THE PRODUCTIVITY OF INDONESIAN E-COMMERCE: EVIDENCE FROM A DIGITAL MERCHANT SURVEY

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Abstract: The Indonesian government is aware of the enormous potential of e-commerce and provides various measures to support local products. However, many imported products are still present in Indonesian e-commerce. Through this study, we want to provide an analysis of the productivity of domestic products compared to imported products in shopee.com. Besides, this study also seeks to identify factors that affect sales. We find that the productivity of imported products is higher than domestic products. In order to increase the productivity of domestic products, the Government of Indonesia should continue to improve the logistics sector in order to lower transaction costs for domestic products and also provide support for small- and medium-sized enterprises (SMEs). We also found factors that affect average sales per month are price, seller's type and the length of time the seller joins shopee.com. Therefore, sellers in shopee.com should consider those factors to increase their sales.

Keywords: E-commerce, Productivity, Sales
JEL : L86, D21

1. Introduction

E-commerce is growing rapidly in Indonesia as online shopping has become a trend for its efficiency and practicality. Based on data reported by Momentum Works (2021), in 2020, the gross merchandise value (GMV) of the e-commerce market in Indonesia was approximately US$ 40,1 billion. Moreover, Indonesian e-commerce gross merchandise value grew to 91 percent by the previous year with Shopee and Tokopedia leading the market share. The growth has been primarily driven by the rising in internet penetration rate and number of mobile payment tools in Indonesia.

Many local stakeholders in the e-commerce industry can take advantage of its booming market. The manufacturers, the suppliers of raw materials, the logistics companies, the infrastructure providers, the distributors, the sellers and the buyers are all the main recipients of the benefits of the growth of the e-commerce industry. It does not only benefit local players, but also drives the incoming flows of many foreign investors. Big names such as Alibaba, JD.com and Tencent of China already marked huge investments in locally operated big e-commerce players (Febransyah and Goni, 2020).

The Indonesian government is aware of the enormous potential of e-commerce as well as its challenge for domestic products in this borderless marketplace. To support it, the government has set a policy to restrict the sales of imported products from 13 categories on shopee.com (Timoria, 2021), as well as additional import taxes through Ministry of Finance Regulation No. 199/PMK/010/2019 (Anggraeni and Lestari, 2021). This policy is intended to protect domestically made products thereby increasing the competitiveness of local sellers both in the domestic and international market, as the competition in e-commerce is predicted to be more intense than in the conventional physical market.

Nevertheless, to date there are still many imported products which are not included in the restricted categories that flood Indonesian e-commerce. Based on the shopee.com data used in this study, there were still around 196 imported products out of a total of 417 products observed. The sales of the 196 products were also quite large, reaching around 561,861 units in our study period. This figure is equivalent to 47.17 percent of the total sales of 417 products observed in this study.

Therefore, through this study, we want to provide an analysis of the productivity of domestic products compared to imported products in shopee.com. This study differs from Chun and Kim (2005), where they compare the prices of online retail products with conventional physical retailers in South Korea using a t-test. This study also uses a t-test, but to compare prices and sales of imported and Indonesian-made products. In addition, this study also wants to identify the factors that affect the sale of e-commerce products at shopee.com. This study seeks to enrich the previous literature that identifies the factors that influence sales in e-commerce, such as Fauzan et al. (2019), Ye et al. (2009) and Zhang et al. (2013).

By looking at the comparison of prices and product sales on shopee.com, we can determine strategies to increase the productivity of local products, in order to compete with imported products in e-commerce. Subsequently, by identifying the factors that affect sales, we can provide recommendations to sellers at shopee.com to increase sales of their products in general.

2. Literature Review

There are two points that will be discussed in literature review. The first one is about e-commerce and productivity, and the latter is about determinants of productivity.

2.1. E-commerce and Productivity

The Internet has fundamentally changed the environment of business, offering business and consumers a powerful communication channel and making it possible for these two entities to come together in more efficient ways by creating new marketplaces. The Internet offers consumers greater benefits from increased information and lower transaction costs, including search costs, and a wider set of choices than those available in the traditional economic environment. It also improves the consumer's bargaining position with vendors, both online and via traditional channels (Chun and Kim, 2005).

