The Determinant Factors of Automobile Production in Indonesia

Abi Revyansah Perwira[1]✉

Faculty of Economic and Business, Universitas Padjadjaran, Bandung

Article Info	Abstract
	As the fourth populated country in the world, Indonesia's automobile production is the seventh rank among automobile producer developing countries. With the production capacity of more than 2 million units, the industry only produces less than 60% of its capacity. To increase the production performance, the role of Foreign Direct Investment (FDI) is essential. However, previous empirical studies do not explain the nexus between FDI and the development of the Indonesian automobile industry. Based on the Ordinary Least Square (OLS) regression analysis, FDI inward stock, domestic sales, imported components, and exchange rate are significant determinants factors in automobile production. The domestic demand is the primary pillar of automobile production. Since the domestic market seems to be saturated, the export market can be an alternative to increase automobile production. Unfortunately, the competitiveness of Indonesia's automobile is still weak and need to be improved because the Indonesian automobile industry still produces Euro2 automobile products and depends highly on raw material import for upstream industries. Therefore, transfer technology through FDI mechanism is required to develop Indonesia's automobile competitiveness. This paper suggests that FDI should be used focusing on Euro4 standard upgrade and local upstream industries development.

✉Corresponding author :
Address: Perumahan Citra Palam Permai Blok Z no. 20
Banjarbaru, South Kalimantan
E-mail: abi.revyansah@bps.go.id

INTRODUCTION

The largest transportation industry in the world is the automobile industry, with more than one billion units used globally. The automobile industry is one of the gates for innovation, technology transfer, infrastructure improvement, socio-culture shifting, and global market expansion which boost a nation's economy as the primary goal. The automobile industry utilizes high capital investment, absorbs significant employment, improve technology capability, and opens opportunities to develop related industries. Therefore, many developing countries eagerly promote their automobile industry through policies series (Jan & Hsiao, 2004). In addition, the automobile industry still positive growth globally for the past 15 years (Figure 1).
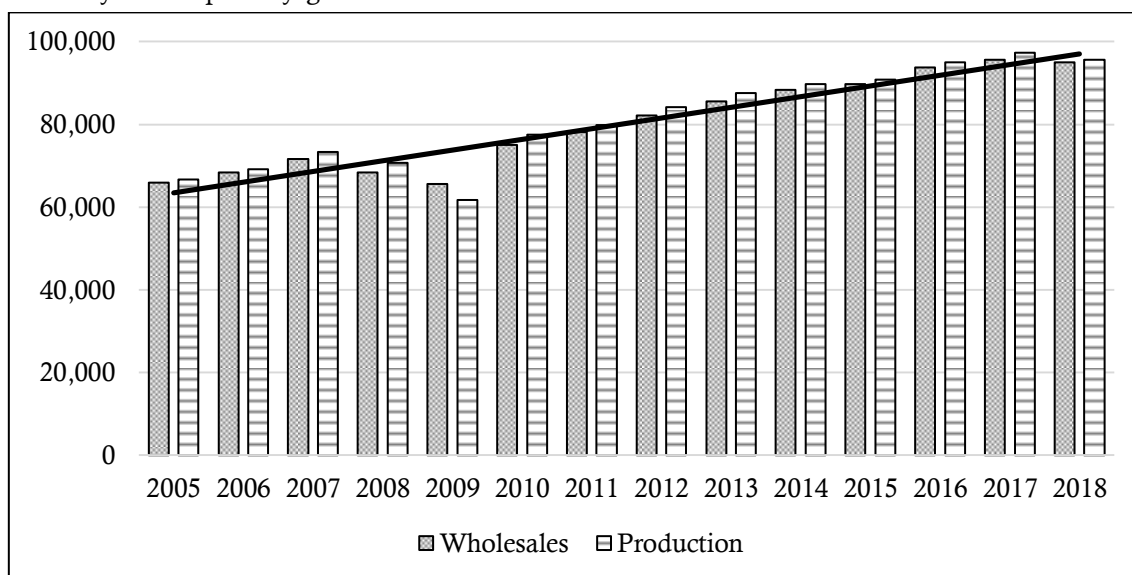

Figure 1. Global Automobile Wholesales and Production in Thousands of Units
Source: The International Organization of Motor Vehicle Manufacturers / *Organisation Internationale des Constructeurs d'Automobiles* (OICA)

However, the typical characters of developing countries are lack of qualified human capital, technology, management skill, and global network information. These factors force developing countries to seek assistance from Multinational Companies (MNCs) to develop their automobile industry through MNCs' Foreign Direct Investment (FDI). FDI is an essential element in the automobile industry for developing countries and the main reason how and why the automobile industry exists in developing countries.

