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Abstract

We focus on whether signing preferential trade agreements (PTAs) is a solution to improve the balance of trade, specifically applied to the case of Indonesia's trade with forty-two other countries over 1989-2019. Using a gravity model of bilateral trade and the Poisson pseudo-maximum likelihood econometric technique, this research estimates contractionary effects of some of the preferential agreements on both aggregate trade flows and their disaggregation by nine product groups. We find that partial scope agreements (PSAs) and collaboration with WTO member countries were beneficial for Indonesia. Further, trade partners with a higher level of internet penetration than Indonesia imported more products from this country. The analysis disaggregated by products generated similar results. If Indonesia pursued strategies based on comparative advantage then they could improve their trade balance within the ASEAN-Plus-One and AFTA partnerships.

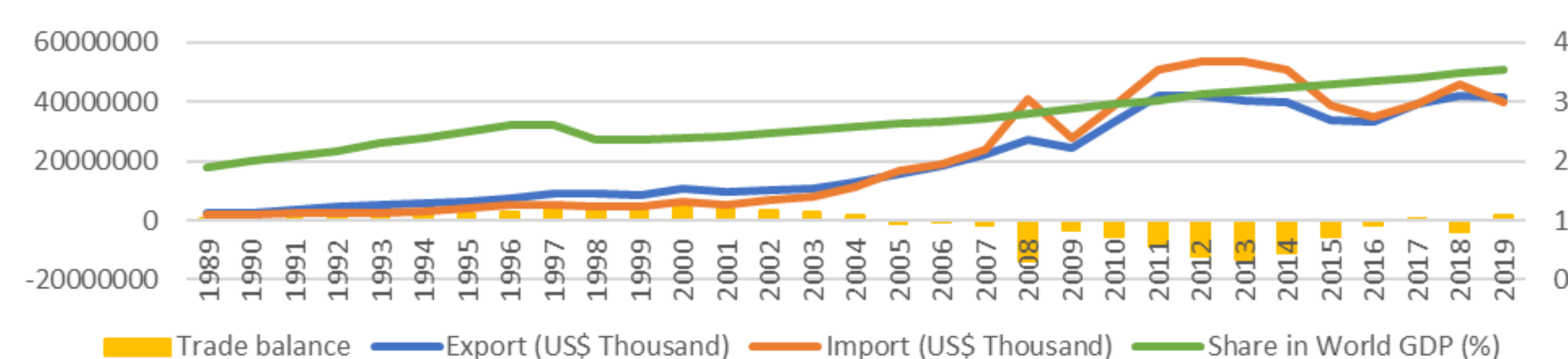
Introduction

Do various types of PTAs similarly benefit both partners? The preliminary review of data for Indonesia, which covered the trade flows with its forty-two partners in 1989-2019, assessed a significant reduction in the balance of trade after signing some of the PTAs.

Thus, in 1989-1992, Indonesia, in aggregate terms, ran a trade surplus with its future AFTA partners (Figure 1). Indonesia entered the AFTA in 1993 and reported trade deficit with its partners, estimated as an aggregate of all trade flows, since 2005 onward.

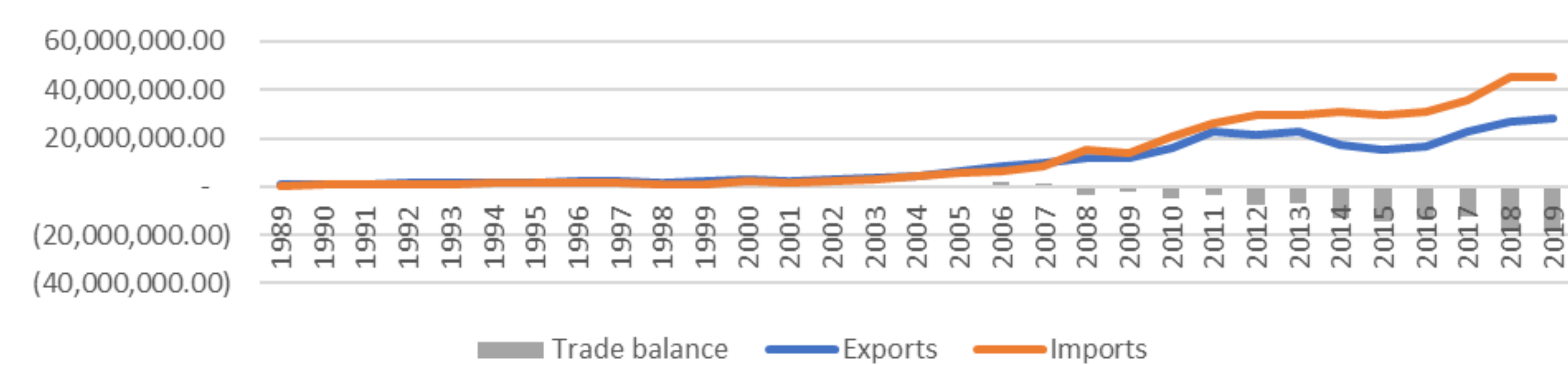
Indonesia, as part of the ASEAN free trade zone, launched "ASEAN-Plus-One" FTAs with seven countries, such as China, Australia, Japan, etc. For example, the ASEAN-Plus-One agreement with the People's Republic of China entered into force in 2005. In two years, the trade surplus with China reversed and Indonesia has reported a growing trade deficit with this country from 2007 onward (Figure 2).

