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The Effect of A Country's Size on the Extensive Margin of Trade in the Economic Partnership Agreement (Epa)

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ABSTRACT

This study employed the Casella (1996) model and its extension Badinger and Breuss (2006) to examine the relationship between the size of a country and the effects of trade bloc enlargement on the extensive margin of trade. Therefore, export of large and small European countries to African, Caribbean, and Pacific (ACP) countries on the extensive margin were investigated to validate the effect of introducing an economic partnership agreement from 2004 to 2014. The empirical results from the fixed and random effect panel regression on HS 6 digit disaggregated data provided the evidence on the minor benefits of the small country over a large country. Hence, the interpretation of the results was in line with Casella's (1996) hypothesis, which emphasized the importance of reducing domestic market differences between large and small countries by improving their market access. Our findings imply that the market access initiative will eventually play a vital role in helping the small countries. This in turn encourages firms in small countries to increase the quantity and diversity of the goods they produce. These findings urge the policymakers to pay more attention to the size of the country in improving the formulation of trade agreements in line with their benefits for different groups of countries.

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1. Introduction

Over the last 15 years, scholars such as Felbermayr and Kohler (2006), Buono and Lalanne (2012), Dutt et al. (2013) had explored the relationship between trade agreements and the extensive-intensive margins of trade, which had thereafter received considerable attention from researchers and policymakers worldwide. The trade agreement was constructed to enhance the trade performance of the member countries. It is comprised of facilitative provisions that had been mutually agreed upon by the member countries. Therefore, it was viewed as an important aspect of the trade facilitation process.

Additionally, improved market access provided in trade agreements helps to reduce trade cost, and ultimately increase the trade flow and products variety (Santos-Paulino and Thirlwall, 2004). The new trade agreement has several effects on the economic growth of the new members. One of those effects includes improving access to a new market. The formation of ACP-EU Economic Partnership Agreement (EPA) was a major step in solidifying the economic integration of the European Union (EU) and African, Caribbean, and Pacific (ACP). EPA consisted of some vital aspects. In terms of population, it created a free trade area for some 1 billion people and diverted the center of gravity toward the south. It dated back to the first Lomé Conventions as a trade and aid agreement signed in 1975. Political, economic development and trade cooperation agreements between EU and ACP countries were signed in Togo in the year of 1975. Then from 2000 to 2020, 79 ACP countries had signed the Cotonou Agreement and agreed to the abolition of non-reciprocal trade preferences, which was granted to ACP in 1975. With the prospective expiry of the Contonou agreement in December 2007, it was replaced with the ACP-EU EPA as a result of its incompatibility with the standards of the most favored nation i.e., preferential access was given explicitly to ACP countries (Vollmer et al., 2009). Negotiated between 2004 and 2007, the EPA is an extension and a joint response to the challenges of globalization and development. This EPA incorporates chapters on trade in products, trade in service, investment, innovation, competition, intellectual property, public procurement, and development aid. Thus, much of the Cotonou agreement scheme was consolidated into this agreement (UN, 2013).

The ACP countries have to comply with the reciprocal agreement in order to maintain some export preferences on their products. At the minimum, if ACP countries not joining Economic Partnership Agreements at the end of 2007, the EU would be taxing ACP exports and generate revenue equivalent to adverse aspects of Union-level aid and at worse, it may lead to the complete halting of some exports to the EU with severe unfavorable economic effects (Stevens et al., 2007).

The primary objective of the EPA is to strengthen the regional integration process and achieve sustainable economic development in ACP countries (Pannhausen, 2006). Moreover, EPA aims gradually opening up the markets between 2008 and 2020 to improve competitiveness and reducing prices, at the same time, taking into account the dissimilarity in the level of economic structure and economic development between the European Union and ACP countries (ACP Group)[1].

This agreement provides the opportunity for market access to the European single market, which is the largest market in the world of 500 million consumers. The agreement promotes job-creating opportunities for a large number of people in ACP countries and provides flexible Rules of Origin (ROO) that can help companies to obtain input at lower prices. The trade pact is designed to create an economic area for free movement of goods, finance, and services. Also, it can facilitate trade by providing more transparency and flexible rules of origin.

Sensitive products, such as agricultural and perishable products in ACP countries are excluded from liberalization where EPA provide flexible provision for some agricultural and essential commodities. Although a significant magnitude of product exported from ACP was not exposed to customs duties, these countries were still unable to maintain their market share and diversify their exports (EU Trade Commissioner Peter Mandelson, 2008). Also, it observed that EU-ACP preferences had an adverse effect on export diversification (Persson and Wilhelmsson, 2016). On the other hand, Stender et al. (2021) reported no general EPA effect on trade between EU and ACP countries but varying effects across different agreements and economic sectors. EPA appeared to replace the previous market regime of unilateral preferences given to ACP countries due to unsatisfactory results on account of trade flow and trade diversification.

