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Turkey - Africa trade: A gravity model estimation of determinants

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Abstract. This study investigates the key determinants of trade between Africa and Turkey by using the gravity model of international trade. The major objective is to identify the core socio-cultural and macroeconomic factors of bilateral trade between both sides. Poisson – Pseudo-Maximum Likelihood Estimator is used in order to efficiently test the impact of many dummy variables and fixed effects. The results illustrate that there are geographic, socio-cultural and macroeconomic factors in the African economies and Turkey's side. African countries near to Turkey, sharing similar religion and recorded higher economic growth rates in the last couple of decades have better bilateral trade with Turkey than the others. Besides, economic freedom improvements in these countries have positive relationship with their bilateral trade. On the other hand, improvement in corruption level of Turkey, increasing its ODA donation and opening commercial consulates in African countries are the positive factors of its bilateral trade with Africa. However, there is no statistical evidence to say Turkey's trade with Africa is for the purpose of natural resources.
Keywords. Turkey, Africa, Foreign Trade, Gravity Model.
JEL. F01, F14, F19.

1. Introduction

In the past couple of decades some important macroeconomic realizations have been recorded in many parts of the world. Africa has many of the fast - growing economies of the world which recorded high rate of GDP growth in the last couple of decades. Turkey is also one of the major emerging economies of the world which recorded vast economic changes in this period. The total GDP of Africa, for example, was around 630 billion dollars in 2001. It reached 2.2 trillion dollars in 2015 recording more than 3.5 folds increment. Similarly, the GDP size of Turkey reached near to 718 billion in 2015 which is again more than 3.5 folds of its GDP size in 2001. On average, in the last 15 years, the growth of the world economy was 2.56%. However, Turkey and Africa recorded a GDP growth of 4.15% and 4.58% in the same period. Moreover, the GDP per capita income of Turkey and Africa reached 9,126 and 1,914 dollars in 2015 from 3,054 and 756 dollars in 2001 respectively.

Based on the UNCTAD figures, in terms of trade, the total exports of Turkey reached approximately 142 billion dollars in 2016 from 31 billion in 2001 and 113 billion in 2010. Its share of world exports improved from 0.5% in 2001 to

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approximately 0.9% in 2016. Similarly, the total imports of Turkey increased from 41 billion dollars in 2001 to nearly 185 billion in 2010 and 199 billion dollars in 2016. Its share of world imports reached 1.2% from about 0.65% in 2001. On the other hand, the exports of Africa have also increased from 139 billion dollars in 2001 to 346 billion last year. It share of world exports, in fact, did not improve significantly. It was 2.24% in 2010 and reached 3.4% and 2.16% in 2010 and 2016 respectively. However, the imports to Africa have increased significantly from 135 billion in 2001 to more than 500 billion in 2016. In the same span, its share of imports increased by 1% rate.

Because of the economic growth of the continent and its macroeconomic outcomes, Africa is now attracting new economic partners such as the BRICS and other emerging economies. Turkey is one of these new partners of Africa. Its exports to Africa reached roughly 12.5 billion dollars from only 1.5 billion dollars in 2001. Its import of African goods has also increased from 2.8 billion to 5.1 billion dollars in the same period. Therefore, in this study, the major objective is to assess the determinants of the ever increasing trade between both sides. Is the improving trade between them pushed by the macroeconomic changes in Turkey or mainly attracted by the macroeconomic improvements in Africa? The study attempts to answer this question by employing the gravity model of international trade.

2. Methodology

2.1. The Gravity Model

In this study the traditional gravity model of direct and simple equation is employed. This model helps to assess the main determinants of trade and investment between the Africa and Turkey. The basic form of the gravity equation of international trade is:

$$T_{AB} = \frac{GDP_A^{\alpha} GDP_B^{\beta}}{D_{AB}^{\theta}}$$

Where, T_{AB} indicates bilateral trade between country *A*, and *B*; GDP_A and GDP_B indicate the economic size of country *A and B*, and D_{AB} indicates the bilateral distance between the two countries. The parameters α, β and θ are often estimated in a log-linear reformulation of the model (Bergeijk & Brakman, 2010).