Figure 1. Trade balance of Indonesia and its AFTA partners (in thousand USD) and share of AFTA in World GDP (%)*



*Right vertical axis reflects the share of AFTA in World GDP (%)

Figure 2. Trade balance of Indonesia and China (in thousand USD)



Methods and Materials

This analysis uses four binary variables to denote various types of preferential trade agreements (PTA), grouped as follows: PTA_{1t} - AFTA (or intra-ASEAN trade); PTA_{2t} - ASEAN-Plus-One, PTA_{3t} - PSA; and PTA_{4t} - no PTA (not having a PTA).

In addition to generally used controls in gravity models, we also use the level of digitalization estimated as: $Dig_{it} = \frac{\text{number of internet users}_{it}}{\text{population}_{it}}$, [1]:

The Poisson pseudo-maximum likelihood (PPML) econometric technique is used to conduct data analysis. This method is described in Santos Silva and Tenreyro (2006).

Thus, the model is described by the following equation [2]:

$$Dep_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it-1} + \alpha_2 \ln GDP_{jt-1} + \alpha_3 \ln Dist_{ij} + \alpha_4 \ln Pop_{it-1} + \alpha_5 \ln Pop_{jt-1} + \alpha_6 \ln Exch_{t-1} + \alpha_7 \ln Dig_{t-1} + \alpha_8 PTA_{1t} + \alpha_9 PTA_{2t} + \alpha_{10} PTA_{3t} + \alpha_{11} PTA_{4t} + \alpha_{12} WTO_{it} + \alpha_{13} Rem_{it-1} + \alpha_{14} A_i + \varepsilon_{it}$$

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Results

PTAs had a significant impact on total **exports** of Indonesia (Table 1). According to the analysis, ASEAN free trade area (PTA_{1t}) agreement did not significantly impact the exports from Indonesia. The exports from Indonesia were impacted significantly and negatively by the ASEAN-Plus-One (PTA_{2t}) agreements; the flow of exports to an ASEAN-Plus-One trade partner was lower on average by USD 0.273 million, or in aggregate terms for seven countries by USD 1.9 million. Exports from Indonesia to countries which used partial scope agreements (PTA_{3t}) significantly rose, on average, by USD 0.364 million per country or in aggregate terms for seven countries by USD 2.6 million. Exports from Indonesia were lower by USD 0.452 million per each country which did not have any effective PTA in place (PTA_{4t}); this subgroup included eighteen countries. Exports from Indonesia were positively and significantly impacted by WTO members. Digitalization had a significant effect for acceleration of exports directed to the countries with higher levels of internet penetration than that in Indonesia.

PTAs significantly impacted **imports** to Indonesia (Table 2). On average, the imports from each AFTA country were higher by USD 0.702 million or in aggregate terms for nine countries by USD 6.3 million. The imports with the ASEAN-Plus-One partners were higher on average by USD 0.352 million or in aggregate terms for seven trade partners were close to USD 2.5 million. The analysis did not reveal significant effects on Indonesian imports received from countries trading under PSAs, not having PTAs and WTO members.

Thus, two simultaneously occurring effects produced trade deficit of Indonesia. First, it was due to contraction of exports as an outcome of ASEAN-Plus-One cooperation and not having effective PTAs with major trade partners. This negative effect outweighed the exports to other partner countries. Second, Indonesia experienced significant increase in imports from the AFTA and ASEAN-Plus-One partners.