For many years, the Indonesian automobile industry is one of the industries which has received a large number of FDI and the Government of Indonesia (GoI) interventions. However, many studies point out that during the New Order era, the GoI failed to develop its automobile industry because of unconstructive regulations (Adnan, 2014; Okamoto & Sjöholm, 2000; Tarmidi, 2004).

As a result, as the fourth largest populated country in the world, Indonesia automobile production is the seventh rank among automobile producer developing countries (Table 1). Moreover, according to Gabungan Industri Kendaraan Bermotor Indonesia (Gaikindo), with more than 2 million units production capacity, Indonesian automobile industry only produces less than 60% of its production capacity indicating the industry does not optimally perform yet.

Since Indonesia has a large number of domestic market, low-cost capital resources, growing middle-class income society, automobile MNCs still has the interest to put their investment to Indonesia (Natsuda & Otsuka, 2014). However, FDI inflow is still not

optimal yet due to complicated investment regulations and inefficient bureaucracy in Indonesia (Sjöholm & Lipsey, 2010; Ukhtiyani & Indartono, 2020). Furthermore, Indonesia has not optimized the benefits from the presence of FDI (Negara & Adam, 2012).

Empirical studies about the nexus between FDI and the development of the Indonesian automobile industry are not yet conducted. Most studies observe the policy development of the Indonesian automobile industry (Adnan, 2014; Aswicahyono et al., 2000; Natsuda & Otsuka, 2014; Tarmidi, 2004). Some empirical studies in Indonesian automobile industry topic are already performed, such as the Total Factor Production (TFP) (Okamoto & Sjöholm, 2000) and Export fragmentation of automobile components (Soejachmoen, 2014). Nonetheless, those studies do not connect to FDI in the automobile industry.

Table 1. Top 10 Automobile Industry Data in Developing Countries 2016

Country	Production (units)	Domestic Sales (units)	Export (units)	Population
China	28,118,794	28,028,175	1,008,945	1,378,665,000
India	4,488,965	3,669,277	1,052,343	1,324,171,354
Mexico	3,597,462	1,647,723	1,960,585	127,540,423
Brazil	2,156,356	2,050,321	431,612	207,652,865
Thailand	1,944,417	768,788	1,188,515	68,863,514
Turkey	1,485,927	1,007,857	773,811	79,512,426
Indonesia	1,177,389	1,048,135	178,306	261,115,456
South Africa	599,004	547,406	257,462	56,015,473
Argentina	472,776	709,482	85,493	43,847,430
Romania	359,250	142,020	346,315	19,702,332

Source: OICA and The World Bank Group

FDI has the stability inflow characteristic, the smallest risk, and more benefits compared with other investments such as portfolio investment and foreign debt since it is a long-term investment (Sagita, 2013). Hence, many previous studies investigate the FDI impact on the host country's industries. Commonly, FDI has a positive effect on productivity (Adekunle et al., 2020; Fillat & Woerz, 2011; Jude, 2012; Khan & Mehboob, 2014; Liu et al., 2016; Negara & Adam, 2012; Ni et al., 2017; Yazdan & Hossein, 2013)

However, many previous studies provide various FDI effects to the host country's industries performance depending on the characteristics of the industries, the host-countries, FDI origin countries, and the period length. FDI has positive spillovers on efficiency change but negative spillovers on technological change in the Indonesian food-processing industry, but FDI spillovers are negative in efficiency change while positive in technological progress in the Indonesian electrical machinery industry (Suyanto & Salim, 2010). Contrasting results are also shown by Suyanto et al. (2014) where FDI spillovers give negative effects on high-efficiency industries but give positive effects on low-efficiency industries in Indonesia. The time period also could cause different results where FDI backward spillovers affect TFP growth negatively in the short-term and positively in the long-term because the spillovers require technological progress stimulation (Fujimori & Sato, 2015). FDI has significant effects when it flows from developed countries to developing countries, but FDI from developing countries has no effect to host countries (Kim et al., 2015). Different industry size could experience different effect from FDI where FDI gives a negative effects on productivity for Small and Micro Enterprises (SMEs) but gives a positive effect for large enterprises (LEs) (Kurita et al., 2017).