The theory behind the gravity model is that big nations in economic size have bigger foreign trade between each other. They also have the capacity to attract large shares of other countries ' spending because of their range of product types. Moreover, according to the gravity model, it is expected that as distance increases, the trade amount between any two countries is, other things equal, diminishes (Krugman & Obstfeld, 2009). In this study, an improved gravity model is used with the following equation:

$$\begin{aligned} lnBilTrade_{TrAft} = {} & \beta_0 + \beta_1 lnGDP_{Trt} + \beta_2 lnGDP_{Aft} + \beta_3 lnDist_{TrAf} \\ & + \beta_4 lnPI_{Aft} + \beta_5 InODA_{Aft} + \beta_6 lnAllTrade_{Aft} + \beta_7 InFuelEx_{Aft} \\ & + \beta_8 InOMEx_{Aft} \\ & + \beta_9 lnPI_{Trt} + \beta_{10} lnAllTrade_{Trt} + \beta_{11} InODA_{Trt} \\ & + \beta_{12} InFDIpos_{TrAft} \\ & + \beta_{13} ComRelig_{TA} + \beta_{14} NrAf_{Af} + \beta_{15} ComCons_{Af} + \beta_{16} TrAg_{TA} \\ & + \beta_{17} CPI_{Aft} + \beta_{18} CPI_{Trt} + \beta_{19} InEFI_{Trt} + \beta_{20} InEFI_{Aft} \end{aligned}$$

Where:

$BilTrade_{TrAft}$: Bilateral trade between Turkey and Africa in year t

GDP_{Trt}: GDP size of Turkey in year t

GDP_{Aft}: GDP size of African country in year t
$Dist_{TrAf}$: Distance between the capital city of Turkey and the African country
$PI_{Aft:}$ Per capita income of the African country in year t
$ODA_{Aft:}$ Official Development Assistance to the African country in year t
$AllTrade_{Aft}$: Overall trade volume of the African country in year t
$FuelEx_{Aft}$: Share of fuel to the export of the African country in year t
$OMEx_{Aft}$; Share of ores and metals to the export of the African country in year t
$PI_{Trt:}$ Per capita income of Turkey in year t
$AllTrade_{Trt}$: Overall trade volume of Turkey in year t
$ODA_{Trt:}$ Official Development Assistance donation of Turkey in year t
$FDIpos_{TrAft}$: Outward FDI positions of Turkey in the African country in year t
$ComRelig_{TA}$: Common religion in Turkey and the African country (Dummy)
$NrAf_{Af}$: Location of the country in Northern Africa (Dummy)
$ComCons_{Af}$: Commercial consulate of Turkey in the African country (Dummy)
$TrAg_{TA}$: Trade Agreement between both sides (Dummy)
CPI_{Aft}: Corruption Perception Index of the African country in year t
CPI_{Trt}: Corruption Perception Index of Turkey in year t
EFI_{Aft}: Economic Freedom Index of the African country in year t
EFI_{Trt}: Economic Freedom Index of Turkey in year t

The equation has five groups of variables. The first line indicates the core form of the gravity model with only GDP sizes and distance. In the second and third lines, additional related macroeconomic characters of the African countries and Turkey are included. In the fourth line, dummy variables of having a common religion, any type of trade agreements, opening commercial consulates and the location of the African country in the North African regions are incorporated. The last line forms corruption and economic freedom indexes of both partners.

Next to the core variables of the gravity model, this study gives emphasis on the socio-cultural and regional location variables, the importance of natural resources and economic performance of the partners. Accordingly, the dummy variables of a common religion, location in the North Africa and having commercial consulates of Turkey form the socio-cultural factors. This is because North African countries have strong historical and cultural linkages with Turkey and Turkey opened commercial consulates mainly with countries of long-time partnerships.

One of the arguments in the literature is that the need for a natural resource in general and petroleum and minerals, in particular, is the major determinant of FDI and trade with Africa both from the old and new partners (Fung & Garcia-Herrero 2012; and Ngouhouo, 2013). Therefore, the dummy variables of FuelEx and OMEx help to test this hypothesis. Moreover, the EFI helps to test if economic freedoms, including property rights, fiscal freedom, government spending, business freedom, trade freedom and some other issues have an impact on the bilateral trade (Yu, 2010; Abidin *et al.,* 2013; and Narayan & Nguyen, 2016).