From the corporate point of view, the Internet provides opportunities to access global markets without having to incur large entry costs or having to keep sizable inventories, as well as improving targeted advertising and sales efforts (Adamic and Huberman, 1999). The Internet also induces greater price competition among sellers (Bakos, 2001) because almost all information is available and hence, each seller can observe prices charged by other sellers and change it quickly when needed. Therefore, transaction costs in internet markets or electronic commerce (e-commerce) are lower than in conventional physical retailers.

E-commerce, as applications of information technology to commercial areas, is believed to reduce unit transaction costs through the substitution of computer data processing and internet connections for labor services in the production of transactions (Lucking-Reiley and Spulber, 2001). Cost reduction comes from more efficient searching for trading partners, more efficient communication, quicker negotiation and confirmation of transactions, reduction of inventories, and even transaction automation, but sellers have to purchase computers and software to set up a local network, as well as hire IT experts to maintain the

services needed. Therefore, while e-commerce increases unit transaction efficiency, producers who adopt e-commerce incur a setup and maintenance cost.

Although adoption of e-commerce by product sellers incurs a fixed cost, reduction in unit transaction cost may encourage further specialization and higher trade dependency in the economy. When there are economies of specialization in production, a higher level of specialization implies higher productivity. Considering the complex reality where the global adoption of e-commerce connects different economies and extends the boundary of markets, the effect of e-commerce on productivity increase will be strong because the network effect is strong globally (Wen, 2004).

2.2. Determinants of E-commerce Productivity

The most commonly used measure of retail productivity is labor productivity, the ratio between a measure of output (frequently sales or gross value added) and a measure of labor (the number of employees or man-hours worked) (Higgon et al., 2010). In this study we used the product's average sales per month as a proxy of productivity. This variable is also the dependent variable in our regression model.

Based on literature, there are many factors that affect productivity in e-commerce. We identify the following factors that are relevant to our study.

1. **Price**. Price is expected to negatively affect sales. Many previous studies support this argument. For example, Zhang et al. (2013) found a negative relationship between prices and camera sales based on data collected from amazon.com. Ye et al. (2009) also found a negative relationship between hotel room price and the amount of online sales based on data retrieved from Ctrip (www.ctrip.com). Fauzan et al. (2019) also found a negative relationship between price and sales volume based on data collected from bukalapak.com.

2. **Additional marketing costs**. Sullivan (2001) presented evidence that search engines offer banner ads, content deals, paid placement and/or inclusion and/or submission. Even though these features are separated from the editorial listings, they offer a way to be present on search result pages and consequently reduce the transparency of the market, and highlight the role of marketing and advertising expenditures in the customer acquisition processes. In shopee.com, these features are present. Sellers must pay additional cost if they want to become a member of shopee mall, star plus, or star. This membership raises the probability of their product appearing in the top search in shopee.com. We expected that these advantages would affect sales performance.

3. **Seller's location and market demand**. It is expected that sellers who are located in densely populated areas would generate higher sales than sellers who are located in sparsely populated areas. Besides, sellers who are located in trading hub areas (such as Jakarta) would enjoy greater benefits and therefore can generate more sales than their counterparts in other areas with relatively poor trading facilities. Sellers who are located far from the buyer, especially in an archipelagic country like Indonesia, will take longer time and more expensive to send their products to the buyer.

4. **Observational learning**. Bikhchandani et al. (1998) defined the term of observational learning, or social learning, as the influence resulting from rational processing of information gained by observing others. As another external influence, observational learning is different from contagion in that members would learn from all the members they can observe in the community rather than just their neighbors. In e-commerce, this observational learning is evident among sellers, and they can use it to increase their sales performance. Besides, buyers can also learn and get information from other buyers from

the product review (Xiao et al., 2015; Zheng et al., 2013). In addition, factors surrounding the merchant (e.g., website design, reputation, service quality) or product (e.g., specification, quality) or individual factors (e.g., trust, self-efficient) also significantly impact the consumer purchase decision (Bai et al., 2015; Li et al, 2013; Luo et al., 2012), so sellers must be aware and consider these factors.