Some studies find that FDI has a low impact in developed countries (Fillat & Woerz, 2011; Yazdan & Hossein, 2013) or even is not significant (Turnbull et al., 2016; Vahter, 2011). Vahter (2011) points out that FDI spillovers has no short-term effect on productivity and may need to be materialized within a certain period.

Based on the background and various findings from previous researches, this paper attempts to investigate the determinant factors on automobile production in Indonesia particularly the FDI effect. The automobile industry is considered as a large size industry which receives numerous FDI for latest technology utilization. By combining physical, financial, and monetary variables, the empirical result is expected to give an appropriate forecasting model of automobile production in Indonesia.

RESEARCH METHODS

This paper utilizes the secondary annual data, from various sources between 1990 and 2019. Based on the data, this paper provides empirical analysis by employing Ordinary Least Square (OLS) time-series regression to observe how the trend of automobile production moved during the period. From the observation, the pattern model of data behavior can be obtained and utilized for forecasting purpose (Aljandali & Tatahi, 2018). This paper proposes the determinant factors of automobile production in Indonesia as follows:

$$P_t = \beta_0 + \beta_1 FDI_t + \beta_2 DS_t + \beta_3 IC_t + \beta_4 ER_t + \varepsilon_t$$

$$..(1)$$

Pt is the automobile production (units) in the year t obtained from Gaikindo as the main subject of this paper. The production includes passenger vehicles and commercial vehicles such as busses and trucks. Also, this paper does not distinguish whether the production is for the domestic market or the export market.

FDIt is the investment by foreign automobile MNCs (US dollars) in the year t acquired from BKPM. As the primary predictor variable, this paper investigates the nexus between FDI and automobile production. An industry with sophisticated technology like the automobile industry requires FDI as the fundamental establishment and development (Sekuloska, 2018). This paper follows Soejachmoen's (2014) argument in which FDI inward stock is chosen as the predictor variable to avoid high fluctuation. FDIt is expected to have a positive sign.

DSt is the domestic automobile sales (units) in the year t taken from Gaikindo. The domestic sales are used to represent the automobile demand because more than 75% of the production are absorbed in the domestic market. This paper hypothesizes that DSt affects the production positively.

ICt is imported parts (US dollars) in the year t collected from UN Comtrade. Indonesian automobile industry still depends on imported components. Although the locally made components increase quantitatively and qualitatively, particular components still cannot be produced locally and have to be imported due to technology lackness. ICt is expected to have a positive linear relationship with the production.

ERt is the Rupiah exchange rate against the US dollar in the year t as a monetary variable downloaded from the World Bank Group. Since the Indonesian automobile industry still requires automobile components from abroad, the Rupiah depreciation might increase the production cost. As a result, the automobile demand will be lower because of a higher price. Therefore, ERt is expected to have a negative sign.

εt denotes the error term in the year t. In order to avoid a spurious regression, Gujarati & Porter (2009) suggests to carry out cointegration test by performing the stationarity test on εt. If the regression between $\Delta\varepsilon$t and εt-1 is significant, then all variables are cointegrated among them.

RESULTS AND DISCUSSION

Table 2 shows the summary result of the OLS analysis on the equation (1) and the classical assumption tests. All determinant

factors are significant at 1% critical level have the similar sign as expected. The test results inform that the model has high Adjusted-R2 value, significant F-statistic, and no classical regression assumption violation. Also, the model does not generate a spurious regression because the cointegration test shows that the residuals are stationary at 1% critical level. This means that the dependent and independent variables are cointegrated. Overall, the regression model is fit to explain the automobile production in Indonesia and can be written as follows:

$$P_t = 80{,}692.02 + 3.6413 \times 10^{-5}(FDI_t) + 0.7101(DS_t) + 3.9446 \times 10^{-5}(IC_t) - 12.4342(ER_t) \varepsilon_t \ldots \ldots (2)$$