2.2. Estimation Techniques

Primarily, the Hausman Test is conducted to decide whether the fixed effect or random effect regression of panel data are appropriate. The results indicate that fixed effect is more suitable for this model. However, using the fixed effect excludes all the dummy variables and distance since they are time-invariant variables. Considering the importance of including these variables to the study, the Poisson – Pseudo-Maximum Likelihood Estimator is employed. This method was introduced by Silva and Tenreyro in 2006 and provides consistent estimates of the gravity model. This estimator is consistent in the presence of fixed effects and it includes observations with zero value which habitually happens in bilateral trade (Shepherd, 2012).

3. The development of Turkey - Africa relations

Turkey has a long-time historical attachment with Africa. The relatively strong relation with North Africa countries is because of the hefty economic, social, cultural and political ties of the Ottoman Empire with the continent. The Ottomans were successful to start strong economic relations with Africa when they first reach in the lands of Egypt in 1518. The strategic trade link of this location with Europe, its fertile land, and its large population gave them strategic and economic advantages. Through time, their economic bond has extended to Libya, Tunisia, Algeria and other close by Sub-Saharan African countries such as Sudan, Eritrea, and Ethiopia. Moreover, they sustained to form economic interaction with several Western and Central African nation states of present day Nigeria, Niger, and Chad. These all links formed an immense benefit for both sides to trade generously (Enwere & Yilmaz, 2014).

However, the relationship started to turn down in the 18th century due to the spreading out of Europeans and their products. The European capitalism approach of production started to substitute the customary Ottoman economic method at that time. Therefore, African states, such as Egypt, preferred to take up the new capitalist ideas, values and technological products of Europe. Finally, when the Ottoman Empire collapses, the economic relations reached its lowest level (Enwere & Yilmaz, 2014). Consequently, Turkey's relation with Africa was limited to some diplomatic contacts until the end of the WWII. However, a new period of cooperation started as Turkey joined the United Nations in 1946 and NATO in 1952 (Ipek & Biltekin, 2013).

At this time, cooperation with Africa is taken as one of the strategic directions of Turkish foreign policy. Turkey's opening policy to Africa was initiated when the country announced the 1998 Action Plan. Likewise, the Undersecretariat for the Foreign Trade designed a strategy on Development of the Economic Relations with African Countries in 2003. Additionally, the Turkish government announced the year 2005 to be a "Year of Africa". The cooperation of both sides has amplified yet again since 2008 after the affirmation of Turkey as a partner of Africa by the African Union. Immediately, the first Turkey-Africa Cooperation Summit followed the partnership announcement in 2008. Afterward, a follow-up method was formed and high – level meetings conducted in the subsequent years. In 2014, the Second Turkey-Africa Partnership Summit held in Equatorial Guinea (Ministry of Foreign Affairs of Turkey, 2017).

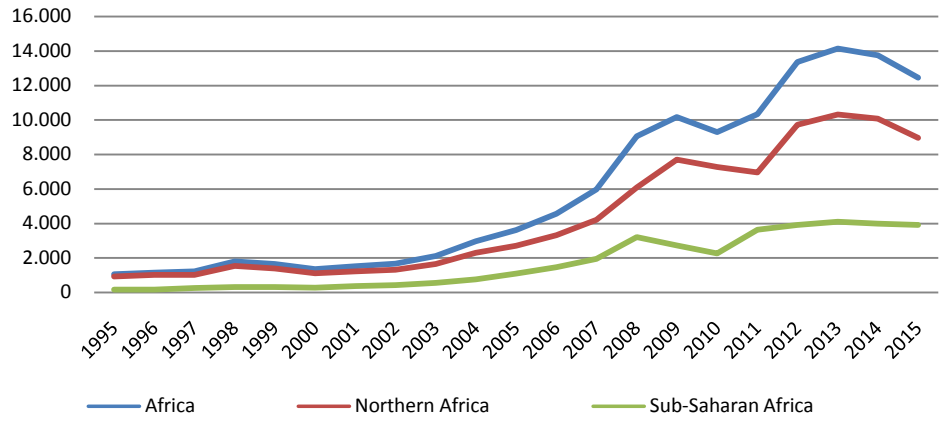
In the areas of diplomatic and development cooperation, the cooperation between Africa and Turkey has drastically enlarged. In the diplomatic part, the number of Turkish Embassies in Africa reached 39 from 12 in 2009. Correspondingly, the number of African countries' embassies in Ankara increased from 10 to 32 recently. In the development cooperation, the Turkish International Cooperation and Development Agency (TIKA) is now in service in 15 African nations. Turkish Official Development Assistance (ODA) to Africa, mainly through TIKA, reached 383.3 million dollars in 2014 and 183 million dollars in 2015. Besides, the number of African students in Turkey is was around 5437 in 2016. Only in the 2015/16 academic year, 1239 African students got Turkish government scholarships in various disciplines.