3. Data and Research Method

This research is based on data collected from Shopee.com, the largest online retail store in Indonesia by market share. At first, sales data are collected from all relevant sellers and then grouped into eleven categories, namely: (1) microfiber duster, (2) non-minus glasses, (3) women's belts, (4) leather wallet, (5) stainless kitchen knife, (6) men's plain shirts, (7) cat necklace, (8) apple, (9) rice, (10) orange, and (11) sneakers shoes. These categories were chosen because the composition of imported and domestic products are almost the same (see Figure 1).
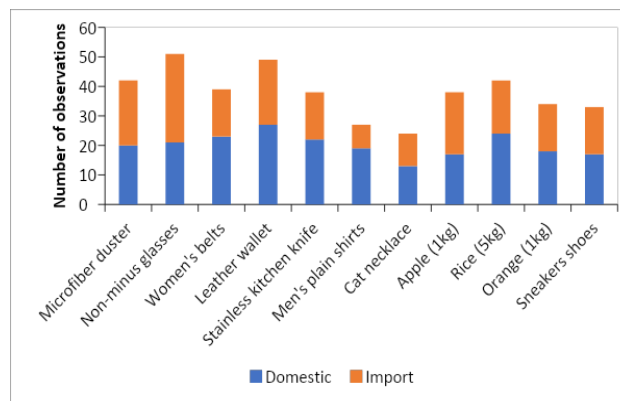
Source: Shopee.com (2021)

Figure 1: The Number of Observations per Product Category (Imported vs Domestic)

The data was collected between 23 June 2021 and 7 July 2021. In total, 589 observations have been collected from 589 different sellers. However, because 172 observations in our study have incomplete sales or product data, we dropped these observations. Consequently, our final sample was 417 observations from 417 different sellers. Additionally, the data was retrieved for one product category in a day to ensure comparability as price and sales data in e-commerce are so dynamic. Therefore, it can be considered as cross-section data.

After the data was collected and grouped into eleven categories, a t-test for each category was conducted. T-test is used to identify whether the price and average sales of imported products are different from its counterpart from Indonesia (the first research questions). Then, to answer the second research questions, a simple regression to identify the determinants of average sales per month was conducted. The regression model is adapted and modified from Fauzan et al. (2019), Ye et al. (2009) and Zhang et al. (2013), and can be expressed as follows:

$$ln\ ln\ avsales\ _i$$
$$= a + \beta_1\ ln\ ln\ price\ _i + \beta_2 type_i + \beta_3\ ln\ join\ _i + \beta_4\ ln\ join\ _i^2$$
$$+ \beta_5 location_i + \beta_6 import_i$$
$$+ \varepsilon_i \qquad\qquad (1)$$

where $ln\ avsales$ is the natural logarithm of average sales per month, $ln\ price$ is the natural logarithm of price, $type$ is a dummy of the seller's type, $location$ is a dummy the seller's

office location, and *import* is a dummy of imported products. Additionally, $ln\ join$ (a measure of the length of time the seller joins shopee.com) and its quadratic form are included in the regression to identify potential observational learning effects among sellers across time. The error term of the regression model is expressed by ε in equation (1). Both the t-test and regression model are estimated using STATA version 13 software.

4. Finding and Discussion

Table 1 shows the descriptive statistics of all variables in this study. The unit measurement, mean, standard deviation, minimum and maximum value of all variables in this study are summarized in this table. It can be seen that there are huge variations in average sales per month and price.

Table 1: Descriptive Statistics

Variable	Unit measurement	Mean	Std. Dev.	Min.	Max.
Average sales per month	unit/month	294.08	688.94	0.42	10,000.00
Total sales	unit	2,856.37	3,592.03	4.00	10,000.00
Duration of product presence in shopee.com	month	16.52	11.23	1	60
Import	dummy (1=import, 0=domestic)	0.47	0.50	0	1
Price	Rp	51,301.79	109,313.70	999.00	1,680,000.00
Seller's location	dummy (1=jakarta, 0=otherwise)	0.37	0.48	0	1
Join	month	34.84	17.94	3	72
Seller's type	dummy (1=shopee mall, star, star plus, 0=otherwise)	0.59	0.49	0	1

Table 2 shows the results of the t-test that has been carried out on the prices of the 11 observed products. This table shows that the prices of women's belts, men's plain shirts, cat necklaces, apples, rice and oranges imported from abroad are significantly higher than the prices of similar products produced domestically. On the other hand, the prices of domestically made microfiber duster, non-minus glasses and leather wallet are significantly higher than similar products imported from abroad.

