Is the Gravity Model applicable in Albania and the Mini Schengen Zone?

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The purpose of the study is to determine if the Gravity Model is applicable in the Albanian economy and conforms to the economic theory. This study offers a timeline of the historical changes that brought about the commerce liberalization and the integration of the country into organizations and trade agreements that have facilitated significant growth. This study employs an original panel data regression of the Gravity Model focusing on exports between Albania and its European reported trade countries during 2003-2019. The Model supports the theoretical framework and demonstrates how GDP and FTA's positively impact export, while distance negatively impacts export. In addition, this study also discusses the *Mini Schengen Zone*. The Model also supports the economic theory, proving that GDP impacts positively the export flows and distance negatively. However, the impact of Free Trade Agreements (FTA) on export flows was not significant.

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Introduction

Trade is as ancient of a concept as the birth of civilizations. Scholars have contributed to the field of international trade, through the creation of many theories that address, analyze the mechanisms and reasons for these relations among countries (Akira1972, Leamer & Levinsohn 1995). For instance, Voica et al. (2021) concludes that the FDI's impact of foreign trade of the host country depends on the type of investment and absorptive capacity of the receiver, the economic development of host and home countries, and not every type of FDI leads to more trade. This is in line with the findings of other studies (Hysa & Mansi 2021, Iacovoiu & Panait 2014, Panait & Voica 2019). One of these theories that has gained traction in the last few decades is the Gravity Model of International Trade.

Gravity models, stemmed from Newton's law of universal gravitation (1687), are defined as 'Newton's law of gravitation, statement that any particle of matter in the universe attracts any other with a force varying directly as the product of the masses and inversely as the square of the distance between them.' These models are utilized in diagnosing socio-economic phenomena. The gravity model has also been applied to analyze tourism (Khadaroo & Seetanah 2008), agriculture (Atif, Haiyun & Mahmood 2017), transportations (Christie 2002), territorial analysis (Crooks & Schuurman 2012), and migration

(Vanderkamp 1977), among others. However, we wish to examine the model in the context of international trade.

In economics, the Gravity Model has been beneficial in addressing bilateral flows, its determinants ranging from tariffs, non-tariff obstacles to trade agreements that played a role in establishing an influx of these flows. However, these are not the only influences, which can be accounted for. "Unconventional" determinants such as cultural ties or disparities, diversities in languages spoken, historical links, bureaucratic challenges, contrasting technologies etc. have also proven to impact these flows. As a theory, stemming from Newtonian concepts, the size of the economies and distances, are the two central factors expressed in the gravity equation (Anderson 1979). Although, previous research has touched upon such issues, Albania is yet to conduct an in-depth study utilizing the Gravity Model.

Albania is an ideal setting to test the Model as it has faced its fair share of trials and tribulations relating to international trade. After being marked by a long period of communist regime and restricted trade policies, it implemented a set of more unconstrained economic policies in 1990s which initiated the transition that impacted foreign trade. The country's foreign trade policies are considered to be liberal. These policies to do not encompass quotas and large-scale constraint and they do not require special licensing. Further, the country relies on an uncomplicated system of customs taxes unlike other nations in the territory. Kraja and Sejdini (2014) have demonstrated that international trade is more contingent on limitations of domestic supply, rather than by external ones. It would be interesting to address the inconsistencies relating to domestic producers to assess the trade obstacles.

The purpose of the study is to test if Albania conforms to the economic theory of the Gravity Model using the European export data, and determine factors that support Free Trade Agreements. Further, due to the many initiatives (bilateral agreements with Balkan countries) undertaken by the Government of Albania to further incentivize and promote trade flows and relations in the Western Balkan area—*Mini Schengen Zone*—this study also aims to evaluate whether the added regional economic integration adds value to international trade.

Literature Review

The Gravity Model states, "Interaction between large economic clusters is strong between smaller ones, and nearby clusters attract each other more than far-off ones" (Bergeijk & Brakman 2010). The notion does lend itself to ambiguity, and for the longest of times as a theory, it had been largely disregarded by scholars due to its lack of strong theoretical roots. However, this has not halted its rise into becoming the go-to theory in international trade studies. The majority of the empirical studies has employed the model to interpret and forecast bilateral commerce. Tinbergen (1962) and Pőyhőnen (1963) fused the model in international trade, followed by Linnemann (1966). However, its reputation among academics did start to wane during the 1970's and 1980's primarily due to its vagueness, especially in microeconomics. In a self-contradictory manner though, scholars were able to deduce this theory even from previously well-established economic theories such as the Heckscher-Ohlin model, the increasing returns to scale, and Ricardian models, among others, which in turn did provide an assurance to policy makers (Leamer & Levinsohn 1995).