Previous studies focused on the effects of size and the endowment factors of trade flow. Therefore, less attention was given to the link between the countries size, endowment factors, and extensive margin. Nevertheless, Dalton's (2017) empirical evidence did not provide adequate interpretation and link between the effect of the country's size, the growth in the extensive margin and the trade bloc expansion. Although Dalton (2017) found regional integration effect on extensive margin, his study suggested an implicitly different amount of effect on large and small countries. This study proposed to explore the economic partnership between ACP and the EU to test the effect of market size expansion, which involved the implementation of an

[1]. For more detailed information on EPA refer to ACP Group or European Commission websites (https://ec.europa.eu/international-partnerships/acp-eu-partnershipen).

agreement on the extensive margin. Although the impacts of the different trade agreements on the extensive margin had been tested (Foster, 2012; Dutt et al., 2013), however, little research had been focused on examining the effect of the country's size, endowment factors, and trade openness on extensive margin in the context of trade expansion.

Hence, the present study argued that trade openness made firms more productive because it helped increase the capacity of the firm to serve more markets. Firms in countries with more open trades probably served more markets, and therefore the level of productivity could be affected by the current stage of trade openness in one country. Therefore, it is imperative to include a country's level of openness in determining the overall performance of that particular country. A country's culture of openness could be a good indicator of understanding its market size and tariff rates. The inclusion of trade openness helps account for the size of the market before and after the expansion of trade bloc. Firms with more open trades in comparison to firms with less open trades had larger and diverse international markets. As such, it was deemed logical to further extend Casella (1996) and Badinger and Breuss (2006) models alongside trade openness. Since the EU was considered as the largest market in the world, hence the present study pursued to examine the existence of a significant relationship between the enlargement of trade bloc and the extensive margin, specifically focusing on the economic partnership agreement between the European Union (EU) and African, Caribbean and Pacific (ACP). The novelty of this study lay in its intention to test the Casella model on the microeconomics level through extensive margin instead of trade flow. This is important because Melitz (2003) theory suggests that the effect of reducing trade costs is stronger on the extensive margin.

Previous studies such as Badinger and Breuss (2006) had dealt with the effect of a country's size on the increasing market access based on trade flow. This was done because the review of the extensive margin had not distracted much attention from the researchers in the past. Casella (1996) examined the effects of bringing in new members to the trade bloc on the upsurge of market access. Casella (1996) argued that when the economic scale indicated that the firms located in large countries possessed lower costs, then the small countries would indulge in the privilege of expanding the trade bloc. This was because the entry of new members in small countries reduced the relative importance of the domestic market and improved those small nations (Casella, 1996). However, this model had not been extended to extensive margin. Nevertheless, the introduction of extensive margin in the analysis may give a different result. Additionally, Kehoe and Ruhl (2013) defined extensive margin or commonly known as new good margin as the change in goods' export quantity that had not been exported

previously. Intensive margin, on the other hand, is the increase in export of an already existed product among trading partners. Consumers gain welfare and firms gain productivity via standard and new input as a result of the availability of the new margin (Debaere and Mostashari, 2010; Feenstra and Kee, 2007).

Therefore, according to the European Commission European Union trade with ACP countries had increased by 52% from 40,000 million euro to 80,000 million euro from 2004 to 2014, which was represented by1.5% of EU exports and 1.4% of EU imports. The EU, in turn, was the leading trade partner of ACP countries for both the imports (27.9%) and the exports (20.3%).

Table 1 shows the magnitude of trade flow and trade balance between EU and ACP countries from 2009 - 2019. In general, the EU imports had increased from 2009 to 2019 from 45,553 to 75,199 Million Euro, despite the lowest in 2009, which could have resulted from global financial crisis. In terms of export, the EU countries also showed good performance and positive export growth. All in all, the total trade had increased considerably from 2009 to 2019 with just a slight fluctuation within a few years in-between. The trade balance of EU countries in some years shows a slight trade deficit with ACP countries. Extra-EU in table 1 describes the percentage of export and imports between the EU and ACP out of the total trade with the rest of the world, excluding the trade within the European Union.

Table 1. EU Trade Flows and Trade Balance with ACP (Total)

Period	Value M €	Imports Growth (%)	Extra-EU (%)	Value M €	Exports Growth (%)	Extra-EU (%)	Trade Balance Value M €
2009	45,553		3.8	51,043		4.3	5,490
2010	55,628	22.1	3.8	60,497	18.5	4.2	4,869
2011	74,383	33.7	4.5	70,957	17.3	4.4	-3,426
2012	79,961	7.5	4.7	74,100	4.4	4.2	-5,861
2013	76,914	-3.8	4.7	76,611	3.4	4.3	-304
2014	77,514	0.8	4.8	76,988	0.5	4.3	-526
2015	70,010	-9.7	4.2	78,409	1.9	4.2	8,399
2016	56,906	-18.7	3.6	69,698	-11.1	3.7	12,792
2017	62,288	9.5	3.5	74,058	6.3	3.7	11,770
2018	72,394	16.2	3.8	77,389	4.5	3.8	4,995
2019	75,199	3.9	3.9	78,617	1.6	3.7	3,418

Source: Eurostat Comext European Commission (2020).