Back to the specific economic relations in the last couple of decades, the economic share of Turkey in Africa has been radically mounting. The opening of commercial consulates in 26 African capitals to ease the economic ties is one of the attentions given to this ever increasing trend. Besides, Turkey has hosted several economic summits in Istanbul and other cities attended by high – profile businesspersons and government delegates.

Such progressive economic partnership can be clearly explained by the trade figures. The exports of Turkey to Africa, for example, reached roughly 12.5 billion dollars in 2015 from around 1.5 billion dollars in 2001. Likewise, its import from Africa has doubled from 2.8 billion to about 6 billion dollars in 2014 and 5 billion

dollars in 2015. These figures show that the export amount has augmented by above 8 times and its import has doubled in 15 years.

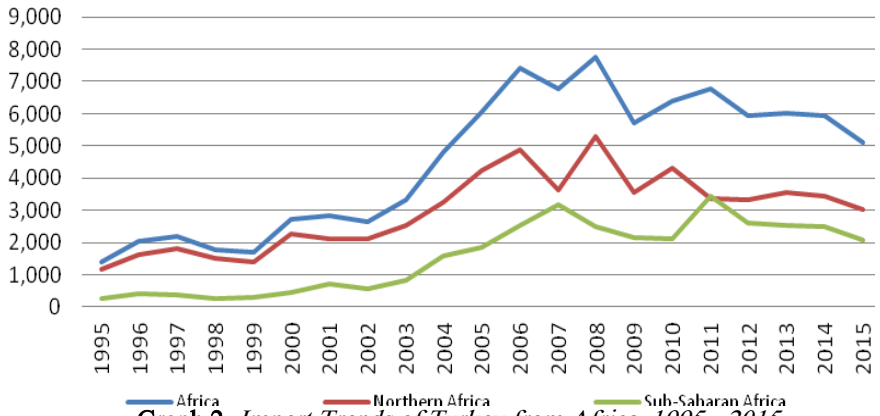
However, there is unevenness in Turkey's trade with Africa. Northern Africa countries have higher bilateral trade than Sub-Saharan countries which resulted from the historical economic and cultural ties. In 2015, for example, North African countries got about 72% of the total Turkish exports and 59% imports from Africa whereas the Sub-Saharan African countries covered the remaining 28% of exports and 41% of imports. The general trend of Turkey – Africa bilateral trade is depicted in Graph 1 and 2.



Graph 1. E*xport Trends of Turkey to Africa in Million USD, 1995-2015*
Source: Extracted from UNCTADSTAT database

The export of Turkey to Africa has been continuously rising at increasing rate. Nevertheless, both imports and exports have a considerable declining propensity since the economic crisis period of 2008/9. Despite this tendency, the share of Sub-Saharan African countries is gradually growing while the share of North African countries is reducing. In the last 5 years, the Turkish export to Sub – Saharan Africa countries is moderately steady whereas the export to North African countries is waning.

On the other hand, the imports have declining trends for both groups but with repetitive ups and downs in the imports from North African countries. The imports from Africa to Turkey increased by about 1.8 times. Particularly, the increment rate for North Africa and Sub-Saharan Africa are roughly 1.4 and 3 folds respectively. These trends imply that the bilateral trend of Turkey with Sub –Sahara African economies is rising at a higher rate than North African economies. The details are depicted in Graph 2.



Graph 2. *Import Trends of Turkey from Africa, 1995 - 2015*
Source: Extracted from UNCTADSTAT database

The main export items of Turkey to Africa are mainly manufactured or processed products such as iron and steel bars, meal and flour of wheat, petroleum oil and construction materials. African countries, in return, export mainly raw products and minerals such as coal, cocoa, oil seeds, copper, aluminum and tobacco products. In 2015, the total exports of Turkey to Africa were 3.9 billion dollars whereas its imports from Africa were approximately 2.1 billion dollars. The major ten export items of Turkey to Africa cover 44% of its total exports while the major ten import items from Africa cover roughly 80% of the total imports. This implies that African exports to Turkey are very concentrated on some products. The main import and export items are presented in Table 1.