Table 2. OLS Regression Analysis Result

Variable	Coefficient	Standard Error	t-Statistics	Prob.
Constant	80,692.02	14,252.68	5.661535	***0.0000
FDI	3.64E-05	2.69E-06	13.53109	***0.0000
Domestic Sales	0.710107	0.035445	20.03412	***0.0000
Imported Components	3.94E-05	1.24E-05	3.191476	***0.0038
Exchange Rate	-12.43452	1.850665	-6.718948	***0.0000
R-squared	0.997590	Adjusted R-squared		0.997204
F-statistic	2586.906	Probability (F-statistic)		0.000000
Autocorrelation Test				
F-statistic	1.749022	Probability F(2,23)		0.1963
Heteroscedasticity Test				
F-statistic	1.447445	Probability F(4,25)		0.2479
Cointegration Test				
ε_{t-1} Coefficient	-1.123008	t-Statistics	-5.900939	Prob. 0.000

Source: *EViews* Output
Note: (*) significant at 0.1, (**) significant at 0.05, and (***) significant at 0.01

Table 2 reconfirms the findings from previous studies where FDI is a significant determinant on the large capacity industries with sophisticated technology like Indonesian automobile industry (Kurita et al., 2017; Suyanto & Salim, 2010; Zhao & Zhang, 2010). Based on the analysis, if FDI inward stock increases 1 million US dollar, then the automobile production rises about 36 units.

FDI and the development of the Indonesian automobile industry cannot be separated. FDI inflows from MNCs home base to Indonesia as the host country can be realised because both sides have their interests. On one side, Indonesia has attractiveness for FDI inflow because of its large domestic market, low-cost production factors, e.g., labour wage & abundant plant sites, and friendlier tax policy. On the other side, Indonesia needs to shift its level from a developing country to industrialized country, increase employment, and receive the latest technology. Since the automobile industry utilises hi-tech machinery and sophisticated management, Indonesia has no resource and acknowledgement to create such technology and organization. Thus, technology transfer through FDI spillover is required. However, technology innovation and development require large fund and long-duration research, so MNCs are often reluctant to hand over their technology acknowledgements to the host countries. Therefore, supportive regulations from the government must be established to guarantee that MNCs are willing to transfer their technology and knowledge to local industries and technicians. Some sacrifice policies, such as tax holiday, subsidy, and/or import

liberalisation, are suggested to invite more FDI and ease technology transfer.

FDI inflow also has an important role for export base industry (Herlambang et al., 2016; Mahmoodi & Mahmoodi, 2016; Salsabila et al., 2015; Zysk & Śmiech, 2014). According to Kutan & Vukšić (2007), FDI brings international market links where the GoI and local industries do not have the access to the market. To increase the production scale when the domestic market is saturated, the export market can be as the main alternative to absorb excess production. Although Indonesia's automobile export has increased significantly since 2004, the competitiveness of Indonesia's automobile still weak in the export market (OECD, 2012). There are two main problems why the export market has low demand on Indonesia's automobile products.

First, the Indonesian automobile industry still utilizes manufactures with Euro2 standard while automobile importer countries have already implemented Euro4 standard. Therefore, Indonesia's automobiles with Euro2 standard are rejected, and Indonesia has to import particular components with Euro4 standard to produce automobile for the export market. This condition occurs because Indonesia is late to implement Euro4 standard in the transportation regulation since Euro4 was first announced in 2005. According to Gaikindo

(2016), the regulation has been officially applied since 2018 for gasoline automobile, and it will be officially applied in 2021 for diesel automobile based on the regulation of the Minister of Environment and Forestry No. P.20/ MENLHK/ SETJEN/ KUM. 1/3/2017. Also, the GoI is still lack of Euro4 fuel supply nationally, which creates another difficulty for shifting to Euro4.