Note:

*1: Growth (%): relative variation between the current and previous period

*2: Extra-EU (%): imports/exports as % of all EU partners, i.e., excluding trade between the EU Member States.

The remainder of this paper is structured as follows. The next section provides a review of the recent literature on trade facilitation and extensive margin. Section3 lays out the econometric model and describes the methodology and measurement of variables. Section 4 describes the data and provides summary statistics. Section 5 estimate and present the results. Section 6 concludes and provides policy recommendations.

2. Literature Review

Keesing (1968) made the first attempt to elucidate the theoretical relationship between trade and the country's size. Keesing asserted that countries with a minimum level of population held comparative disadvantages when it came to international trade in manufactured goods because it limited their abilities to exploit internal and external economies. Small countries faced drawbacks with the exportation of finished goods and therefore liberalization equalized their opportunities with larger countries (Balassa, 1969). However, the scholars were not concerned about the influence of a country's size during the expansion of the trade bloc until it was brought up by Casella (1996). Dalton (2014) had emphasized that it would be inappropriate to evaluate the trade liberalization when the trade model was not included in the extensive margin. Therefore, the extensive and intensive margin should both be taken into consideration if the goal was to determine the magnitude of increase in relative export and import of the small and large countries post-bloc expansion.

In an intention to test Casella's hypothesis on the size and trade bloc expansion, Badinger and Breuss (2006) postulated the concepts of economic scale and endowment factors, which make larger countries more competitive so they can more sufficiently exploit the trade liberalization opportunity. The study extended Casella's (1996) model by including the capital-labor ratio as a controlled variable to detect the endowment factors of the large and small countries. Moreover, large countries may be at the advantageous end of the line in comparison to small countries as a result of high market power, favourite term of trade, economic scale, endowment factor, large product varieties and advanced technology (Badinger and Breuss, 2006). The notion explicitly indicated that firms located in larger countries benefited from the vast domestic markets and were able to exploit the economic scale and produce at lower costs in comparison to firms located in smaller countries. Therefore, large countries are reaping the perks of expansion. Another study by Badinger and Breuss (2009) applied Casella's model to explain the expansion of the market via the introduction of single currency and its impact on small and large countries. They assessed the European integration using the aggregate and sectoral trade data from 1960–90 for the panel data to disclose the relative gain among small and large countries from the enlarging trade

bloc. The results observed by the scholars proved to have worked in accordance to Cassella's (1996) model. Therefore, past studied had concluded that the increase in the small countries'.

relative competitiveness had brought about more benefits for them compared to large countries. Moreover, Badinger & Breuss (2009) had reported a statistically significant but quantitatively moderate gain for small countries.

In the context of Japan and China, Dalton (2014) discovered that Japan's GDP in 2001 was four times greater than that of China's GDP. Dalton (2014) investigated the impacts of China's 2001 WTO membership, which focused on the changes between China and Japan's trade margins. Therefore, in 2001 China's relative size of the economy was less than Japan when China's export to Japan was increased by 22% in comparison to Japan's exports to China, which was only 15.9%. Additionally, the emergence of China into the WTO increased China's extensive margin to 22%, whereas Japan, an old member of the WTO was left with a 15% increase only.

The Japan-China trade pattern was in harmony with the findings reported by Dalton (2017), which was related to the change in the twenty bilateral extensive margin trade flow between Austria and the new countries that had joined the EU in 2004. The study reported that the Austrian import from the Czech Republic documented an increase of 34% in the new goods margin and 85% for the Austrian import from Cyprus. Therefore, on average, about 56% of the bilateral trade flow in new goods was from trade liberalization. Moreover, results showed that small countries had higher magnitude of benefits compared to large countries. Because of the economies of scale and domestic market advantage, firms in large countries produce at lower cost. The expansion of trade bloc with new members diminishes the advantage of large countries domestic market and improve the relative competitiveness of small countries (Casella, 1996). However, the working mechanism of the effect of trade bloc expansion for countries with different sizes on extensive margin is unclear and need further investigation.

