number of commodities RCA_2013	Number of commodities TBI_13	#RCA & TBI_13
Commodities nes		0%	0	3		547,717	4%	1	5	1
Gold non-monetary ex ore	-		0	3	0	547,711		1	5	1
Crude mater.ex food/ fuel	433,125	4%	34	150	29	1,758,652	11%	39	148	35
Metal ores/ metal scrap	74,067	17%	3	12	4	772,957	44%	3	11	5
Crude/ synthet/rec rubber	29,237	7%	11	27	1	453,266	26%	14	28	4
Cork and wood	237,695	55%	5	17	3	370,245	21%	4	12	2
Others	92,127	21%	15	94	21	162,183	9%	18	97	24
Food & live animals	1,208,474	12%	86	219	73	2,499,849	16%	78	219	66
Fish/shellfish/etc.	658,403	54%	6	14	26	1,334,766	53%	7	14	22
Coffee/tea/ cocoa/spices	197,355	16%	1	14	11	434,365	17%	3	17	15
Misc food products	118,304	10%	15	24	7	379,966	15%	17	26	5
Others	234,412	19%	64	167	29	350,753	14%	51	162	24
Machinery/transp equipmt	864,660	8%	31	152	24	1,227,046	8%	37	100	22
Electrical equipment	347,634	40%	6	31	6	495,409	40%	8	18	6
Road vehicles	210,611	24%	6	10	2	309,367	25%	8	6	3
Others	306,415	35%	19	111	16	422,269	34%	21	76	13
Manufactured goods	4,094,476	40%	98	385	92	3,480,973	22%	130	345	111
Paper/paperboard/ article	1,001,596	24%	9	19	19	1,012,797	29%	9	18	17
Non-ferrous metals	1,985,002	48%	7	48	6	771,863	22%	7	43	8
Cork/wood manufactures	199,921	5%	2	12	9	558,122	16%	5	14	8

Sector / Industry	Exports US$ (000) 2007	% share Exports -2007	Number of Commodities RCA_2007	Number of Commodities TBI_07	#RCA & TBI_07	Exports US$ (000) 2013	% share Exports -2013	Number of commodities RCA_2013	Number of commodities TBI_13	#RCA & TBI_13
Textile yarn/ fabric/art.	288,453	7%	7	27	26	457,256	13%	16	27	35
Others	619,504	15%	73	279	32	680,937	20%	93	243	43
Mineral fuel/lubricants	306,927	3%	1	22	1	453,197	3%	2	18	1
Petroleum and products	306,832	100%	0	4	1	452,811	100%	0	4	1
Others	95	0%	1	18	-	386	0%	2	14	-
Miscellaneous manuf arts	1,088,626	11%	45	201	45	1,664,740	11%	71	211	56
Footwear	225,489	21%	7	52	10	550,347	33%	12	74	10
Furniture/ furnishings	521,473	48%	0	3	9	542,075	33%	0	4	10
Misc manufactures nes	274,048	25%	10	17	18	415,338	25%	11	17	24
Apparel/ clothing/ access	56,369	5%	9	20	7	134,978	8%	10	16	9
Others	67,616	1%	28	129	8	156,980	1%	48	116	12
Grand Total	10,350,634		353	1296	312	15,473,791	9%	436	1190	349

An important change in the composition of exports is observed. Vegetable oils (grew by 90%), crude materials (75%), commodities nes (100%), food (52%) and tobbaco (50%) sectors gained important share of total exports from 17% in 2007 to 40% in 2013. All of themtogether represent more than US$ 4,6 billion in 2013. Manufactured goods and chemical products on the other hand, dropped from 60% on share in total exports, to 36%, (as low as US$ 600 million). Top 10 groups of commodities (out of 859 exported in 2013) represent more than 30% of total exports in JATIM, all of them related to natural resources, non- ferrous metals, and metals.

Revealed Comparative Advantage and Export Specialization

In 2013, JATIM exported more than 860 different commodities (based on SITC 5 digits) to the rest of the world, with 443 groups of commodities enjoying comparative advantage (RCA>1) and 425 with RCA<1 (non-comparative advantage). However, only 350 of them enjoyed both comparative advantage and export specialization (TBI>0). In terms of comparative advantage intensity, 193 out of the 350 commodities enjoyed StrongComparative Advantage (RCA>3), 71 enjoyed medium level (3>RCA>2) and 86 have weak level (2>RCA>1).