Table 1. *Top 10 Export and Import Items of Turkey–Sub–Saharan Africa Trade in Million USD, 2015*

	Import Items from Africa to Turkey	Amount in Million $		Export Items from Turkey to SSA	Amount in Million $
1.	Coal, whether or not pulverized, not agglomerated	405	1.	Iron & steel bars, rods, angles, shapes & sections	342
2.	Cocoa	400	2.	Meal and flour of wheat & meslin	302
3.	Oil seeds and oleaginous fruits (excluding flour)	203	3.	Cereal preparations, flour of fruits or vegetables	288
4.	Copper	159	4.	Petroleum oils or bituminous minerals > 70 % oil	168
5.	Pumps (excluding liquid), gas compressors & fans	115	5.	Lime, cement, fabricated construction materials	156
6.	Aluminum	105	6.	Structures & parts of iron, steel, aluminum	130
7.	Tobacco, unmanufactured; tobacco refuse	82	7.	Paper & paperboard, cut to shape or size, articles	100
8.	Cotton	80	8.	Edible products and preparations	94
9.	Gold, non-monetary (excluding gold ores and concentrates)	55	9.	Equipment for distributing electricity	79
10.	Ferrous waste, scrape; re-melting ingots, iron, steel	47	10.	Articles of plastics	65
	Total All Products	2,092		Total All Products	3,917

Source: Extracted from UNCTADSTAT database.

However, Turkey's exports to North African countries are relatively different from the Sub –Saharan Africa countries. The main export items to these countries are petroleum oil, iron and steel products, vehicles for the transport of persons, furniture products, and household equipment and cotton fabrics whereas its imports are manufactured, processed or semi-processed products such as petroleum gasses, petroleum oil, plastic products, chemical products, vehicles, fertilizers and textile yam. In 2015, Turkey's export to the region was around 8.9 billion dollars and its import was almost 3 billion dollars. This illustrates that some North African countries have a higher bilateral trade than the other majority African countries. Moreover, the imports and exports of Turkey to North African countries are comparatively broad in type. The top ten exports and imports cover 63% and 33% of the total export size. Generally, the trade of Turkey with North Africa countries has, to some extent, a characteristic of an intra-industry trade. This is because of the resemblance of import and export products. The major ten import and export product categories of Turkey – North Africa trade are presented in Table 2.

Table 2. *Top 10 Export and Import Items of Turkey – North Africa Trade, 2015*

	Import Items from North Africa to Turkey	Amount in Million $		Export Items from Turkey to North Africa	Amount in Million $
1.	Petroleum gases, other gaseous hydrocarbons	509	1.	Petroleum oils or bituminous minerals > 70 % oil	631
2.	Petroleum oils or bituminous minerals > 70 % oil	249	2.	Iron & steel bars, rods, angles, shapes & sections	613
3.	Other plastics, in primary forms	230	3.	Motor vehicles for the transport of persons	337
4.	Inorganic chemical elements, oxides & halogen salts	201	4.	Furniture & parts	231
5.	Motor vehicles for the transport of persons	197	5.	Household type equipment, electrical or not	229
6.	Fertilizers	134	6.	Floor coverings, etc.	204
7.	Textile yarn	130	7.	Cotton fabrics, woven	192
8.	Gold, non-monetary (excluding gold ores and concentrates)	118	8.	Jewellery & articles of precious materials	189
9.	Cotton fabrics, woven	83	9.	Household equipment of base metal	184
10.	Fabrics, woven, of man-made fabrics	80	10.	Articles of plastics	169
	Total All Products	3,032		Total All Products	8,952

Source: *Extracted from UNCTADSTAT database*

In comparison to other emerging and advanced economies Turkey has generally strengthened its trade with Africa in the last couple of decades. In 2001, Turkey was 22nd export to Africa while France, USA and Germany were the major three exporters to the continent. In 2015, Turkey became the 10th major exporter to Africa whereas China came to the first rank. However, there is a decline in the rank of major importers of African products. Turkey turned down from 13th in 2001 to 16th major importer in 2015. South Africa, Switzerland and United Arab Emirates have performed well to consume more African products than Turkey in those years. There are two possible reasons for the waning in imports of African goods into Turkey largely since 2009. The first one is the 2008/9 global economic crisis and the second one is the political crisis in some North African countries such as Egypt, Libya and Tunisia in the last few years. The major importer and exporter countries are presented in Table 3.