3. Research Methodology

This paper proposed to test whether a significant effect of market size post-bloc expansion paved the path for firms in small or large countries to reap the benefits. Badinger and Breuss (2006; 2009) adopted Casella's (1996) hypothesis and expanded their exploration of the effects of trade bloc enlargement and the single currency profit-allocation among old members based on the size, endowment factors, and the exchange rate in different countries. Badinger and Breuss (2006; 2009) further investigate their effects only on trade flow. Halpern et al. (2015) emphasized the importance of trade

openness because the emergence of numerous importers and foreign firms would increase the productivity gained from tariff reduction. Therefore, in our study, we argue the importance of trade openness and extend Badinger and Breuss (2006) model with trade openness, another relevant variable. All in all, scholars and past research had examined the multiplicities of trade bloc comprehensively. Based on those studies, the present study proposed to look at some of those questions from a whole new context and adopted the neoclassical and monopolistic competitive model, which claimed that small countries would reap more benefits. Nevertheless, all of the questions were based on testing the effects of expansion on countries inside and outside of the European Single Market trade bloc.

Therefore, this paper's model intended to answer two central questions: (1) does larger countries trade less compared to smaller countries post-bloc expansion? (2) do the extensive and intensive margins possess different trade patterns? Both questions were raised as a result of the separation between the intensive and extensive margins and the argument in the introduction previously. These questions; therefore, complemented each other in the present study. This study attempted to bridge the gap between past research. Therefore, the present research had extended the model by including trade openness and tested it on extensive margin instead of intensive margin. Three models were employed to estimate the static linear panel data; pooled OLS, random effect (REM), and fixed-effect model (FEM). Pooled OLS assumed that ε had identically and independently been distributed (i.i.d) and was uncorrelated with x. Pooled OLS assumed that the intercept and slope were the same across units and time, which could give biased heterogeneity results since the intercept and slope might not be the same across units and time. The random and fixed effect in contrast to Pooled OLS presumed that each unit, e.g., countries and household had their intercepts (heterogeneity). To account for such heterogeneity ε was decomposed into two components to convey the structure of the panel data[1]:

$$y_{it} = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} + \ldots + \beta_k x_{kit} + \varepsilon_{it} \quad (1)$$

$$y_{it} = B_0 + B_{1x1it} + B_{2x2it} + \cdots + B_{kxkit} + \lambda_i + u_{it} \quad (2)$$

$$\varepsilon_{it} = \lambda_i + u_{it} \quad (3)$$

The λ_i assumed to be random variable with zero mean and variance and drawn independently from some probability distribution. The random effects (RE) estimator

[1]. For more details on fixed and random effect panel data analysis refer to Law (2018). Applied Panel Data Analysis, Short Panel. Kuala Lumpur: UPM press.

uses the orthogonality conditions that the individual specific effect is uncorrelated with the regressors, i.e., Cor (λ_i,x_it) =0.

If t=1,then $y_{i1} = B_0 + B_{1x1i1} + B_{2x2i1} + \cdots + B_{kxki1} + \lambda_i + u_{i1}$ (4)

If t=2 then $y_{i2} = B_0 + B_{1x1i2} + B_{2x2i2} + \cdots + B_{kxki2} + \lambda_i + u_{i2}$ (5)

If t = 3, then $y_{i3} = B_0 + B_{1x1i3} + B_{2x2i3} + \cdots + B_{kxki3} + \lambda_i + u_{i3}$ (6)

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If t=6, then $y_{i6} = B_0 + B_{1x1i6} + B_{2x2i6} + \cdots + B_{kxki6} + \lambda_i + u_{i6}$ (7)

The error term $\varepsilon_{it} = \lambda_i + u_{it}$ has three correlation structures, namely the variance of each term is $\sigma_\lambda^2 + \sigma_u^2$, within unit autocorrelation is σ_λ^2 and the remaining covariance terms are equal to zero. As a result of this autocorrelation, the OLS will be insufficient, and the standard error is invalid.

The Fixed Effect Model uses for variables that vary over time. The reason for using the fixed effect is to control individual characteristics (heterogeneity) of the entities, e.g., country, firms that could affect the dependent variable and provide biased results. FE assume the correlation between the entity error terms and the repressors. The fixed effect could remove the effect of those individual characteristics and assess the net effect of regressors on the dependent variable. In FE, individual characteristic should not be correlated with other individual characteristics. In another word, the error term and constant should not be correlated with other error terms contrast to the case with the random effect model (REM) in which the error term is correlated.

Fixed effects (FE) estimator uses the orthogonality conditions that the individual specific effect is correlated with the regressors, i.e., Cor (λ_i,x_it) ≠0.

The fixed effect can be estimated in three different ways. First, within the group fixed effect in which unobserved effect will be eliminated to allow the real effect of the regressors on the dependent variable presented in these equations:

$y_{it} = (\beta_0 + \lambda_i) + \beta_1 x_{1it} + \beta_2 x_{2it} + \ldots + \beta_k x_{kit} + \varepsilon_{it}$ (8)

$y_{it} - \bar{y}_i = B_0 - B_0 + \lambda_i + \bar{\lambda}_i + B_1(x_{1it} - \bar{x}_{1i}) \ldots + B_k(x_{kit} - \bar{x}_{ki}) + u_{it}$ (9)

Second, least square dummy variable fixed effect (LSDV), in which it includes in the specification both unit and time specific effect by using F and significant joint test for the existence of such effects in the model. Third, first difference fixed effects model in which unobserved effect (λ) eliminates by differencing out the dependent and independent variables instead of using within transformation and then run the OLS.

