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The determinants of Tunisia's exports to sub-Saharan Africa: the impact of institutions

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ABSTRACT

The objective of this research paper is to analyze the key factors influencing export flows between Tunisia and sub-Saharan African countries. The study focuses on the impact of five institutional measures: government effectiveness, regulatory quality, control of corruption, rule of law, and political stability, on Tunisia's total export volume to these countries. We employ an augmented gravity equation and use the Poisson Pseudo-Maximum Likelihood approach to estimate the model using annual bilateral export data between Tunisia and 42 sub-Saharan African countries. After conducting various sensitivity analyses, the paper concludes that government effectiveness, control of corruption, and the rule of law act as significant impediments to trade between Tunisia and its sub-Saharan African partners.

ملخص

الهدف من هذه الورقة البحثية هو تحليل أبرز العوامل التي تؤثر على تدفق الصادرات بين تونس ودول أفريقيا جنوب الصحراء الكبرى. وتركز الدراسة على تأثيرخمسة تدابيرمؤسسية على إجمالي
حجم صادرات تونس إلى هذه البلدان، وهذه العناصر هي: فعالية الحكومة، والجودة التنظيمية، ومكافحة الفساد، وسيادة القانون، واالستقرار السياس ي. اعتمدنا معادلة معززة للجاذبية ومقاربة االحتمالية القصوى الزائفة لبواسون لتقديرالنموذج باستخدام بيانات التصديرالثنائية السنوية
بين تونس و42 دولة أفريقية جنوب الصحراء. وبعد إجراء مجموعة من تحليالت الحساسية، خلصت الدراسة إلى أن فعالية الحكومة ومكافحة الفساد وسيادة القانون تشكل عوائق كبيرة
أمام التجارة بين تونس وشركائها في أفريقيا جنوب الصحراء.

RÉSUMÉ

L'objectif de ce document de recherche est d'analyser les facteurs clés influençant les flux d'exportation entre la Tunisie et les pays d'Afrique

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subsaharienne. L'étude se concentre sur l'impact de cinq mesures institutionnelles : l'efficacité du gouvernement, la qualité de la réglementation, le contrôle de la corruption, l'état de droit et la stabilité politique, sur le volume total des exportations de la Tunisie vers ces pays. Nous employons une équation de gravité augmentée et utilisons l'approche du pseudo-maximum de vraisemblance de Poisson pour estimer le modèle en utilisant des données annuelles d'exportations bilatérales entre la Tunisie et 42 pays d'Afrique subsaharienne. Après avoir effectué diverses analyses de sensibilité, le document conclut que l'efficacité du gouvernement, le contrôle de la corruption et l'état de droit constituent des obstacles significatifs au commerce entre la Tunisie et ses partenaires d'Afrique subsaharienne.

Keywords: Tunisia; gravity model; quality of institutions; sub-Saharan African countries.

JEL Classifications: F14, F50, C33

1. Introduction

Many scholars believe that exports are among the key factors contributing to a country's economic development (Kugler, 1991). The export-led growth assumption, in particular, encourages policymakers in developing economies to prioritize export promotion as a means to enhance economic growth (Atif et al., 2017). Given the significance of exports, numerous researchers and policymakers have conducted studies since the onset of globalization to investigate the determinants and drivers of export flows.

In Tunisia, as in other emerging economies, exports have the potential to contribute significantly to economic growth, particularly, when engaging with rapidly growing emerging markets. Just like any country aiming to promote exports and enhance terms of trade, Tunisia underwent an extensive process of trade reforms as part of the structural adjustment program in the late 1980s. Various measures were implemented to boost exports, including the establishment of export processing zones, the introduction of fiscal incentives for exporting companies, and the negotiation of numerous free trade agreements. Nevertheless, despite the substantial growth in Tunisian exports from 1986 to 2017, the country has experienced a notable widening of its trade deficit in recent years.

By examining the structure of Tunisia's trade, one can notice that over the 1995-2016 period, Tunisia's foreign trade was concentrated in a main region, the eurozone. European Union (EU) member countries are

Tunisia's largest trading partners, accounting approximately for 80% of Tunisia's total trade. Within these countries, France, Italy, and Germany are the most important trading partners. Beyond the EU, North Africa is in second place with a share of around 10%. Asia and America rank third and fourth, with shares below 5%. Finally, trade with sub-Saharan Africa (SSA) seems to be relatively limited (UNCTAD database, 2020).