The applicability of gravity model can easily be justified in terms of international trade. The model proposes that the quantity among two nations is proportionate to their economic size (can be the case of domestic earnings) and inversely related to the distance. As a result, it makes the   prediction that nations which are financially prosperous and in proximity geographically will tend to trade more with each other than with other nations. The gravity model's dominance relates to its empirical robustness when employing it to studies. It is especially adept in the explanation of the variation in bilateral trade (Linders & De Groot 2006). Essentially it articulates that the volume of commerce among nations is expected to be rising in their sizes, as calculated when taking into accounts their domestic earnings, and declining in the

expenses of transportation among them (Braha & Qineti 2017). Policy makers discussed how the gravity equation was sturdy in relation to economic notions. In 1090's, it was utilized to examine the large shifts in the world trade system after the fall of the Iron Curtain and subsequently used by policy institutions to conduct empiric studies on this policy related dilemma.

The early 1990s marks the initiation of Albania's market economy transition. This passage from communism into a free market system was an unprecedented event that came with trials and tribulations. The reforms undertook at the early stages of this change promoted a sweeping reform resembling that of shock therapy, leading the country's economy to extreme and intense fundamental transformations. Price regulations were revoked, markets were deregulated and the privatization procedures began. A noticeable economic growth, spurred by these reforms, was observed within 1993 and 1996 (with some of the topmost growth rates in comparison to all other transition economies). Nevertheless, the 1997 crisis brought about by the burgeoning financial pyramid schemes collapsed the systems either political and/or economic. Albania observed the disintegration of pyramid investment schemes. The latter proved to be bigger (compared to the economy's size) than any preceding schemes of this sort (Korovilas 1999). Thus, the country plummeted into an unprecedented profound economic crisis. The above-mentioned consequences produced riots and civil anarchy which lead the nation to the brink of civil conflict. The episodes became lessons on the calamity of market and institutional decline. The 2000s brought about a constant economic growth, which is also credited to the integration into international markets (Hysa & Hodo 2016). The advancement in trading links and the boost of foreign capital investments within the national economy sustained the expansion prospects of Albania. These new trade links paved the way for increased cooperation regionally and other more distant partners.

Cooperation, collaboration and unification among the countries of the Western Balkan is a crucial element to consider when considering economic and trade relations among them. Therefore, the heads of state of Albania, Serbia and Macedonia have come to the agreement to promote and ameliorate their liaisons and advance the liberal movement of people and merchandise throughout the territory, by creating a *Mini Schengen Zone*. Moreover, the state representatives have sent a unified message of cooperation to other regional leaders, emphasizing the evidence that the future of the Western Balkans is dependent upon the mutual efforts of all the countries of the area. Especially, inviting Bosnia-Herzegovina, Montenegro and Kosovo to join them as soon as possible and move forward to the project (Shaqiri 2014). The declaration states as a first step the abolishment of border controls and other obstacles to free movement in the region as soon as possible and no later than 2021. In the next section, we formulate three hypotheses relating to the impact of GDP, Distance and Free Trade Agreement (FTA) on Export flows.

Hypotheses Development

Different scholars have used different methods to test the relationship between same variables eg Panel Estimated Generalized Least Square (Feruni & Hysa 2020), Ordinary Least Squares (OLS) method (Kraja & Sejdini 2014), PPP methods (Pere & Ninka 2017). The fundamental repressors are GDP (of Albania and partner countries), Distance (between Albania and partner country) as well as a variable either describing Free Trade Agreements as a whole or focusing more specifically on CEFTA. Kraja and Sejdini (2014) expands on the topic by adding variables such as common border, the GDP per capita for each respective country as well as the difference between these variables is also included. Pere and Ninka (2017) have furthermore broadened the scope by incorporating variables on the industrial development of partner countries, Albania's and the partner countries purchasing power parity, the share of imports to GDP of these countries as well as dummy variables on similar languages whether part of the EU or not.