The fixed effects assumed that the differences intercepted across groups or over a period of time, whereas the random effect attributed to the differences in error

variances. Therefore fixed effect assumed that there was one actual size of effect, which motivated all the studies in the analysis, and every difference in the observed effects was due to sampling error (Borenstein et al., 2010). On the other hand, the random effect focused on the actual size of effect, which varies from study to study. Based on Casella (1996) and Badinger and Breuss (2006), the present study's regression was modeled and expanded as follows:

$$\ln\left(\frac{NEP_{Lj.t}}{NEP_{Sj.t}}\right) = \alpha + \beta_1 \ln\left(\frac{GDP_{L.t}}{GDP_{S.t}}\right) + \beta_2 \ln\left(\frac{FE_{L.t}}{FE_{S.t}}\right) + \beta_3 \ln\left(\frac{TO_{L,t}}{TO_{S,t}}\right) + \beta_4 \ln(ER_L)_t + \gamma_{LS} D_{jt} + \lambda_t + u_{LSj,t} \quad (10)$$

The model was then further simplified into:

$$\ln NEPR_{it} = \alpha + \beta_1 \ln GDPR_{it} + \beta_2 \ln FER_{it} + \beta_3 \ln TOR_{it} + \beta_4 \ln ERL_{it} + \gamma_i D_{jt} + \lambda_t + u_{i,t} \quad (11)$$

where in Equation (11) $NEPR$, the dependent variable is the ratio of the number of products exported by a large and small country to country j within time *t*. Following the previous studies, the gravity model was used in a ratio to measure the relative exports of large and small countries. The numerator and denominator in the equation consist the ratios of 6 digit code products exported from large countries (5 EU countries) and small countries (9 EU countries) to 22 ACP countries[1]. $GDPR$ represented the GDP ratio of large to small European countries. FER_{it}Factor Endowment Ratio depicted the capital-labour ratio (K/L) between large and small countries. TOR_t Trade Openness Ratio illustrated the sum of exports plus the import of large countries to their GDP divided by the sum of exports plus the import of small countries to their GDP. $ERL_{it}$was the real exchange rate of large countries. The variable distance (time-invariant) is allowed to be captured by constant. $\gamma_i D_{jt}$ represented the Dummy (zero before country j entered the agreement and every country thereafter). λ was time-specific effect. Finally, u_{it} signified the error term.

In line with previous studies that use this model (market expansion hypothesis) between large and small countries, it is clear that the effect of new trade Bloc or joining an old Bloc is reducing the trade cost among different participants. We test the model for a group of countries (EU-ACP countries). The difference between our study and

[1]. The dependent variable is the number of product exported from large to ACP countries devided by the number of products exported from small to ACP countries. The independent variables also follow the same rules as it measures the ratio of GDP, K/L , and trade openness of large (5 countries) to small (9 countries) European countries.

previous is that we are extending the model with trade openness and test the model for extensive margin instead of intensive margin.

4. Data Source

The dependent variable (NEPR) was from the UN Comtrade, and the model was applied to the 22 countries in the Africa Caribbean Pacific (ACP) from 2004 to 2014. The examined equation was employed to estimate a sample of export in the 6-digit code product (5171 product lines) from large and small countries to the 22 ACP countries. Size of large and small countries was differentiated in term of relative GDP. The definition of extensive margin and data collection for dependent variables were based on (Beverelli et al., 2015; Hummels and Klenow, 2005). The sample period datasets spanned from 2004 to 2014. The list of the countries was presented in Appendix A.

The data for the number of exported products of some small European countries to some ACP countries are unavailable, and some countries have incomplete time dimension data that would make the dataset unbalanced. In this regard, we include small countries with complete data over time. This allows us to more efficiently estimate the benefit of EPA on large and small countries because having many group observations with unbalanced data may not present the effect over time.

The annual data on GDP was from the World Bank and OECD National Accounts data. Additionally, the source of data on trade openness was obtained from the World Development Indicators. Next, the real effective exchange rate was acquired from the World Bank. It was used to measure the state of competitiveness. The capital-labor ratio was calculated by dividing the real capital formation on the number of employees from each country. Therefore, the capital-labour ratio was obtained from the World Development Indicators whereas the employment data was from the International Labour Organization (ILOSTAT) database.