One possible explanation for Tunisia's weak trade performance is its prolonged reliance on conventional commodity markets in Europe, among others, which renders Tunisia's trade vulnerable to exogenous shocks. This vulnerability is particularly evident during the 2008 global financial crisis and the European sovereign debt crisis. Consequently, as a developing economy, Tunisia should diversify its export markets to enhance trade terms, reduce economic volatility, and expedite growth (Shepherd, 2010). In this context, sub-Saharan Africa, boasting the world's largest free trade area and a market encompassing 1.2 billion people (World Bank, 2022), has long been recognized as a natural partner due to its complementarity with Tunisia (Millogo and Oulmane, 2012; African Development Bank, 2014).

This paper aims to analyze the determinants of Tunisia's low level of trade integration with sub-Saharan African countries, with a particular focus on examining the effect of institutional quality in SSA on Tunisia's exports. In this context, it seeks to provide an understanding of Tunisia's trade patterns with SSA and suggests ways to enhance bilateral trade between Tunisia and sub-Saharan Africa. Despite the steady increase in Tunisia's exports to SSA nations over the past decade, there remains a significant opportunity to further boost export volumes and improve Tunisia's terms of trade (African Development Bank, 2014).

We employ a panel data gravity model that incorporates bilateral exports from Tunisia to SSA countries, along with the economic, geographical, cultural, and institutional traits of 42 sub-Saharan African nations. The model estimation spans 2000-2016, utilizing the Poisson Pseudo-Maximum Likelihood (PPML) approach.

Many studies focusing on African trade have been conducted to elucidate bilateral trade flows within a gravity model framework (*e.g.,* Awad and Yussof, 2017; Fankem, 2018; Baita, 2019; Oparanya *et al.,* 2019; Osabuohien *et al.*, 2019; Ejones *et al.*, 2021, among others). For example,

Awad and Yussof (2017) explore the effect of corruption and the quality of bureaucracy on intra-African trade using a sample of 36 countries, including both North and sub-Saharan African countries. Fankem (2018) examines the impact of the level of democracy on trade in Central Africa. Baita (2019) investigates the role of the quality of institutions in the exporting country on bilateral trade flows within the Economic Community of West African States (ECOWAS). Osabuohien *et al.* (2019) examine the impact of trade barriers and regional trade integration on export performance within the Economic Community of West African States (ECOWAS) during the 2006-2013 period. The results of the econometric analysis based on OLS, GLS, and PPML reveal that trade complementarity, multilateral resistance, and regional economic integration all have a meaningful effect on trade within the ECOWAS region. Ejones *et al.* (2021) investigate whether regional trade agreements promote trade within the East African Community regional bloc.

Empirical research on trade flows examining African North–South trade relations is scarce. So far, only the paper by Ghazi and Msadfa (2016) has explored this issue. They deal with the export potential between Morocco and its 40 African partners. Specifically, they estimate a gravity model using cross-sectional data and panel data over the 2000-2014 period. They demonstrate that Morocco still has a good chance of expanding its exports to the African continent despite the relatively low complementarity of its trade with African nations. Within the context of the Tunisian economy, empirical research on trade flows is also limited. So far, only the paper by Ben Doudou (2022) has focused on this perspective. He discusses how free trade agreements affect Tunisia's trade balance. We aim to fill this gap by offering new insights into African North-South trade relations using Tunisian data and by providing evidence on the crucial role of institutional quality in explaining North-South trade flows in Africa.

This paper enriches the current literature on African trade relationships in general, and Tunisian trade in several ways. First, in contrast to previous studies, this paper focuses on the relationship between Tunisia and its 42 SSA partners and offers several robustness checks. In particular, it aims to explain the weakness of Tunisia's exports to SSA countries. These discoveries ought to give significant strategy suggestions to Tunisia and other countries with a similar trade structure, that seek to improve their trade balance.

Second, we examine to what extent existing bilateral free trade agreements (FTAs) have contributed to stimulating Tunisia's exports to SSA countries. Many studies have investigated the reaction of bilateral trade flows to the effect of FTAs. However, the consequences of existing FTAs between Tunisia and SSA countries are unknown.

Thirdly, while the role of institutions in encouraging intra-African trade has been studied by some researchers, little is known about trade barriers, particularly between North African nations and their SSA partners. In this paper, we augment the gravity equation with an aggregate index that captures the different dimensions of institutional quality, as well as individual indicators of institutions. This sheds light on the importance of developing a suitable institutional framework within SSA for facilitating North-South integration. This aspect has not received much attention in previous studies.

The remainder of the paper is organized as follows: In Section 2, we present the econometric framework based on an augmented gravity model, the data, and the explanatory variables. Section 3 contains the econometric results as well as the economic interpretation. Finally, Section 4 concludes and offers some policy recommendations.