Table 2: T-test Results for Product Price

No.	Product	Mean price (Rp)		t-value (p-value)	Higher price (5%)
		Domestic	Import		
1	Microfiber duster	2,521.05	2,128.77	2.046 (0.024)	Domestic
2	Non-minus glasses	16,038.86	7,506.77	3.915 (0.000)	Domestic
3	Women's belts	3,808.04	10,561.00	-4.494 (0.000)	Import
4	Leather wallet	96,001.85	69,832.55	2.204 (0.016)	Domestic
5	Stainless kitchen knife	19,364.59	24,364.94	-1.306 (0.099)	Not clear
6	Men's plain shirts	28,058.21	35,111.13	-2.592 (0.008)	Import
7	Cat necklace	4,903.39	7,367.36	-2.518 (0.010)	Import
8	Apple (1kg)	28,464.71	38,464.24	-3.483 (0.001)	Import
9	Rice (5kg)	63,944.29	120,375.00	-6.255 (0.000)	Import
10	Orange (1kg)	24,000.56	42,556.25	-5.497 (0.000)	Import
11	Sneakers shoes	234,828.50	279,746.80	-0.422 (0.338)	Not clear
	All products	47,657.92	55,410.43	-0.722 (0.235)	Not clear

Source: Shopee.com (2021)

Meanwhile, Table 3 shows the results of the t-test that has been carried out on the average sales of the 11 products. This table shows that the average sales for domestically produced leather wallets, men's plain shirts, cat necklaces and oranges are significantly higher than similar products imported from abroad. Interestingly, although the price of domestically made leather wallets is more expensive than imported products, the average sales of domestic products is actually higher than imported products.

Table 3: T-test Results for Average Sales per Month

No.	Product	Mean Average sales (Rp)		t-value (p-value)	Higher average sales (5%)
		Domestic	Import		
1	Microfiber duster	254.15	1,420.17	-4.712 (0.000)	Import
2	Non-minus glasses	157.29	470.04	-2.920 (0.003)	Import
3	Women's belts	455.58	295.80	1.561 (0.064)	Not clear
4	Leather wallet	266.50	77.12	2.481 (0.008)	Domestic
5	Stainless kitchen knife	84.10	86.79	-0,066 (0,474)	Not clear
6	Men's plain shirts	512.39	61.11	2.345 (0,014)	Domestic
7	Cat necklace	380.32	99.68	1.922 (0.034)	Domestic
8	Apple (1kg)	34.96	83.85	-0.828 (0.207)	Not clear
9	Rice (5kg)	74.89	38.02	1.181 (0.122)	Not clear
10	Orange (1kg)	68.23	21.89	1.868 (0.036)	Domestic
11	Sneakers shoes	102.54	1,070.86	-1.577 (0.063)	Not clear
	All products	216.98	381.01	-2.441 (0.008)	Import

Source: Shopee.com (2021)

From the two tables above, it can be concluded that the prices of imported and domestic products are not statistically significant, but the average sales per month for imported products is significantly higher than that of domestic products. It means that the productivity of imported products is higher than domestic products. One reason for the lower productivity of domestically made products is the poor logistic performance. The World Bank reported that poor logistic performance leading to high-cost operations made it difficult for companies in Indonesia to achieve competitiveness (Arvis et al., 2018). The report indicated that the inadequate infrastructure, followed by inefficient custom process, international shipments and logistic competences as the main cause of unsatisfactory logistic performance in Indonesia. This slows down the flow of goods that will enter or leave Indonesia. In addition, in an archipelagic country whose logistics sector is still dominated by land transportation, shipping goods between regions in Indonesia also takes a long time considering that cargo and port facilities are not well developed. In order to increase the productivity of domestic products, the Government of Indonesia should continue to improve the logistics sector in order to lower transaction costs.