The Table 2 below demonstrates the expected sign of relationship for our dependent variable in respect of those independent variables. Follow Badinger and Breuss (2006); Casella (1996) all our variables could take both positive and negative sign. Because the variables are in ratio the positive sign of variable support the large country benefits from trade bloc enlargement while negative sign attributes the benefits to the small countries. All our variables are in log form, The reasons make log form variable favorite in applied work is first, using log for dependent variable better satisfy classical assumptions than model using variable in the level. Second, taking log can mitigate or eliminate the problem of heteroscedasticity and skewness and finally, reduce the

sensitiveness of dependent and independent variables to outliers' observation in the model (Wooldridge, 2009: 191).

Table 2. Expected Sign of Relationship between Dependent and Independent Variables

Variable	Definition	Source	Expected sign	Year
NEP	Number of all HS (2002) 6 digit products exported from large countries (5 EU countries) as well as small countries (10 EU countries) to 22 ACP countries. 5171 sub-headings each expressed as one product	UN COMTRADE	N/A	2004-2014
GDPR	The ratio of GDP of large to small European countries (constant)	World Bank, and OECD National Accounts data	+/_	
ERL	The real exchange rate of large countries	World Bank	+/_	
FER	Factor Endowment Ratio is a ratio of capital to labor between large and small countries	World Development Indicators. International Labour Organization (ILOSTAT) database.	+/_	
TOR	the sum of exports plus import of large countries to their GDP divided by the sum of exports plus import of small countries to their GDP	World Development Indicator	+/_	
Dummy	zero before country *j* enter to the agreement and 1 after	N/A	+/_	

Source: Research finding.

The ratio of GDP is a ratio of real GDP of the large country over the small country. Likewise, the ratio of the exchange rate is the real effective exchange rate of large over a small country. Real effective exchange rate defined as the nominal effective exchange rate divided by a price deflator or index of costs that were computed by measuring the value of a currency against a weighted average of several foreign currencies .

We calculate K/L ratio by dividing real capital formation (capital formation minus consumption of fixed capital or replacement value of capital used up in the process of production) on a number of employee in each country. The way to get the number of unemployment is by dividing laborforce on the unemployment rate, which is a percentage rate of labor force subtracting the number of unemployment from the labor force we obtain the total number of employee in each country.

In the obtained data, if a number for the capital formation (K) was negative, resulting from a higher rate of depreciation of fixed capital, then the ratio between two values were automatically deemed undefined. Therefore, a new variable could be created by adding 1 to the decimal number of the mean in summary statistics. However, this method is not popularly utilized in the research. Hence, to make a log of the negative value we followed Busse and Hefeker's (2007) formula:

$$y = \ln(x + \sqrt{(x^2 + 1)}) \quad (12)$$

Where in Eq. (12) y was the newly generate variable, *x* denoted the variable with the negative sign, which needed to be transformed. All variables were then expressed in natural logarithms. The descriptive statistics of the variables were summarized in Table3.

Table 3 provides descriptive statistics on two sets of variables to verify the statistic characteristics of the individual variables. The first set of variables described the export, trade openness, capital-labour, and GDP for respective large and small countries. The second set provided information for the same variables in the form of natural logarithm and ratio. The abbreviations L and S in the table depicted the Large and Small countries respectively. On the other hand, K/L represented the capital-labour ratio. The first two rows provided informative summary of the number of products exported from the large EU- countries and small EU-countries to the ACP. Based on the table, a considerable variance between both groups of counties was observed. The data showed that the exports ranged from 8 to 3442 and 1 to 2411 products for large and small countries. Besides that, the mean value of the export was higher in large countries than in small countries. In general, the mean and standard deviation of trade openness and capital-labor were higher for small countries.

Table 3. Descriptive Statistics for Panel Data

Variable	Obs	Mean	Std.Dev.	Min	Max
Export-L	6864	592.138	714.359	8	3442
Export-S	6864	148.74	327.795	1	2411
TO-L	6864	60.094	10.345	45.609	85.875
TO-S	6864	157.504	65.989	82.208	382.291
K/L-L	6864	3525.622	2489.715	-1463.005	11076.72
K/L-S	6864	5456.093	5361.282	-1661.402	23860.83
Exchange-L	6864	102.711	6.832	95.135	125.723
GDP-L	6864	2.39e+12	6.30e+11	1.23e+12	3.56e+12
GDP-S	6864	3.06e+11	2.67e+11	7.40e+09	8.57e+11
Ratioexport	6864	27.516	57.541	0.061	877
RatioTO	6864	0.431	0.15	0.146	0.88
RatioK/L	6864	1.076	6.532	-55.414	121.428
RatioGDP	6864	34.968	57.229	1.635	429.369
logratioexport	6864	2.028	1.64	-2.803	6.777
logratioTO	6864	-0.907	0.378	-1.925	-0.128
logratioK/L	6864	0.692	1	-4.708	5.492
Logexchange-L	6864	4.63	0.062	4.555	4.834
logratioGDP	6864	2.622	1.322	0.492	6.062

Source: Research finding.