The largest share of competitive commodities comes from Manufactured goods (30%

equivalent to 129 commodities), food and live animals (18%), miscellaneous manufactured articles (16%) and chemicals (13%), meaning that they account for almost 77% of total commodities with comparative advantage (RCA>1). Together these commodities represented nearly 66% of total value exports, while the remaining groups accounts for 23% of commodities with RCA>1 and represents 34% of total exports ($US), meaning higher contribution per commodity.

In terms of products with export specialization, JATIM reached 1,190 commodities in which they enjoyed export specialization in 2013 compared with 1,296 in 2007, meaning that more than a hundred products lose export specialization during the seven years. Among the largest losses were machinery and transportation (52 commodities) and manufactured goods (40) indicating a kind of deindustrialization in JATIM, or a switch towards production of different kinds of commodities. Chemical sector lost almost 40% of their products with specialization on 2007 while machinery and transport lost 35%. However, it is interesting to notice that the same industries experienced a kind of revitalization. Almost 40% of the commodities enjoying export specialization within the chemical sector in 2013 are new, 35% in machinery and transportation, and 31% in miscellaneous manufactured articles. On the other hand, commodities related to natural resources add only few new commodities.

Table 2: Number of Commodities With Export Specialization. 2003 - 2013

	Number of commodities with Export Specialization TBI>0					
	TBI2007	TBI2013	DifferenceTBI 07-13	RemainTBI 07-13	% of remain TBI	% of New TBI
Animal/veg oil/fat/wax	30	29	-1	26	90%	10%
Beverages and tobacco	20	9	-11	9	100%	0%
Chemicals/products n.e.s	114	106	-8	66	62%	38%
Commodities nes	3	5	2	3	60%	40%
Crude mater.ex food/fuel	150	148	-2	122	82%	18%
Food & live animals	219	219	0	179	82%	18%
Machinery/transp equipmt	152	100	-52	65	65%	35%
Manufactured goods	385	345	-40	252	73%	27%
Mineral fuel/lubricants	22	18	-4	15	83%	17%
Miscellaneous manuf arts	201	211	10	146	69%	31%
Grand Total	1296	1190	-106	883	74%	26%

Source: BPS and UNCOMTRADE, author's calculation.

A total of 883 commodities remained specialized in exports from 2007 to 2013, meaning that 400 products lost export specialization. The newcomers as net-exporters were 300 products (equivalent to 26%) of total export specialized commodities in 2013. Among the commodities with export specialization in 2013, 76% of them are somehow related to low levels of skills, while the remaining correspond to industries with high or medium skills intensity. This may imply the importance to keep competitive wages in the labor market.

Considering the characteristics of the loses, 200 commodities in which JATIM used to be a net exporter in 2007 represented almost 12% on total exports, and became a net importer in 2013 causing a reduction in exports from US$ 1 billion to US$ 317 million. But on the other hand, there were 208 commodities that did not enjoy export specialization in 2007 and became net-exporters in 2013, moving from US$ 36 million (less than 1% of total exports) in 2007 to almost 10% of total exports in 2013 (US$ 1.379 billion). There were 1,900 commodities regis-

tered in 2013 as non-export specialized, while in 2007 there were 1,795, meaning that JATIM was able to substitute imports in 100 commodities (in absolute terms).

Inter-Temporal Variation in Revealed Comparative Advantage: 2007 – 2013

Looking only at comparative advantage excluding export specialization there were 350 and 434 commodity groups (5 digit SITC) that enjoyed comparative advantage in 2007 and 2013 respectively, implying an important improvement. However, out of the 350 in 2007, there were more than 120 commodities that lost comparative advantage from 2007 to 2013, representing a huge loss from almost 10% of total value of exports to nearly 1% (in 2013), from US$ 835 million to only $US 73 million. On the other hand, there were more than 200 additional new commodities that gained comparative advantage and brought significant gains for export value (from US$ 73 million to US$ 3,5 billion).