Table 3. *Major Trade Partners of Africa, 2001 & 2015*

	Major Exporting Economies to Africa				Major Importing Economies of African Goods			
	2001	Amount (Bil. $)	2015	Amount (Bil. $)	2001	Amount (Bil. $)	2015	Amount (Bil. $)
1.	France	14.55	China	98.88	USA	22.37	China	41.18
2.	USA	11.50	France	32.28	Italy	14.10	India	27.14
3.	Germany	10.14	USA	30.42	France	12.93	France	23.97
4.	South Africa	8.74	Germany	26.96	UK	9.24	USA	23.81
5.	Italy	8.32	South Africa	26.33	Spain	9.13	Spain	23.16
6.	UK	7.23	India	24.96	Germany	7.31	Italy	20.41
7.	China	5.03	Italy	22.06	Netherlands	4.98	UK	16.69
8.	Japan	4.48	Spain	17.61	Belgium	4.03	Netherlands	15.48
9.	Saudi Arabia	3.68	Netherlands	13.53	China	3.73	Germany	13.63
10.	Spain	3.63	Turkey	13.20	Japan	3.72	Japan	11.53
11.	Belgium	3.11	UK	13.19	Brazil	2.93	South Africa	10.60
12.	Netherlands	3.06	UAE	12.49	India	2.47	Brazil	8.67
13.	Korea Rep.	2.93	Belgium	11.06	Turkey	2.27	Belgium	8.62

Source: Extracted from UNCTADSTAT database

4. Results

Using the fixed effect, random effect and the Poisson - Pseudo-Maximum Likelihood Estimators give completely different results. The random effect is not commonly used in the literature because of its weak features to address the gravity model while a fixed effect is commonly employed but it does not include some dummy variables as they are and thus difficult to test hypotheses in this type of

extended gravity model with many dummy variables related to the major objective. Therefore, the Poisson Pseudo-Maximum Likelihood Estimator gives a better result which is also compatible with the core form of the gravity model.

Accordingly, the core form of the gravity model, which includes only GDP size and distance, has the same feature in this study. An increase in the GDP of the African countries enabled the trade volume to rise slightly but the GDP of Turkey does not have a significant impact on the trade volume. At 5% level of significance, a 1% change in the GDP of an African country created 0.2% additional trade with Turkey. On the other hand, a percentage additional distance reduces trade by 0.03%. This means since distance is directly linked with a cost of transportation, as the cost increases the trade volume is declining.

In the second line of the gravity equation, there are some macroeconomic features of the African countries. The impacts of per capita income, ores and mineral production and ODA volume of the African sides are not statistically significant. However, the overall trade volume and fuel production have a negative association with the bilateral trade. A percentage change in overall trade in the African continent generates 0.05% additional trade with Turkey while 1% change in the contribution of fuel exports to the GDP of the African country reduces the trade with Turkey by 0.007%. The slight impact of overall trade indicates that the bilateral trade between Turkey and Africa is not proportionally growing or there are other countries which are taking the increasing share of trade in Africa. The negative sign on the fuel production may indicate that Turkey has higher trade volume with fuel non-producing countries than fuel-producing countries. This also implies the declining share of Turkey in importing African goods since 2006.

In the same way, the per capita of Turkey and its overall trade are not statistically significant factors of Turkey – Africa trade. However, the ODA size of Turkey is positively related with its trade volume with Africa. Around 0.013% additional trade is created for each 1% increase in Official Development Assistance from Turkey. This implies that the highly increasing ODA flow of Turkey, which is notably benefiting some African countries, is generating extra trade for the country from Africa.