5. Results and Discussion

Table 4 depicts the estimate results based on three distinctive models: pooled ordinary least square (OLS), random effect model (REM), and the fixed effect model (FEM). The trade openness index, which is commonly used to measure trade openness was represented by the sum of export plus import and divided by GDP. Therefore, the index indicated that small countries were more open than large countries (refer to Table 2 Min & Max TO-L and TO-S). The results of the trade openness ratio in column 5 illustrated a 0.42% coefficient and a 10% significant with the negative sign, which depicted the advantages of small counties over large countries. For example, it shows that small countries were competitively more globalized and had exported more after they entered the bloc enlargement. This result is in line with Dalton (2017) which found an average increase of 85% export from Cyprus to Austrian compared to 34% export of Czech Republic to Austrian. Some reasons were related to the whole idea that economic openness generally benefitted the total factor of productivity and improved the term of the trade (Alcalá and Ciccone, 2004; Miller and Upadhyay, 2000). Secondly, the evidence from the magnitude of trade openness in Italian firms' showed

that the open industries had smaller dispersion of costs across active firms, and possessed smaller average cost too (Del Gatto et al., 2008).

Badinger and Breuss (2006) had pointed out that trade in manufacturing goods is considerably intra-industry and therefore, it does not leave any advantages of the endowment factor for both small and large countries and even for countries with similar endowment factors. In a similar vein to Badinger and Breuss (2006) the present study had deemed the ratio of capital-labor to be insignificant. The reasonable explanation is the similar intra industrial nature of manufacturing that negate factor endowment in trade patterns between two countries. The real exchange rate sign was insignificant and has not shown a meaningful change in the state of competitiveness between large and small countries during sampling. In other words, this indicates the similarity in competitiveness and no price differences between large and small countries. Previous studies such as Badinger and Breuss (2006; 2009) reported mixed results.

The expected results pertaining to the ratio of GDP showed a positive sign, which signified the vital role GDP played in increasing the trade. Besides that, the GDP positive sign was also compatible with the concept of gravity model. The GDP in the model captured the changes in relative sizes. The coefficient of the Dummy variable, which was the primary interest of the present study was illustrated in Table 3. The Dummy variable depicted a coefficient significance of 10% and an overall negative sign of 676-panel groups that indicated the benefits of the small country over the large country in terms of trade enlargement. The result of fixed effect without country effects in column 4 was identical to the Least Squares Dummy Variable (LSDV).

Table 4. The Estimated Results From Panel Fixed And Random Effects (Effect Of Bloc Enlargement On Extensive Margin)

(1) Variable name	(2) Pooled OLS	(3) Random Effects	(4) Fixed Effects	(5) Fixed Effects without Hetero & Serial Correlation	(6) LSDV	(7) Fixed effect without outliers	(8) Fixed effect without outliers, Hetero & Serial Correlation
logratioTO	-0.589*** (0.036)	-0.489*** (0.074)	-0.424*** (0.102)	-0.424*** (0.146)	-0.424*** (0.102)	-0.011 (0.079)	-0.011 (0.104)
logratioK/L	0.047*** (0.014)	-0.005 (0.007)	-0.003 (0.007)	-0.003 (0.009)	-0.003 (0.007)	-0.004 (0.006)	-0.004 (0.007)
Logexchange-L	3.006*** (0.230)	0.202 (0.144)	0.100 (0.148)	0.100 (0.217)	0.100 (0.148)	0.349*** (0.114)	0.349** (0.150)
logratioGDP	0.860*** (0.010)	0.851*** (0.029)	0.695*** (0.118)	0.695*** (0.180)	0.695*** (0.118)	0.812*** (0.094)	0.812*** (0.115)
Dummy	0.074** (0.030)	-0.052*** (0.015)	-0.065*** (0.018)	-0.065*** (0.024)	-0.065*** (0.018)	-0.080*** (0.014)	-0.080*** (0.019)
Country effect					F(99, 6760) = 16.57 (0.000)***		
Breusch–Pagan test	21461.80 (0.000)***						
Hausman test			33.11 (0.000)***				
Xtoverid test			48.518 (0.000)***				
Observation	6864	6864	6864	6864	6864	6427	6427
Multicollinearity (vif)			1.05			1.05	
Heteroskedasticity			4.5 (0.000)***			5.0 (0.000)***	
Serial correlation			56.967 (0.000)**			116.594 (0.000)***	

Source: Research finding.

Note: The models were estimated using fixed effect and random effects Stata xtreg commands. The number in parentheses was represented by Standard error, except for the Breusch–Pagan test, Hausman test, Xtoverid test, Heteroskedasticity, and serial correlation test, which were p-values. * indicated the significant level at 10 percent, ** significant level at 5 percent, and *** significant level at 1 percent.