There are more than 230 commodities that remained competitive for the seven years, representing the backbone of exports for JATIM. Most of the sectors experienced important gains. Manufactured goods (65 commodities) and miscellaneous manufactured articles (40) are the groups that gained the largest number of new commodities with RCA>1. Interestingly, the same sectors also lost a good number of commodities with comparative advantage on 2007 meaning a kind of shift in product variety. Manufactured goods (33 commodities) and food (28) are the largest groups, indicating a change in composition of trade for most of the industries. Related to the level of comparative advantage, it can be observed that 193 commodity groups revealed strong RCA (above 3), while 71 are medium (2<RCA<3), and 86 revealed a weak level (1<RCA<2).

Table 3: Number of Commodities Enjoying Comparative Advantage (RCA>1)2007 -2013

INDUSTRY	NUMBER OFCOMMODITIES WITHRCA>1		NUMBER OF COMMODITIESWITH RCA>1			LEVEL OF COMPARATIVE ADVANTAGE (only thosewith RCA> 1 and TBI>0)			
	2007	2013	Remain 07-13	Gain 07-13	Loss 07-13	Number RCA	Weak RCA	Med RCA	Strong RCA
Animal/veg oil/fat/wax	7	12	6	6	1	33	2	0	9
Beverages and tobacco	8	9	8	1	0	15	0	0	7
Chemicals/products n.e.s	42	57	29	28	13	425	5	11	31
Commodities nes	0	1	0	1	0	5	0	0	0
Crude mater.ex food/fuel	34	39	20	19	14	226	6	5	28
Food & live animals	86	78	58	20	28	267	20	11	44
Machinery/transp equipmt	30	37	14	23	16	626	13	6	7
Manufactured goods	97	129	64	65	33	706	25	25	55
Mineral fuel/lubricants	1	2	0	2	1	32	0	1	1
Miscellaneous manufarts	45	70	30	40	15	405	15	12	11
Grand total	350	434				2740	86	71	193

Source: BPS and UNCOMTRADE, author's calculation

The commodities with comparative advantage and export specialization moved from 246 in 2007 to 349 in 2013, an important improvement of 100 new commodities. From the initial 246, a total of 198 remained competitive from 2007 to 2013 meaning that JATIM kept

the comparative advantage in most of them, while developing some new industries (more than 150 new industries with RCA>1 and TBI>0).

Comparative advantage and export specialization was lost in 50 commodities. This indicate once again that JATIM had maintained a strong composition of traditional commodities (almost 200) that are the backbone of exports, and allowing at the same time thecreation of new industries. Some of these new industries (around 30) are highly related to commodities (price driven expansion), while some others are more related to incursion into global supply chains (110 are related to manufacturing). The additional ones (almost 60) are miscellaneous products mainly demand driven –external factors- or new products within previous industries.

The almost 200 commodities that remained competitive for the whole 7 years, represented 80% of total value exports in 2007 and 67% in 2013, increasing value by 23%, meaning gaining competitiveness rather than losing value over time. Interestingly, from thesegroup, nearly 170 enjoyed comparative advantage and export specialization for the whole period –not losing it in a single period -, representing almost 70% of total value exports for JATIM in 2007 and 64% in 2013, confirming their strategic role as back bone of exports for JATIM.

Looking at more disaggregated level, more than 70 out of the almost 200 commodities are non-manufacturing ones (food, beverages & tobacco, crude minerals, vegetable oils/ fats), while the rest, almost 130 are related to manufacturing sectors. This indicates the important role of manufacturing industries in JATIM, both in number of commodities and in export value. In terms of growth at commodity level (5 digit), out of almost 200 commodities with RCA and TBI, almost 25% of them lost total export value from2007 to 2013, while the additional 75% experienced growth. There are 10 special commodities that grew more than 800% (accumulated) in the 7 years[3]. 15 other products grew between 300% and 600%, 40 more than 100%, and 61 that grew below 100%. A total 140 commodities gained more than twice in RCA index (among those enjoying comparative advantage in 2013).