However, when comparing outcomes of these studies, they observe a direct positive relationship between exports and GDP (be it either GDP per capita, GDP of either country), likewise between exports and FTA or CEFTA. This positive impact on exports extends also to the common language and common

borders, European Union, and large and highly industrialized countries. Unanimously, they report a direct negative relationship between exports and distance of varying magnitudes depending on the methods used.

GDP and Export Flows

Export is an important factor for economic growth, as measured by Gross Domestics Products (GDP) as it directly affects the level of production of goods. The removal of the foreign exchange constraint also affects export (McKinnon 1964) in addition to the availability of the technical information (Grossman & Helpman 1991) and the simplification of the exploitation of economies of scale (Helpman & Krugman 1989). Usually, international trade (exports, imports) is a major element in the economic growth, chiefly for the developing countries with small open economy such as Albania. Over the recent years, Albania made some institutional changes such as the membership to the World Trade Organization (WTO) along with signing various bilateral agreements of free trade with the countries in the region. Consistent with past studies that found a positive link between export and GDP (Feruni & Hysa 2020, Kraja & Sejdini 2014, Pere & Ninka 2017), we hypothesis that the relationship should also hold true in the context of Albanian economy and recent changes to its economic policies. So we propose to test our first hypothesis as follow:

H1. GDP has a positive impact on the export flows.

Distance and Export Flows

Export flows between two nations are precisely comparable to economic *size* and negatively comparable to the square of distance among them (Isard 1975). However, contrary perspectives also exist regarding the relation between distance and exports. Based on the literature of the internationalization process, various activities of the international businesses are affected negatively by the distance, especially the ones which have a primary activity of exporting. According to Ellis (2008), the gained knowledge through international experience leads to increased or decreased in physic distance. Hence, it could be inferred that the experience aids to bridge the gap by diminishing the overestimations and underestimations of the differences. Thus, by addressing the influence of the international experience in the proper way, the relation between these variables could be easily defined. In the case when the perceived differences are high and when firms have a lack of experience on how to adapt with the foreign environment or uncertainty, then the export flows should be affected negatively by the distance. Albania as a developing country with a small open economy with low export intensity, export flows is negatively affected by the distance. Our second hypothesis is:

H2. Distance has a negative impact on the export flows.

Free Trade Agreements and Export Flows

Previously Albania had a centralized economy where assets were publicly owned. Free Trade Agreements contribute to international trade and export. In general, the trade barriers are being removed and the economies opened up for the free flow of capital, labor, goods and services among the countries. As a developing country and embracing a free market economy, Albania adopted trade liberalization policies to attract trade and foreign direct investment (FDI). Over the years, it has signed various bilateral and multilateral trade agreements operates under World Trade Organization (WTO), Stabilization and Association Agreement (SAA) with the European Union (EU), and Turkey, among others. Because of the trade liberalization and the lower trade barriers and regulations, the level of exports will be decreased. In the context of Albania given its small size, import may be a better choice due to the low taxes, tariffs and

quotas than producing and exporting at higher costs. Thus, we hypothesize that Free Trade Agreement and export flows have a negative relation.

H3. Free Trade Agreements (FTA) have a negative impact on the export flows.

Methodology

The models employed to analyze the export flows among Albania and the countries it trades with, are both Random Effects Models (REM) based on the Gravity Model equation. This equation demonstrates the positive relation that GDP and GNI have when accounting for these trade flows, and the negative relation that the distance between nations represents. The gravitational rule is represented mathematically as follows.

$$F_{ij} = G \frac{GDP_i GDP_j}{D_{ij}}$$

Based on the stated equation, *Fij* represents the export flows among Albania and the countries accounted for and G accounts for a constant. The predicted equations from both regression models are expected to exhibit this form:

Log (Exports) = *β0* + *β1* log (GDP) + *β2* Distance + *β3* FTA

Data Specification and Analyses
In this section, we illustrate the econometric model using Gravity Model for Albania which has 32 trading partners from Europe. These countries are all included in the data provided by INSTAT on the European export partner countries. The division and the creation of two sets of models was done to assess whether the volume of exports is impacted by the size of the GDP of the partner countries, the distance between them or by the implementation of FTAs to facilitate trade. We also created a separate specific model for the *Mini Schengen Zone*.