Second, Indonesia's automobile production relies too much on the Multi-Purpose Vehicle (MPV) model, while the export market requires model differentiation, particularly SUV and sedan (Gaikindo, 2020c). This condition occurs because the MPV model is the most popular and affordable for Indonesian people as the family car. As a consequence, automobile MNCs tend to fulfil the domestic market rather than produce for the export market expansion. The MPV model gained popularity when Toyota launched the Innovative International Multi-purpose Vehicle (IMV) project with Daihatsu in 2004 (Toyota Motor Corporation, 2012). The project resulted in the famous low-MPV model, Toyota Avanza and Daihatsu Xenia, which is the leader of the domestic sales for more than 15 years. The IMV project also became a positive momentum for the performance of Indonesia's automobile export, where Toyota's MPV dominates the export.
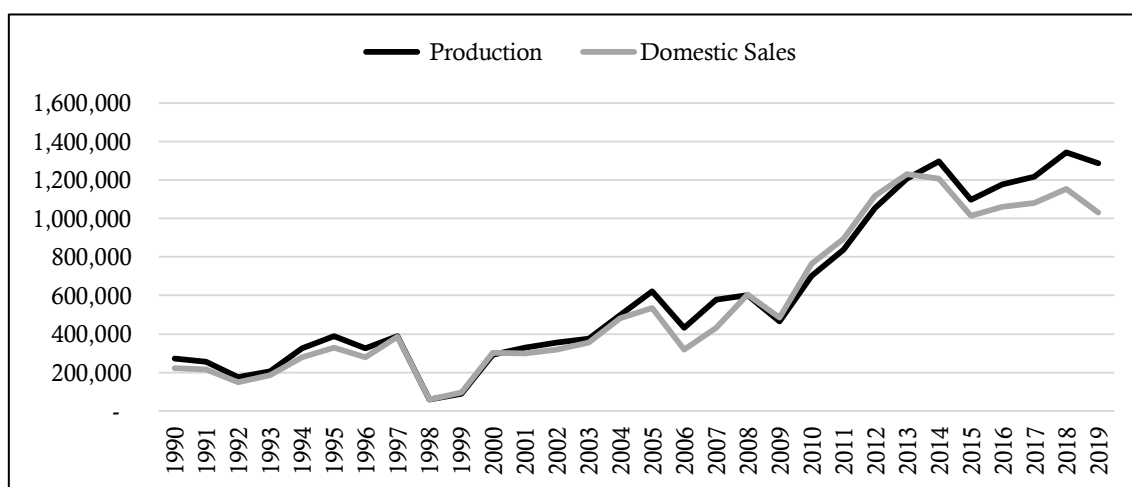

Figure 2. Automobile Production and Domestic Sales in Indonesia (units)
Source: Gaikindo

Based on Table 2, if the domestic demand rises ten units, then the production increases by seven units. Table 2 and Figure 2 are evidence that the domestic market strongly influences the automobile production. The domestic sales dropped severely in 1998 with only 58,000s units because of the Asian economic crisis. The best momentum for the domestic sales was in the early 2010s and reached its peak in 2013 with 1,2 million units. However, since 2015, the domestic demand seems saturated and difficult to surpass 1,5 million units. Currently, Based on (Gaikindo, 2015), the automobile production capacity is more than 2 million units per year so Indonesian automobile industry cannot rely on the domestic demand only and has to expand to the export market.

The Indonesian automobile industry Indonesia still imports the automobile components, although the local component manufacturers can supply about 80% of the automobile components for the industry (The Ministry of Industry Republic of Indonesia, 2015). The imported components are only high-tech components, particularly with Euro4 standard, which cannot be produced locally. The dependency on particular imported components can make Indonesia's Current Account Deficit (CAD) worse. Table 2 informs that if the imported components increase 1 million US dollar, then the automobile production increases by 39 units. Technology transfer from FDI spillover can be used to increase the opportunity of import substitution. From Figure 3, it is clearly seen that the growth of imported components is inline with the automobile production.

Table 2 also shows that the automobile production is significantly influenced by the exchange rate US dollar to Indonesian rupiah. If the US dollar increases 1 rupiah then the Indonesian automobile industry tends to cut the production of about 12 units. The reason is that the upstream industries still need to import raw materials to produce automobile components (Gaikindo, 2020a). According to the Ministry of Industry Republic of Indonesia (2015), the upstream industries still imports raw materials such as steel, aluminium, plastic (resin), and compound rubber because the local production cannot meet the quality requirement of the automobile industry. Rupiah depreciation causes imported raw materials more expensive resulting in an increase in the production cost and the automobile price. Also, FDI has an essential role in local upstream industries development by creating a joint venture or partnership between automobile MNCs and the upstream industries.
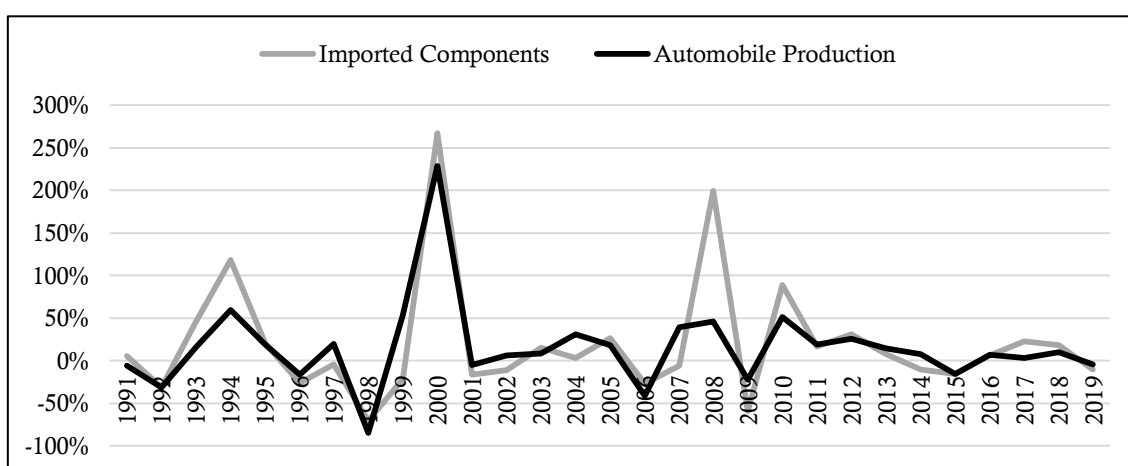