The analysis disaggregated by nine product groups generated similar results.

Table 1. Selective results on total exports and exports by product types

Variables	Total exports	Exports by product types								
		Fuel	Minerals	Animals	Plastic/Rubber	Textile	Wood	Metals	Machines	Vegetables
PTA_{1t}	-0.186 (.317)	.189 (.663)	-2.957*** (.386)	-.735** (.272)	-2.740*** (.495)	-2.268*** (.552)	-1.576** (.539)	-.791*** (.263)	.225 (.169)	-1.668*** (.455)
PTA_{2t}	-2.733** (.103)	-.091 (.128)	-1.940*** (.139)	-.126 (.176)	-1.322*** (.073)	-.773*** (.147)	-1.878** (.141)	-1.923*** (.188)	-.282*** (.076)	-1.087*** (.070)
PTA_{3t}	3.644*** (.129)	-.629* (.253)	2.258* (.126)	.454 (.514)	.029 (.158)	.557*** (.115)	.207** (.084)	-.691** (.289)	.132 (.239)	.354*** (.082)
PTA_{4t}	-4.52*** (.092)	-.531** (.188)	-2.755*** (.159)	.261* (.130)	-2.193*** (.151)	-1.467*** (.139)	-1.861*** (.075)	-2.381*** (.130)	-.573*** (.135)	-1.362*** (.208)
WTO	.198*** (.054)	.1310 (.091)	.875*** (.169)	.119 (.155)	.525*** (.080)	.198* (.100)	.087 (.101)	.280 (.150)	.750*** (.110)	.344* (.145)
$\ln Dig_{it}$.041** (.014)	.040* (.017)	.101** (.039)	.040* (.021)	.072* (.034)	.040* (.0168)	.046** (.017)	.035 (.034)	.163*** (.022)	.084* (.038)

Table 2. Selective results on total imports and imports by product types

Variables	Total imports	Imports by product types								
		Fuel	Minerals	Animals	Plastic/Rubber	Textile	Wood	Metals	Machines	Vegetables
PTA_{1t}	.702* (.362)	-1.475*** (.393)	-2.167*** (.503)	1.530** (.596)	-.103 (.643)	.733 (.420)	.219 (.602)	.439 (.475)	.158 (.589)	-2.839*** (.314)
PTA_{2t}	3.52*** (.068)	-.789*** (.199)	-2.243*** (.112)	.977*** (.109)	-.431*** (.098)	-.257 (.166)	-.088 (.080)	.244** (.083)	.316*** (.084)	-2.430*** (.107)
PTA_{3t}	-.241 (.330)	.352* (.169)	1.519*** (.193)	.205 (.208)	-1.259*** (.178)	-.593 (.351)	3.091*** (.144)	1.762*** (.174)	-1.177*** (.227)	.760** (.240)
PTA_{4t}	-.065 (.139)	-1.796*** (.147)	-2.712*** (.169)	.607*** (.086)	-.740*** (.182)	-.244 (.265)	-.415* (.199)	-.224 (.234)	-.410* (.177)	-2.803*** (.132)
WTO	.165 (.092)	.259 (.238)	.502* (.244)	.448*** (.136)	-.032 (.155)	.054 (.137)	.151 (.149)	.198 (.139)	.265 (.146)	.442* (.197)
$\ln Dig_{it}$	-.002 (.014)	-.105* (.052)	.012 (.032)	.070* (.032)	.013 (.022)	-.001 (.025)	.039** (.015)	-.001 (.022)	.012 (.019)	.009 (.022)

Conclusions

Indonesia did not fully benefit from the potential that operating as a member of the AFTA may offer. The negative and insignificant coefficient associated with exports from Indonesia to the AFTA countries implies that the negative effect on exports is not systematic, and Indonesia has the potential to turn around the situation. The AFTA partners utilized the potential of Indonesian market much better which impacted the rise in their imports.

Our analysis suggests that the trade with the ASEAN-Plus-One partners had the largest area for improvement, since the exports to these countries were directly and negatively affected by the terms of these agreements. Simultaneously, the imports from the ASEAN-Plus-One partner countries significantly grew.

Finally, not having PTAs with major partners was another significant contributor to the decline in Indonesian exports.

If Indonesia pursued strategies based on comparative advantage then they could improve their trade balance with the ASEAN-Plus-One and AFTA partners.

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