 We utilized panel data from 2003 till 2019 (Feruni & Hysa 2020). Exports (*Xij*) between Albania and the 32 countries were considered as the dependent variable (for the first study) and Albania and five countries, while *GDP* (Gross Domestic Product of partner country), *DISTANCE* (Distance between Albania and partner country) and *FTA* (a qualitative variable, considered a dummy taking on only values of 0 and 1). We used E-views10 software to estimate regression equations. GDP in USD were taken from the World Bank Open Data sources, EXPORT from UN COMTRADE, and DISTANCE in kilometer from DistanceCalculator.net.

 The Unit Root Test is the first test necessary to assess the stationarity of the dependent and independent variables, with the exemption of dummy and distance among nations, as it remains constant and does not vary throughout time ($p < .05$). For both regressions in Tables 1 and 2, following the Unit Root Test, the p-values for log Exports and log GDP are $p < .05$, signifying that they are stationary in level form. Hausman Test also indicated that Random Effects Model is correct to utilize. To detect serial correlation, we captured the auto-correlation in the residual series. For the first model, the differentiated residual series is $p < .05$. While this indicates that the model does suffer from serial correlation, this problem was tackled through the adjustment of the covariance method from Ordinary to White Cross-Section. For the second regression model, the differentiated residual series is $p < .05$, indicating the presence of serial correlation in the residual series. It was tackled by changing the covariance method to White Cross-Section. Next, we conducted the Heteroscedasticity Test in both the models using the manual version of the Breusch–Pagan test. For the first regression, $p < .05$ indicated inconsistency in the model. However, it was corrected with the adjustment of the covariance to White Cross-Section. The second model did not ($p > .05$) suffer from heteroscedasticity.

Table 1. Albania's Gravity Model on Exports, Panel Data

Dependent Variable: LEXPORTS; Method: Panel EGLS (Cross-section random effects)
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (df corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.84	.85	13.90	.00
LGDP	1.26	.17	7.58	.00
DISTANCE	-.00	.00	-7.20	.00
FTA	1.62	.22	7.25	.00
Effects Specification				
			S.D.	Rho
Cross-section random			1.38	.52
Idiosyncratic random			1.33	.48
Weighted Statistics				
R^2	.36	Mean dependent variance		3.55
Adj. R^2	.36	S.D. dependent variance		1.69
Std Error	1.34	Sum squared residual		895.41
F-statistic	95.06	Durbin-Watson stat		.88
P	.00			
Unweighted Statistics				
R^2	.55	Mean dependent var		15.13
Sum squared residual	1768	Durbin-Watson stat		.44

Table 2. Mini Schengen Zone's Gravity Model on Exports, Panel Data

Dependent Variable: LEXPORTS; Method: Panel EGLS (Cross-section random effects)
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (df corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-63.00	17.36	-3.63	.00
LGDP	3.70	.82	4.53	.00
DISTANCE	-.03	.01	-3.80	.00
FTA	.1	.35	.29	.78
Specification				
			S.D.	Rho
Cross-section random			.47	.40
Idiosyncratic random			.58	.60
Weighted Statistics				
R^2	.63	Mean dependent variance		5.39
Adj. R^2	.61	S.D. dependent variance		1.46
Std. Error	.66	Sum squared residual		25.50
F-statistic	33.03	Durbin-Watson stat		.88
P	.00			
Unweighted Statistics				
R^2	.51	Mean dependent variance		16.90
Sum squared residual	86.78	Durbin-Watson stat		.26

Results

Overall both models presented in Tables 1 and 2 are significant (p<.05). The Gravity Models for Albania and its European partner countries, and *Mini Schengen Zone* have an overall explanatory power of 36 percent and 63 percent, respectively. Specifically, the estimated equations are

Albania: log (Exports) = 11.84 + 1.26* log (GDP) – .00* Distance + 1.62* FTA
Mini Schengen Zone: log (Exports) = – 63 + 3.7* log (GDP) – .03* Distance + .1 FTA
*=*p*<.05)

The results indicate that Exports Flow is (1) positive related to GDP (*H1* accepted both), (2) negative related to distance (*H2* accepted both), and (3) positively related to FTA (*H3* rejected (p<.05) for Albania but inconclusive (p>.05) for *Mini Schengen Zone*) though the direction is still positive.