Table 4: Commodities with Comparative Advantage, Commodities with ComparativeAdvantage and Export Specialization, and Changes from 2007 - 2013

INDUSTRY	NUMBER OF COMMODITIESWITH RCA>1		NUMBER OF COMMODITIESWITH RCA>1 AND TBI >0		CHANGE IN NUMBER OF COMMODITIES RCA>1 ANDTBI >0		
	2007	2013	2007	2013	Remain 07 - 13	Gain 07 - 13	Loss07-13
Animal/veg oil/fat/wax	7	12	6	12	6	6	0
Beverages and tobacco	8	9	7	5	4	1	3
Chemicals/productsn.e.s	42	57	35	40	23	17	12
Commodities nes	0	1	0	1	0	1	0
Crude mater.exfood/fuel	34	39	29	35	16	19	13
Food & live animals	86	78	73	66	48	18	25
Machinery/transpequipmt	30	37	24	22	13	9	11

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[3] Tapioca/sago/etc 2100%, Blankets of textiles nes 1700%, Fish meat exc.fillet,frozen 1300, Tech spec natural rubber 1347%, Misc edible prods nes 1200, Refined palm oil 1235%, Herring etc prepd/presvd 1140, Iron/steel dross/scale. 1118%, Button moulds/parts 911%, Veg prods nes frsh/dried 800%.

INDUSTRY	NUMBER OF COMMODITIES WITH RCA>1		NUMBER OF COMMODITIES WITH RCA>1 AND TBI >0		CHANGE IN NUMBER OF COMMODITIES RCA>1 AND TBI >0		
	2007	2013	2007	2013	Remain 07 - 13	Gain 07 - 13	Loss 07-13
Manufactured goods	97	129	92	111	56	55	36
Mineral fuel/lubricants	1	2	1	1	0	1	1
Miscellaneous manuf arts	45	70	45	56	27	29	18
Grand total	350	434	312	349	193	156	119

Source: BPS and UNCOMTRADE, author's calculation.

Among those new commodities wit RCA>1 and TBI>0, they contributed with additional 15% of total value exports for JATIM in 2013. The largest numbers of them came from manufactured goods (19) and miscellaneous manufactured articles (11). However, the largest contributions in terms of exports value came from sectors that rather lost products with RCA>1 and TBI>0 (food, machinery, tobacco) or from sectors with fewer additions. This may indicate that those industries specialized in fewer products rather than diversify in new varieties.

Product Mapping

When products are mapped according to their level of comparative advantage and export specialization there could be four different groups of products. Group A (export specialization TBI>0 and comparative advantage RSCA>0), Group B (comparative advantage and net-importer), Group C (comparative disadvantage and export specialization), and Group D (comparative disadvantage and net-importer).

In the group A, a total of 349 commodities in JATIM enjoys comparative advantage and export specialization (net-exporter) in 2013. Those commodities are the ones that can be easily promoted considering that there is already capacity installed, experience both in production and export, and the region enjoys competitive costs. The largest group of commodities comes from manufactured goods (111), food (66), miscellaneous manufactures (56), and chemical (40).

Table 5: Product Mapping. Group A, B, C, D for years 2007 and 2013

	A_07	A_13	B_07	B_13	C_07	C_13	D_07	D_13
Animal/veg oil/fat/wax	6	12	1	0	24	17	13	15
Beverages and tobacco	7	5	1	4	13	4	1	9
Chemicals/productsn.e.s	35	40	7	17	79	66	351	349
Commodities nes	0	1	0	0	3	4	2	0
Crude mater.exfood/fuel	29	35	5	4	121	113	110	113
Food & live animals	73	66	13	12	146	153	110	111
Machinery/transpequipmt	24	22	6	15	128	78	494	537
Manufactured goods	92	111	5	18	293	234	421	448
Mineral fuel/lubricants	1	1	0	1	21	17	12	15
Miscellaneous manufarts	45	56	0	13	156	155	242	219

| Grand Total | 312 | 349 | 38 | 84 | 984 | 841 | 1756 | 1816 |

Source: BPS and UNCOMTRADE, author's calculation

There are some 84 commodities that even though enjoy comparative advantage the country is net importer of them (Group B). This may be due to product differentiation (quality, features in products, etc.) or intra-industry trade (transfers within same industry in different countries). However, some of these imported products may be able to be produced at home (import substitution policies), reducing the imports if the industry is able to develop them at home. Groups related to manufacturing activities are the ones who gain the largest numbers within this category (from 38 to 84). This growth could me related to integration of JATIM industry into global networks (inter-industry trade).

Group C is interestingly a large group. It includes those products that have specialization in exports but do not enjoy comparative advantage. 841 commodities are underthis group. This raises the challenge for the region to increase productivity to gain in cost advantage and bring these products into group A. Some of these products are also under intra-industry trade, competing more by quality, differentiation, rather than by cost. More than 100 products lost their positon within this group, perhaps associated with decline in productivity and competitiveness.