Strategies are also needed to increase the competitiveness of local small-and medium-sized enterprises (SMEs) products. The government should increase the participation of SMEs in e-commerce, because the e-commerce adoption of SMEs in Indonesia is still low (Rahayu and Day, 2017). To achieve that target, the government should intensify business empowerment for SMEs and solve the credit access problem faced by SMEs. Subsequently, the government should build a national network of SMEs with similar needs to increase technology transfer and optimize national support programs for SMEs. Finally, local SMEs should be encouraged to join foreign trade by exporting their products. The government can give incentive for export goods in order to help them secure foreign markets.

Furthermore, Table 4 shows the estimation results of the regression model. From this table, it can be seen that the factors that significantly affect the average sales per month are price, seller's type and the length of time the seller joins shopee.com. An increase in product prices will have an impact on a decrease in average sales, and this finding is in line with Fauzan et al. (2019), Ye et al. (2009) and Zhang et al. (2013). These findings reflect the market requirements that put low prices as an order winner in the e-commerce business (Febransyah and Goni, 2020). Meanwhile, sellers with shopee mall, star plus and star status tend to have higher average sales per month than sellers who are not endowed with these status. Buyers tend to place higher trust in products that are part of shopee mall, star plus and star, so that sales of these products are higher. Therefore, to achieve star status or star plus, the seller must actively follow the promos provided by shopee.com.

Table 4: Regression Result

Dependent variable: Average sales per month		
Independent variable	Coefficient	P value
Constant	13.458	0.000
ln price	-0.608	0.000
seller's type	0.478	0.006
ln join	-2.103	0.034
ln join2	0.296	0.066
seller's origin	0.118	0.499
import	0.096	0.566
R-squared		0.229
Adjusted R-squared		0.217
Prob > F		0.000
Number of observation		417

Source: Author's calculation

Interestingly, the join and its quadratic form are both significant and point in different directions. This shows that when they first joined Shopee, the average sales per month of sellers tended to stagnate because they faced stiff competition between sellers of the same product. However, over time, the average sales per month will increase as the seller's reputation improves. This improvement in the reputation of the seller is obtained by learning from each other from other sellers at shopee.com (observational learning effects). Hence sellers should learn from other sellers in order to improve their sales performance.

5. Conclusion

Through this study, we want to provide an analysis of the productivity of domestic products compared to imported products in shopee.com. Besides, this study also seeks to identify factors that affect sales. Our main finding is that the prices of imported and domestic products are not statistically significant, but the average sales per month for imported products is significantly higher than that of domestic products. It means that the productivity of imported products is higher than domestic products. One reason for the lower productivity of domestically made products is the poor logistic performance which adds transaction cost. In order to increase the productivity of domestic products, the Government of Indonesia should continue to improve the logistic sector in order to lower transaction costs. Strategies are also needed to increase the competitiveness of local small-and medium-sized enterprises (SMEs) products.

Furthermore, the factors that significantly affect the average sales per month are price, seller's type and the length of time the seller joins shopee.com. An increase in product prices will have an impact on a decrease in average sales, while sellers with shopee mall, star plus and star status tend to have higher average sales per month than sellers who are not endowed with these status. This study also reveals the learning effect of sellers in e-commerce through the significance of the variable of the length of time. Therefore in order to increase sales and optimize economic benefits, sellers in Shopee.com should utilize pricing strategies, meet and maintain star or star plus status, and actively learn from other sellers' innovation and promotion strategies to keep its own products' competitiveness.

This study has several shortcomings, one of which is the difficulty in distinguishing which products are imported and which are domestic products. This happens because not every product includes the origin of the product (imported or domestically made), even though the product is shipped from within the country. We have tried to minimize this deficiency by as much as possible not to list such products. In addition, we also do not control the size of the business so that the variation in the data is quite large. Therefore, in further research, it is necessary to apply clearer criteria regarding the size and classification of imported or domestic products so that the results are better.

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