In addition, the dummy variables of a common religion, trade agreements, location in North Africa and having commercial consulate of Turkey have statistically significant impact on the bilateral trade. Countries which practice the same religion with Turkey have more than 4% additional trade than the others. Similarly, countries where there is a commercial consulate of Turkey have about 5.6% additional trade than countries without such consulate. Besides, at 10% level of significance, a country located in the North African has 4.6% additional bilateral trade. Generally, North African countries in which there is a commercial consulate of Turkey have a higher trade than Non-Muslim majority Sub-Saharan countries without commercial consulate of Turkey. Contrarily, trade agreement has a negative impact on the bilateral trade. This implies that either the trade agreements are not applied or they are signed with potential countries but currently have low trade with Turkey.

Finally, there is no evidence that Turkey's trade with African countries is related to their level of corruption. However, the improvement in corruption level of Turkey has a positive impact on the trade with Africans at 10% level of significance. In the other side, the improvement in the economic freedom of Turkey has a negative impact. A 1% improvement in CPI increases trade by 0.11% but the same change in EFI reduces trade by 0.25%. In contrary, the improvement in the EFI of African countries has a positive impact on the trade volume.

Table 4. *Estimation Results of the Study*

	Random Effect	Fixed Effect	PPML
LogDist	-1.3421 (0.7386)*	---	-0.0335 (0.0089)***
LogGDP_Af	0.2320 (0.3251)	2.7899 (1.9518)	0.0228 (0.0114)**
LogGDP_Tr	7.9835 (4.2694)*	2.7912 (6.7052)	0.3079 (0.2390)
LogPI_Tr	-7.5639 (4.6001)*	-2.2812 (6.9993)	-0.3759 (0.2819)
LogPI_Af	0.2839 (0.2354)	-2.9319 (2.0227)	-0.0003 (0.0097)
LogAllTrade_Tr	0.2547 (0.5523)	0.2286 (0.5329)	0.0249 (0.0486)
LogAllTrade_Af	0.9837 (0.3408)**	1.0876 (0.3806)**	0.0499 (0.0162)**
LogFuelEx	-0.0075 (0.0178)	-0.0073 (0.0195)	-0.0071 (0.0019)***
LogOMEx	-0.0542 (0.0524)	-0.0802 (0.0572)	-0.0024 (0.0017)
LogEFI_Tr	-0.4232 (1.1549)	-0.4589 (1.1576)	-0.2513 (0.0994)**
LogEFI_Af	1.3209 (0.6537)**	1.5125 (0.8011)*	0.2325 (0.0532)***
LogCPI_Tr	-0.8573 (0.7636)	-0.9895 (0.9171)	0.1092 (0.0631)*
LogCPI_Af	-0.5329 (0.3645)	-0.5648 (0.3921)	-0.0253 (0.0158)
ComConsDum	0.7560 (0.4115)*	---	0.0559 (0.0153)***
NrAfDum	-0.0684 (0.9989)	---	0.0455 (0.0234)*
CoReligDum	0.4642 (0.3754)	---	0.0431 (0.0220)**
TrAgrDum	0.0597 (0.4229)	---	-0.0480 (0.0074)***
LogODA_Af	-0.0297 (0.0729)	0.0058 (0.0807)	-0.0052 (0.0043)
LogODA_Tr	-0.0549 (0.1117)	-0.0562 (0.1164)	0.0128 (0.0061)**
LogFDIpos_Tr	---	---	0.0048 (0.0031)
FDIpos_Tr	-1.01e-06 (1.34e-06)	-6.82e-08 (1.44e-06)	---
Observations	292	292	63
R-Squared	0.8141	0.5814	0.9586

Notes: *, **& *** indicate 10%, 5% and 1% significance level respectively. The numbers in bracket are robust standard errors; and FDIpos is estimated in log form in the PPML but in level form in the others.

We reject the null hypothesis of being a North African country (H_0: NrAfDummy = 0) with z-value of 1.94 and p-value of 0.052. This indicates that North African countries have a better trade than the Sub-Saharan Africa countries. Similarly, the hypothesis of natural resources (H0: logFuelEx =0, logOMEx = 0) gives a Chi2 of 13.77 and Prob> Chi2 = 0.0010. Therefore, we reject the null hypothesis to conclude that there is statistical evidence which supports natural resource is a factor of Turkey – Africa trade. However, we cannot conclude that Turkey's trade is for the purpose of natural resources since the coefficient of logFuel is negative. Likewise, the hypothesis for the role of socio-cultural factors in trade is H_0: ComRelig = 0. The z-value is again big enough to reject the null hypothesis and say that social-cultural factors also have an impact on the trade between Turkey and African countries.