The Hausman test, which was chosen between fixed and random effects showed that the variance of the coefficient differences was not positive definite. This indicated that the result of the Hausman Test might not be viable. Hence, to solve this problem, the present study employed the artificial-regression form of the Hausman test to examine specific regressors. The test chosen between fixed random effects could also be viewed as a test to over-identify restrictions imposed by the RE. Additionally, the rejection of the null hypothesis or small p-value signified that the fixed effect model was preferred and the RE was inconsistent based on the overidentifying restrictions xtoverid test by Schaffer & Stillman (2006) and the theoretical explication by (Arellano, 1993) and Wooldridge (2002: 290-291). The diagnostic check conducted on the models resulted in a zero multicollinearity problem with a vif mean less than (1.07< 5). Nevertheless, the study faced a heteroscedasticity problem since the p-value of the Wald test was less than 5%, which meant the variances were inconsistent. Wooldridge (2002) and Drukker's (2003) test on serial correlation in the panel data showed that there was a serial correlation in the model where the statistical significance of the p-value was less than 5%. Based on estimations, the founded autocorrelation and unobserved heteroscedasticity had been corrected by adjusting standard error via the clustered standard error for countries. The study also performed the cook's distance test to consider the outlier observations of the dependent variable taking into account the biases that rose from those outliers with unique values.

Properly, the results of the main variable did not change even after the observations with unique values had been removed. Nevertheless, the controlled variable such as real exchange rate with a relatively low coefficient played a significant role and positively indicated the benefits in favor of the small countries compared to the large countries. An increase in the real effective exchange rate of a large country will decrease a large country's international competitiveness because it is associated with more expensive exports. The trade openness possessing a moderate coefficient of 0.01 with a negative sign and exhibited an insignificant effect after removing the outliers . This could have presumably resulted from the samples that included large and small countries in the EU export to ACP countries with a high ratio. An outlier might have indicated a sample of peculiarity when the value of the dependent-variable was unexpectedly given its value based on the explanatory variables. Hence, the sample revealed that the large countries possessed an imperatively higher capacity based on the number of products exported in comparison to the small countries. Table 3 illustrates the summary statistic for this data.

6. Conclusion

The fixed and random effect model was utilized to test Casella's (1996) hypothesis, and analyze the increase in the margins of trade between large and small European countries to 22 ACP countries from 2004 to 2014. Previous studies had implicitly concluded the positive effects of regional integration on the extensive margin with different models. Therefore, those results and conclusions served as the foundational outcome of the present study. Firstly, the present results corroborated Casella's (1996) hypothesis that small countries had an advantage over large countries for the HS trade data disaggregated at 6 digit level products exported by the European Union to the ACP countries. However, the benefits of EPA for the small countries over large countries in the EU showed a moderate coefficient. It implies that small countries relatively are in a better position to diversify the range of exporting products under bloc enlargement. Next, in spite of a country's size, the present study also reckoned that GDP played a vital role in identifying a favoring mechanism. Although larger market access did benefit the small countries, other forces such as GDP played a part in supporting the benefits reaped by the large countries. Higher GDP favours large countries; therefore, countries with higher GDP expect to have more export post-market expansion. This finding, therefore, supported Badinger and Breuss' (2006) study. Finally, despite the initial result of the benefit of trade openness for small countries, the present study's finding can not draw a firm conclusion about the favoring mechanism of trade openness.

This paper had several limitations that should be taken into consideration. Firstly, the duration of EPA was targeted towards 79 ACP countries were involved in the agreement. Nevertheless, this study did not include all the countries because of the insufficient data obtained from many countries. Secondly, the duration or timeframe which was employed to cover the present study did not depict all the effects that could be accompanied by the EPA. Therefore, a comprehensive study is needed to add other structural factors in the future to portray an extension from what the present study had covered. Finally, the future studies should also investigate the effects of other regions such as the emerging economies to form an extensive representation of Cassella's model. From the policymaking perspective, predicting the pattern of trade after joining trade bloc could be a substantial factor in determining the gain from trade for policymakers in developed and developing countries. More specifically, the study's findings urge policymakers to pay more attention to the size of the country in improving the formulation of trade agreements in line with their benefits for different groups of countries.

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Appendix

Table A1.

European Union Large Countries	**European Union Small Countries**		**Africa Caribbean Pacific Countries**	
France	Cyprus	Netherland	Ghana	Antigua and Barbuda
Spain	Ireland	Denmark	Dominica	Cameroon
Germany	Latvia	Belgium	Guyana	Mauritius
Italy	Malta	Luxemburg	Namibia	Saint Christopher and Nevis
United Kingdom	Slovakia		Seychelles	Saint Vincent and Grenadines
			Saint Lucia	South Africa
			Belize	Dominican Republic
			Jamaica	Bahamas
			Swaziland	Fiji
			Botswana	Zimbabwe
			Papua Guinea	Grenada