Group D are those commodities that neither enjoy comparative advantage and are net importers. To move products from this group to other groups (A, B, C) will take more time considering that there may be neither experienced in exporting, or the region does not count with the necessary technology, resources, etc., or the region is not able to produce them competitively.

Table 6: Movements from within Groups (from 2007 to 2013)

	From Group A to group:			From Group B to group:			From Group D to group:			From Group C to group:		
Industry	B	C	D	A	C	D	A	B	C	A	B	D
Animal/veg oil/fat/wax	0	0	0	0	0	1	0	0	3	6	0	4
Beverages andtobacco	3	0	0	0	0	0	0	0	0	1	0	8
Chemicals/productsn.e.s	3	1	8	0	1	3	12	7	27	5	4	33
Commodities nes	0	0	0	0	0	0	1	0	1	0	0	0
Crude mater.exfood/fuel	1	8	4	3	0	2	5	2	18	11	1	22
Food & live animals	4	14	7	1	0	7	5	2	34	12	1	28
Machinery/transpequipmt	1	2	8	0	0	6	6	4	29	3	10	68
Manufactured goods	5	12	19	1	1	1	27	5	64	27	6	103
Mineral fuel/lubricants	0	0	1	0	0	0	0	1	3	1	0	6
Miscellaneous manufarts	2	9	7	0	0	0	11	2	54	18	9	37

| Grand Total | 19 | 46 | 54 | 5 | 2 | 20 | 67 | 23 | 233 | 84 | 31 | 309 |

Source: BPS and UNCOMTRADE, author's calculation

There was no drastic structural change in group size. However, is interesting to noticethat some commodities (156) entered and others (119) exit the Group A. Most of them shifting to Group A comes from Group C (84) and Group D (67), and only 5 of them come from Group B. Related to those leaving Group A (119), a total of 54 shifted to Group D (losing both comparative advantage and export specialization), 46 to Group C (losing comparative advantage), and 19 to Group B (losing export specialization). In absolute terms,it remains very similar from 2007 to 2013 with changes within groups indicating some degreeof diversification (considering new incumbents), as well as efforts towards specialization when looking at those almost 200 commodities that remain as part of Group A.

Related to group D, 307 groups of products lose either comparative advantage, export specialization or both shifting to group D, while 323 groups formerly in D moved into another Group (gain RCA or TBI).

Factor Intensity

When the commodities exported under RCA>1 and TBI>0 are related to the factors they require to be produced, it can be observed that in 2007, 41% of its total exports originated from the non-manufacturing industry, while 58% were manufacturing ones. This proportion changed in 2013, where non-manufacturing increased to 51% and manufacturing declined to 49%, a change of almost 10% in relative factor uses. In fact, the gains in trade (absolute terms $US) are mainly under non-manufacturing, meaning that the 2007 and 2013 levels of the different factor intensity groups remain pretty much the same. They experience ups and downs during the seven years but end up at almost the same 2007 levels.

Table 7: Export Value, Share and Number of Commodities According to FactorIntensities, 2007 - 2013

Exports 2007			Exports 2013		Number of Commodities with RCA and TBI per group				
Industry	$US (000)	% share	$US (000)	% share	LI-RB	HS-TI	LS-TI	MS-TI	U
Chemicals/products n.e.s	1,847,422	18%	1,887,224	12%	0	57	0	0	0
Machinery/transp equipmt	702,870	7%	1,077,468	7%	0	10	3	24	0
Manufactured goods	1,689,674	16%	2,501,859	16%	94	0	23	3	0
Miscellaneous manuf arts	863,288	8%	1,421,261	9%	43	3	0	2	21
Non-Manufacturing	5,247,380	51%	8,585,979	55%					
TOTAL	10,350,634		15,473,791		137	70	26	29	21

Source: BPS and UNCOMTRADE, author's calculation

Products under manufacturing are divided among High Skill – Technology Intensive (HS– TI), Labor Intensive – Technology Intensive (LI – TI), Low Skill - Technology Intensive (LS –TI), Medium Skill - Technology Intensive (MS – TI), Labor Intensive and Resource Base (LI-RB), and others (U). Medium and high level manufacturing products contribute with almost 50%

of total exports, meaning that even though in terms of number of commodities is relatively small (compared with other categories) in value is representative. This means that improving the skills of human capital and technological absorption in JATIMcan represent huge gains for the province in terms of value added in exports.