Finally, we can see that if the improvement in the competitiveness of both partners has an impact on the bilateral trade. Keeping the null hypothesis for Turkey as H_0: logCPI_Tr = 0, logEFI_Tr = 0. The Chi2 is 6.39 and Prob>Chi2 is 0.0410 which signals the rejection of the null hypothesis. The same test for the African sides gives Chi2 is 19.41 and Prob>Chi2 is 0.0001 which again indicates a rejection of the null hypothesis. Moreover, if we take the EFI and CPI differently, the results are almost the same. The H_0: logEFI_Af= 0, logEFI_Tr=0 gives a Prob>Chi2 of 0.0001 but the H_0: logCPI_Af=0, logCPI_Tr =0 gives a Prob>Chi2 of 0.0969 which is rejected only at 10% level of significance. Therefore, we can conclude that the combined and individual improvements in economic freedom index (EFI) and corruption perception index (CPI) of both sides have a strongly positive impact on their bilateral trade.

5. Conclusion

In the last couple of decades, the economic relation of Turkey and Africa has significantly increased. This can be simply proved in the ever-increasing volume of trade. However, the imports from Africa to Turkey has faced a declining trend since the global economic crisis whereas the export to Africa from Turkey is increasing at increasing pace and made the country in the list of top 10 exporters to Africa. This trade expansion has multifaceted factors from both sides. From the

African side, being near to Turkey, sharing the same religion and recording high economic growth have positive impacts on the bilateral trade. Moreover, an improvement in the economic freedom and increasing size of an overall trade in the African countries has also improved the trade with Turkey. However, fuel production is negatively linked with their bilateral trade. From the Turkish side, improvements in corruption perception index, increasing in ODA donation and the opening of commercial consulates in some African countries have improved its bilateral trade with Africans. In contrary, Turkey is not trading more with countries which signed a bilateral economic agreement.

Generally, we can conclude that social-cultural factors, being in the northern Africa, natural resources, GDP growth, increase in overall trade, and improvement in economic freedom and corruption have influenced the bilateral trade of Turkey with Africa. However, there is no evidence to support that FDI position of Turkey is related to its bilateral trade.

Appendix

Table 5. *Variables and Specific Sources of Data*

Variables	Stands for	Sources of Data
LogDist	Distance	https://www.distancecalculator.net/
LogGDP_Af	GDP of African countries	http://unctadstat.unctad.org/EN/
LogGDP_Tr	GDP of Turkey	http://unctadstat.unctad.org/EN/
LogPI_Tr	Per Capita income of Turkey	http://unctadstat.unctad.org/EN/
LogPI_Af	Per Capita income of African countries	http://unctadstat.unctad.org/EN/
LogAllTrade_Tr	Overall Trade of Turkey	http://unctadstat.unctad.org/EN/
LogAllTrade_Af	Overall Trade of African countries	http://unctadstat.unctad.org/EN/
LogODA_Af	ODA to the African countries	http://databank.worldbank.org/data/home.aspx
LogODA_Tr	ODA donation by Turkey	http://databank.worldbank.org/data/home.aspx
LogFuelEx	Share of Fuel export to the total exports	http://databank.worldbank.org/data/home.aspx
LogOMEx	Share of ores and minerals to the total exports	http://databank.worldbank.org/data/home.aspx
LogEFI_Tr	Economic Freedom Index of Turkey	www.heritage.org/index/
LogEFI_Af	Economic Freedom Index of African countries	www.heritage.org/index/
LogCPI_Tr	Corruption Perception Index of Turkey	http://www.transparency.org
LogCPI_Af	Corruption Perception Index of African countries	http://www.transparency.org
ComConsDum	Commercial consulate	http://www.deik.org.tr/turkiye-afrika-is-konseyleri
NrAfDum	North African countries	https://en.wikipedia.org/wiki/North_Africa
CoReligDum	Major common religion	https://en.wikipedia.org/wiki/Religions_by_country
TrAgrDum	Trade/economic agreements	https://www.wto.org/english/tratop_e/region_e/region_e.htm
LogFDIpos_Tr	FDI positions of Turkey in African countries	elibrary-data.imf.org and unctad Bilateral FDI report 2014

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