Figure 3. Automobile Production Growth (%) and Imported Components Growth (%)
Source: UN Comtrade and Gaikindo

CONCLUSION

The automobile production in the Indonesian automobile industry still does not perform optimally yet. With the production capacity of more than 2 million units, the industry only produces less than 60% of its capacity. Based on the OLS regression analysis, FDI inward stock, domestic sales, imported components, and exchange rate are significant determinants factors in automobile production.

Since the domestic market seems to be saturated, the alternative to increase automobile production is through the export market. However, the competitiveness of Indonesia's automobile is still weak because Indonesian automobile industry still utilizes Euro2 technology and relies on the MPV model for the export market. Moreover, Indonesia still highly depends on imported raw materials for automobile components production, although the local components manufacturers can provide 80% of the components.

Transfer technology through FDI spillover from automobile MNCs is required for shifting to Euro4 standard and local upstream industries improvement. Therefore, the GoI should create a friendlier policy environment to attract investment from abroad and provide better infrastructure to support Euro4 standardization.

REFERENCES

Adekunle, I. A., Ogunade, A. O., Kalejaiye, T. G., & Balogun, A. M. (2020). Capital Inflows and Industrial Performance in Nigeria: Including the Excluded. *Jurnal Ekonomi & Studi Pembangunan*, *21*(1), 37–52. https://doi.org/10.18196/jesp.21.1.5030

Adnan, R. S. (2014). Dinamika Struktur-Agensi dalam Perkembangan Industri Otomotif Indonesia. *Jurnal Sosiologi Masyarakat*, *19*(1), 77–92.

Aswicahyono, H., Basri, M. C., & Hill, H. (2000). How not to Industrialise? Indonesia's Automotive Industry. *Bulletin of Indonesian Economic Studies*, *36*(1), 209–241. https://doi.org/10.1080/00074910012331337843

BKPM. (2020). *National Single Window for Investment (NSWI) Statistical Data*. Perkembangan Investasi. https://nswi.bkpm.go.id/data_statistik

Fillat, C., & Woerz, J. (2011). Good or Bad? The Influence of FDI on Productivity Growth. An Industry-Level Analysis. *Journal of International Trade and Economic Development*, *20*(3), 293–328. https://doi.org/10.1080/09638190903003010

Fujimori, A., & Sato, T. (2015). Productivity and Technology Diffusion in India: The Spillover Effects from Foreign Direct Investment. *Journal of Policy Modeling*, *37*(4), 630–651. https://doi.org/10.1016/j.jpolmod.2015.04.002

Gaikindo. (2015). *Kapasitas Produksi Mobil di Indonesia Mencapai 2 Juta Unit per Tahun*. Artikel Economy & Industry. https://www.gaikindo.or.id/kapasitas-produksi-mobil-di-indonesia-mencapai-2-juta-unit-per-tahun/

Gaikindo. (2016). *Industri Otomotif Indonesia Persiapkan Hadapi Standar Emisi Euro4 - Gaikindo (2016)*. Artikel Bahan Bakar & Emisi; Gaikindo. https://www.gaikindo.or.id/industri-otomotif-indonesia-persiapkan-hadapi-standar-emisi-euro4/

Gaikindo. (2020a). *Depresiasi Rupiah, Gaikindo: Biaya Produksi Otomotif Bakal Naik*. Artikel Economy & Industry; Gaikindo. https://www.gaikindo.or.id/depresiasi-rupiah-gaikindo-biaya-produksi-otomotif-bakal-naik/