Despite the positive trend of the contribution of non-manufacturing, however, its exports are highly sensitive to changes in international prices. Therefore, the composition of exports of East Java tend to fluctuate. Overall, the manufacturing sector related to LI-RB group is a major contributor both in the value of total exports of East Java and in terms of the number ofcommodities that have a comparative advantage. The main contributors come from paper, furniture, non-mineral manufactures and footwear sectors. It is followed by groups of HS-IT.

If we consider that non-manufacturing exports are mainly related to natural resources, andits added the Labor intensive and resource based contributions, it is evident the strong reliance of JATIM for products related to natural resources, same products that are volatile (follow global prices) and are susceptible to policy changes and political pressures.

Conclusion

During the period of 2007-2013 exports and imports of East Java in aggregate increased by about 50%. In terms of country of destination, the increase in exports occurred to non- ASEAN countries implying a moving towards internationalization rather than regionalization. Out of the 3,090 commodity categorized under 5-digit SITC, JATIM exported 349 with comparative advantage and export specialization. Most of its products are under manufacturing goods, however the trend in value was higher in non-manufacturing sectors.

In terms of composition, the export of East Java in 2007 consisted of 41% of non-manufacturing industries, while 58% are manufacturing industries. However, by 2013, manufacturing decreased to 49% while non-manufacturing sectors reached 51% of total exports. This new pattern of trade becomes problematic when world commodity prices fluctuate as seemingly happens since 2012.

During 2007-2013, East Java lost comparative advantage in more than 100 products, especially in manufacturing and other sectors, so that exports of this group decreased from US$ 835 million to US$ 73 million. But at the same time, East Java, was able to increase the advantage in more than 200 commodities, increasing its exports in 2013 to more than US$ 3.5 billion from previous US$ 73 million in 2007. It indicates the economic diversification. Almost 45% of products enjoying comparative advantage and export specialization in 2013 are new commodities (not present in 2007). In Group B (comparative advantage and but not export specialization) 50% are new, and 30% in Group C (export specialization but not comparative advantage). These shifts within groups whether gaining or losing comparative advantage, export specialization, or both, indicate that there were certain changes in the patterns of trade and in industry performance (some gaining and some losing).

Overall, the manufacturing sector, Labor Intense-Resource Base group is a major supplierin the value of total exports of East Java and in terms of the number of commodities that havea comparative advantage. Followed by groups of High Skill –Technology Intensive. It shows the economic diversity of East Java.

Somehow, the gains of new products, both through the channel of comparative advantage gains or through export specialization, are bigger than the losses experience in the same channels. What is more interesting is to observe whether those changes are affecting the structure and industrial pattern of JATIM or are more related to temporary movements

(price or demand driven). It is noticeable that manufacturing industries are experiencing a more challenging scenario, both through pressures on prices observed by lost in comparative advantage and through new opportunities offered by global supply chains (new commodities) jumping into the comparative advantage map.

The results found in this study open new questions for future research, specially in finding the causes that are shifting the pattern of trade of JATIM. While this study is able to capture the degree of the changes in patterns of trade, its capability to capture the factors shifting the patterns is limited. Another limitation in this study (as well as a line for future research) is the static approach of the methodology chosen. As the patterns change through time and reacts to different factors in a dynamic way, a more dynamic methodology will allow to better observe the changes and to better identify its causes. Finally, a more disaggregated research level (at sector or industry level) may allow a more precise analysis since natural resource based sectors and manufacturing industries respond in different ways and at different degree to changes, both at supply and demand side

Recommendation

As export specialization and comparative advantage (group A) appear to be important features of JATIM trade, it is important to identify what are the factors helping to keep and to improve competitiveness and specialization. International trade for JATIM offers more gains than losses, indicating that opportunities for trade expansion are large. Export-oriented policies offer higher impacts than anti-trade policies. The recent trade liberalization agreements (ASEAN among others), do not seem to harm exports from JATIM, but rather supported its global expansion. Develop new industries seems to demand more than business as usual efforts. Policy makers and business are in need to work together to develop the specialization and productivity levels required to succeed in global exports.

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