   Our H3 relating to FTA is rejected for Albania but inconclusive for *Mini Schengen Zone*. This result is inconsistent with some past findings. Some studies that supported this negative correlation among the two variables were from Krugman (2018) and Tinbergen (1962). According to the estimations of our model, Free Trade Agreements (FTA) is insignificant in case of *Mini Schengen Zone* regardless of its positive effect on export flows in Albania. It mainly reduces and tries to eliminate the tariffs, helps in minimizing the trade barriers and encourages investment. Free Trade Agreements (FTA) leads to many benefits in an economy. An advantage for the consumers is that the foreign products could be more available at lower prices. Consequencently, the growth that trade and sales will gain, definitely will bring a higher number of employment. Different studies have led to various results whether it is a negative impact or a positive one. In our literature, all the mentioned authors stated the same result which was the negative relation among these variables. Meanwhile, in our model, it resulted a positive impact. Table 3 presents summary of the hypotheses.

Table 3. Expected Impact of Each Variable and Confirmation of the Hypotheses

Hypotheses	Expected sign	Expected direction	Results
H1. GDP has a positive impact on the export flows	Positive (+): (Grossman & Helpman, 1991), (Helpman & Krugman 1985)	Positive (+)	Accepted
H2. Distance has a negative impact on the export flows	Negative (-): Isard (1975)	Negative (-)	Accepted
H3. Free Trade Agreements (FTA) have a negative impact on the export flows	Negative (-): (Krugman 2018, Tinbergen 1962)	Negative (-)	Rejected

Conclusion

This study offers an empirical synopsis of the Gravity Model and its applicability in Albania and its European trading partners and the burgeoning *Mini Schengen Zone*. The Albania Gravity Model was found to be significant. All the variables included in the model appeared to exhibit the expected direction of relation as emphasized by the literature. GDP shared a positive relationship with Exports, while Distance shared a negative relation with Exports. FTA, conformed to the orthodox notion of facilitating trade, and was found in this model to be positively related to Exports. The countries in the European continent are

the main trading partners of Albania with the majority of its export activities being oriented towards European countries. This model further emphasizes the importance of maintaining and strengthening these relations. As an aspiring country on the path towards the European Union, Albania's economy has the potential to additionally expand its export volumes, in turn creating a positive ripple effect throughout all sectors.

The second model concerning the *Mini Schengen Zone* was also significant. The GDP and Distance, as in the first model, had a significant positive effect on the export volumes. However, the FTA in this model was insignificant. This result was to be expected as the countries included in this analysis follow the CEFTA agreement. *The Mini Schengen Zone* with its intent to mimic the European Union's economic cooperation is yet to be well defined and integrated. There are some factors that need to be accounted for that do explain why the creation of this economic zone might not have a successful effect. According to the Gravity Theory, a country with a larger size of the GDP is bound to trade more with countries of a relative smaller GDP size. In the Western Balkan six countries, from the data we can observe that most of them share nearly the same size of the GDP.

Furthermore, when examining the fabric of their economies, and the products that each country tends to produce and export, there is a lack of diversity in the types of products which are often times only differentiated through the different price points. Another obstacle to the success of this economic region is the lack of the fully integrated customs, eliminating once and for all the need for borders when concerned with trading activities. These are concerns that have not yet been considered by policy makers. Nevertheless, this economic zone could be useful if utilized as a direct trading partner with the European Union. The Western Balkan six could potentially cooperate with each other to create a streamlined path for their shared products to enter and comply with the European markets. Such an endeavor has the potential to create a significant economic growth for the whole region.

Implication for Policy Makers

Given our findings, policymakers should develop policies that influence the growth of gross domestic product (GDP). So the production of domestic products would be increased. Secondly, the distance which is the other used variable is negatively related to export flows. An increase in the physical distance decreases exports. The Free Trade Agreement resulted an insignificant though had a positive impact on export flow. The recommendations are also applicable in *Mini Schengen Zone*. There are some concerns which should be addressed. For example, when analyzing, we found that a lack of diversity in the exported products. Customs should be integrated as well.

Directions for Future Research and Limitations of the Study

The lack of available data for the region of the Balkans is a challenge amongst scholars. This article also dealt with this problem. However, it would be beneficial for the region if future studies could examine the potential of the *Mini Schengen Zone* to assess the advantages and disadvantages that it would bring to each of the countries of this region regarding trade relations and the expansion of their respective export potentials.

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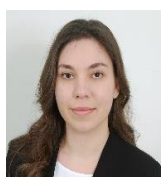
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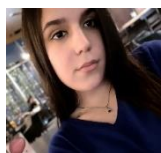
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