Gaikindo. (2020b). *Indonesian Automobile Industry Data*. Data. https://www.gaikindo.or.id/en/indonesian-automobile-industry-data/

Gaikindo. (2020c, June). GAIKINDO: Indonesia Perlu Tingkatkan Produksi Mobil SUV demi Ekspor. *Artikel Economy & Industry*. https://www.gaikindo.or.id/gaikindo-indonesia-perlu-tingkatkan-produksi-mobil-suv-demi-ekspor/

Gujarati, D., & Porter, D. C. (2009). *Basic Econometrics* (5th ed.). McGraw-Hill/Irwin.

Herlambang, J., Barokah, N., & Sulistyani, E. (2016). Analisis Pengaruh Nilai Tukar Rupiah, Foreign Direct Investment (FDI), Domestic Direct Investment (DDI) dan Tingkat Inflasi Terhadap Ekspor Industri Kreatif Indonesia

pada Tahun 2011-2015. *Journal of Business Studies (JOBS)*, *2*(2), 52–64.

Jan, T. S., & Hsiao, C. T. (2004). A Four-Role Model of The Automotive Industry Development in Developing Countries: A Case in Taiwan. *Journal of the Operational Research Society*, *55*(11), 1145–1155. https://doi.org/10.1057/palgrave.jors.2601776

Jude, C. (2012). FDI, Productivity and Wages. New Evidence from a Romanian Matched Sample. *Romanian Journal of Economic Forecasting*, *4*, 36–55.

Khan, S., & Mehboob, F. (2014). Impact of FDI on GDP: An Analysis of Global Economy on Production Function. *Munich Personal RePEc Archive*, *55352*, 1–15. http://mpra.ub.uni-muenchen.de/55352/

Kim, H. H., Lee, H., & Lee, J. (2015). Technology Diffusion and Host-country Productivity in South-South FDI flows. *Japan and the World Economy*, *33*, 1–10. https://doi.org/10.1016/j.japwor.2014.11.001

Kurita, K., Monzen, M., & Khoirunur, R. (2017). FDI Spillover Effects on Productivity Varying from the Size of Firm and Industries in Indonesia. *International Journal of Small and Medium Enterprises and Business Sustainability*, *2*(3), 51–59.

Kutan, A. M., & Vukšić, G. (2007). Foreign Direct Investment and Export Performance: Empirical Evidence. *Comparative Economic Studies*, *49*(3), 430–445. https://doi.org/10.1057/palgrave.ces.8100216

Liu, W. S., Agbola, F. W., & Dzator, J. A. (2016). The Impact of FDI Spillover Effects on Total Factor Productivity in the Chinese Electronic Industry: A Panel Data Analysis. *Journal of the Asia Pacific Economy*, *21*(2), 217–234. https://doi.org/10.1080/13547860.2015.1137473

Mahmoodi, M., & Mahmoodi, E. (2016). Foreign Direct Investment, Exports and Economic Growth: Evidence from Two Panels of Developing Countries. *Economic Research-Ekonomska Istraživanja*, *29*(1), 938–949. https://doi.org/10.1080/1331677X.2016.1164922

Natsuda, K., & Otsuka, K. (2014). *Dawn of Industrialisation? The Indonesian Automotive Industry*.

Negara, S. D., & Adam, L. (2012). Foreign Direct Investment and Firms' Productivity Level: Lesson Learned from Indonesia. *Asean Economic Bulletin*, *29*(2), 116. https://doi.org/10.1355/ae29-2c

Ni, B., Spatareanu, M., Manole, V., Otsuki, T., & Yamada, H. (2017). The Origin of FDI and Domestic Firms' Productivity—Evidence from Vietnam. *Journal of Asian Economics*, 1–46. https://doi.org/10.1016/j.asieco.2017.08.004

OECD. (2012). *OECD Reviews of Regulatory Reform: Indonesia Market Openess* (Issue September 2012). OECD. http://www.oecd-ilibrary.org/content/book/9789264042940-en%5Cn

OICA. (2020). *Sales Statistics*. http://www.oica.net/category/sales-statistics/

Okamoto, Y., & Sjöholm, F. (2000). Productivity in the Indonesian Automotive Industry. *Asean Economic Bulletin*, *17*(1), 60–73. https://doi.org/10.1355/AE17-1F