2. Econometric framework, data, and methodology

2.1. Model specification

We employ a gravity equation of trade to determine the key variables explaining the relatively low level of Tunisian exports to sub-Saharan Africa. The equation considers that the trade volume between two partner countries is proportional to their size, as determined by their national income, and proportional to the cost of transportation, roughly represented by the distance between their capitals. Over the years, the gravity equation has been augmented with binary dummy variables to account for bilateral trade costs that might impact flows between partners. Commonly used binary variables in empirical gravity literature include common language, common border, common colonizer, and free trade agreement. Several other variables have also been introduced in the empirical gravity model depending on the objectives pursued by the authors, including factors related to economics and institutions. Therefore, considering the goal of our research, the log-linear equation

specification used in this study for Tunisia's exports to SSA countries is as follows:

$$\square\square(\square_{\square\square\square}) = \square_0 + \square_1\square\square(\square_{\square\square}) + \square_2\square\square(\square_{\square\square}) + \square_3\square\square(\square\square\square\square_{\square\square}) + \square_4\square\square\square\square_{\square\square} + \square_5\square\square\square_{\square\square} + \square_6\square\square_{\square} + \square_7\square\square\square_{\square\square\square} + \square_8\square\square\square_{\square\square} + \square_9\square\square\square\square_{\square\square} + \square_{\square\square} + \square_{\square} + \square_{\square\square\square}$$

The exports of Tunisia to country j at time t in current USD, denoted by X_{ijt}, depend on the gross domestic product of Tunisia at time t in current USD (Y_{it}), the gross domestic product of country j at time t in current USD (Y_{jt}), the geographical distance separating the capitals of the two partners ($DIST_{ij}$), the quality of institutions in the destination country at time t ($INST_{jt}$), a multilateral resistance term (MRT_{jt}), and a vector of dummy variables that may influence export. This vector includes language similarity ($LANG_{ij}$), colonial links (COL_{ij}), proximity to the sea (AS_j, and free trade agreements (FTA_{ijt}). The term μ_{ij} represents an effect specific to each pair of countries and common to all years, λ_t represents an effect specific to year t and common to all pairs of countries to capture common shocks, and ε_{ijt} is the error term.

2.2. Explanatory variables and expected signs

The GDP of Tunisia is used as a proxy for the level and variety of production in the exporting country. Its coefficient should be positively correlated with the volume of bilateral trade. The GDP of the partner country (Y_{jt}) is an indicator of the capacity to import of the importing country. According to previous studies, an increase in the GDP of the importing country should raise bilateral trade.

Distance is used as a proxy for factors that may restrict bilateral trade, such as transportation costs, delivery times, communication costs, and transaction costs. In a gravity model, this variable is considered a resistance factor to trade flows and should have a negative impact on bilateral trade.

Language similarity ($LANG_{ij}$) and colonial links (COL_{ij}) are measured by binary variables set to unity when the two partners share a common language and the same colonial history, respectively. Sharing a common language between partner countries should increase the volume of bilateral trade. Likewise, historical links, especially relations between ex-

colonies, tend to facilitate trade between certain countries. Several studies have demonstrated the importance of cultural and historical factors in determining trade flows. They assume a positive correlation between the similarity of these factors and the importance of trade flows.

For proximity to the sea (AS_j), we utilize a binary variable that takes a value of 1 if the partner country has access to the sea. Numerous studies have highlighted the positive effect of sea access on regional exports and the role played by maritime networks in fostering international trade (Bottasso et al., 2018). Therefore, a positive sign is expected for the variable AS_j.

Considering the impact of free trade agreements on Tunisian exports, we introduce a binary variable that takes the value of 1 if a free trade agreement exists between the two partners at time t; otherwise, it takes the value of 0. The removal of tariff and non-tariff trade barriers as part of a free trade agreement enhances the trade volume among its members. Therefore, a positive coefficient is anticipated for the variable FTA_{ijt} in the context of this study.

In addition to economic, geographical, cultural, and historical factors, several recent studies highlight the important role of institutions. According to Anderson and Marcouiller (2002), low institutional quality in the host nation acts as a covert tax on trade flows, lowering imports by increasing risks and uncertainty inherent in international transactions. More recently, Levchenko (2007) and Nunn (2007) have demonstrated that the quality of institutions in exporting and importing countries is a significant factor in determining trade flows. Finally, Crozet et al. (2008) show, using a business model with heterogeneous firms, that the low quality of institutions in the destination nation may intensify concerns about corruption and, as a result, discourage exporting businesses from entering.

In general, when the host country's institutions are of poor quality, it can result in higher costs, as exports to countries with weaker institutions can require large initial investments. This is especially true for investors who are wary of taking risks, uncertain about the potential returns, and want more information before making an investment decision. Moreover, the presence of stringent regulations and a lack of regulatory transparency could also necessitate additional investments (Berthou, 2008).

Numerous empirical studies confirm the negative impact of poor institutional quality on trade flows (Levchenko, 2007; Nunn, 2007; Avom and Fankem, 2014; Ben Ali and Mdhillat, 2015; Álvarez et al., 2018). In this context, we introduce a measure of institutional quality in the importing nation to examine how heterogeneity between countries in this regard affects the export flows. We utilize institutional-quality data provided by Kaufmann et al. (2017). Specifically, we employ indices of government effectiveness (GE_{jt}), regulatory quality (RQ_{jt}), control of corruption (CC_{jt}), rule of law (RL_{jt}), and political stability (PS_{jt}). All these aspects of institutions can be linked to the risk-related potential returns of exporting companies. Thus, making them likely to influence the sunk entry cost.

Exporting to a country with poor institutions may necessitate a thorough evaluation of the destination market before initiating production and export activities. Hence, a low institutional score would likely demand a higher initial investment from risk-averse investors. The scores on each index range from -2.5 to 2.5, with a higher score denoting better institutions. We introduce these indicators separately, then following the approach of Avom and Mignamissi (2017), we compute an aggregate index (GOV_{jt}) as the arithmetic mean of the individual indices. Consequently, we expect a positive coefficient for the variable $INST_{jt}$. The greater the level of governance, the more trade exchanges are likely to occur.

As both theoretical and empirical literature suggest that disregarding multilateral resistance terms could yield misleading results, we augment the model with a remoteness index. The index is calculated as the logarithm of the country's average weighted bilateral distance with weights determined by the partner countries' shares of world GDP (Dorakh,2020). The inclusion of this remoteness index helps account for the multilateral resistance effect. It is expected that the sign of the multilateral resistance index will be positive (Xu, 2019).

2.3. Data source

This study includes Tunisia's exports with 42[2] SSA countries (see Appendix 1 for the complete list). The analysis covers 16 years from 2000 to 2016. The dependent variable is the nominal volume of Tunisian exports (in current dollars)[3]. The export data are available from the IMF's DOTS database. GDP data are extracted from the World Bank's World Development Indicators database (2017). Data on bilateral distance, common language, and common colonizer are extracted from the CEPII database. Data on free trade agreements come from the World Trade Organization database. Indicators of institutional quality are those of Kaufman et al. (2017) from the World Governance Indicators database (WGI)[4].

2.4. Estimation method

The econometric specification is estimated using the PPML approach. Santos Silva and Tenreyro (2006) propose utilizing the PPML estimator for gravity equations instead of the ordinary least square (OLS) method since the first technique is the most suitable econometric procedure when heteroscedasticity and a significant number of zeros are present. De Sousa and Lamotte (2009) additionally emphasize that this technique integrates all observations and helps mitigate the occurrence of selection bias. Given that Approximately 15% of our trade data contains zero values, it is likely that this bias is present in our sample. Apart from the advantages mentioned above, the PPML method also addresses issues related to multicollinearity and serially correlated errors that can result from a high correlation between country-time dummies and explanatory variables in the gravity equation (Álvarez et al., 2018).

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2. Eight other countries in sub-Saharan Africa (Eritrea, Eswatini, the Central African Republic, the Democratic Republic of Congo, Lesotho, Somalia**,** the Republic of South Sudan, and Sudan) were excluded from the sample when estimating the model due to data unavailability over the entire study period. South Africa was also excluded in order to have a sample of countries with comparable levels of development.

3. We adhere to the approach of Baldwin and Taglioni (2006) and use trade and GDP data expressed in nominal terms. Baldwin and Taglioni (2006) recommend not deflating nominal GDP and trade volume by a price index because the gravity equation is derived from the expenditure function and therefore requires nominal data.

4. The data for this study is available from the corresponding author.

3. Econometric Results

3.1. Estimation results

The results obtained from estimating the gravity model using the PPML method for the period 2000-2016 period are presented in Table 1. Due to perfect collinearity, it is impossible to simultaneously incorporate country fixed-effects and time-invariant variables such as distance, common language, common colonizer, proximity to the sea, and free trade agreements[5] (Yotov et al., 2016). Therefore, we present two alternative specifications: one with time-invariant country-pair variables and one with time and country-fixed effects. Tunisian GDP is omitted when time-fixed effects are included in the final specification (column 8) due to potential multicollinearity between the included variables. All specifications have been properly defined, as shown by the RESET test's p-value being above 0.01. Adding all fixed effects, as shown in column 8, improves the goodness of fit (higher R2).