Sagita, R. (2013). Analisis Kausalitas Infrastruktur dengan Investasi Asing untuk Meningkatkan Produk Dometik Bruto (PDB) Indonesia. *Economics Development Analysis Journal*, *2*(4), 297–305. https://doi.org/10.15294/edaj.v3i4.2508

Salsabila, A. H., Kertahadi, & Iqbal, M. (2015). Pengaruh Foreign Direct Investment (FDI) dan Daya Saing Terhadap Ekspor (Studi Pada Sektor Industri Manufaktur Indonesia Tahun 2004-2013). *Jurnal Administrasi Bisnis (JAB)*, *2*(2), 1–6.

Sekuloska, J. D. (2018). Causality between Foreign Direct Investment in the Automotive Sector and Export Performance of Macedonian Economy. *Equilibrium*, *13*(3), 427–443. https://doi.org/10.24136/eq.2018.021

Sjöholm, F., & Lipsey, R. E. (2010). FDI and Growth in East Asia: Lessons for Indonesia. *Ssrn*, *852*. https://doi.org/10.2139/ssrn.1689558

Soejachmoen, M. P. (2014). Globalization of the Automotive Industry: Is Indonesia Missing Out? *Asian Economic Papers*, *15*(1), 1–19. https://doi.org/10.1162/ASEP

Suyanto, & Salim, R. A. (2010). Sources of Productivity Gains from FDI in Indonesia: Is it Efficiency Improvement or Technological Progress? *The Developing Economies*, *48*(4), 450–472. https://doi.org/10.1111/j.1746-1049.2010.00115.x

Suyanto, Salim, R., & Bloch, H. (2014). Which Firms Benefit from Foreign Direct Investment?Empirical Evidence from Indonesian Manufacturing. *Journal of Asian Economics*, *33*, 16–29. https://doi.org/10.1016/j.asieco.2014.05.003

Tarmidi, L. T. (2004). Indonesian Industrial Policy in the Automobile Sector. In R. Busser & Y. Sadoi (Eds.), *Production Networks in Asia and Europe* (1st ed., pp. 95–112). RoutledgeCurzon.

The Ministry of Industry Republic of Indonesia. (2015, March 23). Toyota: Industri Komponen Masih Impor Bahan Baku. *Berita Industri*. https://www.kemenperin.go.id/artikel/11433/Toyota:-Industri-Komponen-Masih-Impor-Bahan-Baku

The World Bank Group. (2020). *World Bank Open Data*. http://data.worldbank.org/

Toyota Motor Corporation. (2012). *IMV Project commenced*. Toyota Global Website. https://www.toyota-global.com/company/history_of_toyota/75years/text/leaping_forward_as_a_global_corporation/chapter4/section3/item1_b.html

Turnbull, C., Sun, S., & Anwar, S. (2016). Trade Liberalisation, Inward FDI and Productivity within Australia's Manufacturing Sector. *Economic Analysis and Policy*, *50*, 41–51. https://doi.org/10.1016/j.eap.2016.02.004

Ukhtiyani, K., & Indartono, S. (2020). Impacts of Indonesian Economic Growth: Remittances Migrant Workers and FDI. *Jejak*, *13*(2), 280–291. http://journal.unnes.ac.id/nju/index.php/jejak

UN Comtrade. (2020). *UN Comtrade: International Trade Statistics*. https://comtrade.un.org/data

Vahter, P. (2011). Does FDI Spur Productivity, Knowledge Sourcing and Innovation by Incumbent Firms? Evidence from Manufacturing Industry in Estonia. *The World Economy*, *34*(8), 1308–1326. https://doi.org/10.1111/j.1467-9701.2011.01379.x

Yazdan, G. F., & Hossein, S. S. M. (2013). FDI and ICT Effects on Productivity Growth. *Procedia - Social and Behavioral Sciences*, *93*, 1710–1715. https://doi.org/10.1016/j.sbspro.2013.10.104

Zhao, Z., & Zhang, K. H. (2010). FDI and industrial productivity in China: Evidence from panel data in 2001-06. *Review of Development Economics*, *14*(3), 656–665. https://doi.org/10.1111/j.1467-9361.2010.00580.x

Zysk, W., & Śmiech, S. (2014). *The Influence of Foreign Direct Investment on Foreign Trade in the Visegrad Countries from 2001 to 2011. 2*(3), 7–18.