Columns 1-5 present the estimates of the individual effects of institutional variables on Tunisia's export performance. The coefficient of the quality of institutions is positive and significant when using 3 out of 5 indices[6]. The control of corruption exhibits a positive and significant relationship at the 1% level, consistent with Ben Ali and Mdhillat (2015). The estimates indicate that a 1-point increase in the control of corruption index in the importing country significantly boosts Tunisia's export performance to Sub-Saharan African countries by 93.86%[7]. This validates the idea that enhancing corruption control positively impacts exports, as improved corruption control typically leads to reduced trade-related costs. Similarly, government effectiveness shows a positive and significant coefficient (at the 1% level). The estimates indicate that a 1-point increment in the government effectiveness index of the importing country

5. According to World Trade Organization database, all existing free trade agreements with SSA countries entered into force several years before 2000 (the start date of our study). Hence, when constructing the FTA variable, we create a series that varies bilaterally but remain constant over time.

6 The estimated coefficients of the indices of institutions (PS_{jt}, CC_{jt}, GE_{jt}, RQ_{jt}, and RL_{jt}) remain unchanged when fixed effects are included in the model. Results are not reported here for space reasons but are available upon request.

7 ($\square^{0.662}$ - 1) *100 = 93.86%

corresponds to a substantial 144.24%[8] surge in Tunisia's exports to SSA. This suggests that Tunisia engages in greater trade with SSA countries that possess higher scores of government effectiveness. This result is not surprising, as better public services, efficient policy implementation, and a committed government create a better business environment, ultimately leading to lower trade costs. This result aligns with the findings of Álvarez et al., (2018).

Furthermore, the rule of law is also associated with a positive and significantly large coefficient at the 1% significance level[9]. This indicates that Tunisia engages in more trade with SSA countries where governments ensure high-quality contract enforcement and protect property rights effectively. This result is not surprising as an improved rule of law, particularly in terms of property rights security, can foster greater transparency and confidence between exporters and importers. This result is compatible with the findings of Pavel, Burhan, and Papiya (2019). On the other hand, political stability and regulatory quality have a non-significant effect on Tunisia's exports. This implies that the presence of political instability or unfavorable regulatory quality in the importing nation does not influence Tunisia's exports. This finding is supported by Martınez-Zarzoso1 and Marquez-Ramos (2019) who find that the political stability and the regulatory quality in the importing country do not exhibit a significant impact in the context of MENA exports. In summary, our empirical results indicate that a high quality of institutions, especially in relation to controlling corruption, government effectiveness, and the rule of law, enhances Tunisia's exports to SSA. This implies also that poor institutional quality in SSA appears to be a significant barrier to trade between Tunisia and its partners in sub-Saharan Africa.

Turning now to the control variables, the estimates indicate that Tunisia's exports to sub-Saharan Africa are positively determined by domestic supply capacity (Tunisia's GDP) as well as partner's demand capacity (importer's GDP) while being hindered by geographical distances. The coefficient linked to colonial ties presents a positive and statistically significant relationship (at a 1% significance level), indicating that

[8] ($\square^{0.893}$ - 1) *100 = 144,24%

[9] A 1-point increase in the rule of law index induces an increase in Tunisia's exports by 70.74% (70.74% = ($\square^{0.535}$ - 1) *100).

colonial links are helping to boost Tunisia's exports to sub-Saharan Africa. On the contrary, the FTA variable has a significantly negative coefficient (at the 1% level), suggesting that Tunisia's free trade agreements with various regional countries have been ineffective in stimulating intra-regional trade over the 2000-2016 period[10]. Remarkably, the maritime boundary dummy is not significant in all specifications, indicating that Tunisia's exports to the SSA region are not strongly affected by the geographical position of the two partners in relation to the sea. One possible explanation is that the maritime transport sector is still underdeveloped, especially given the scarcity of shipping lines linking Tunisia with its SSA partners.

The common language and remoteness index exhibit an insignificant impact on Tunisia's exports. This might be due to their strong correlation with other explanatory variables, such as COL_{ij} for the variable $LANG_{ij}$, and Tunisa's GDP for the remoteness index, as highlighted by the correlation matrix (see Appendix 3).

[10] Such a finding is unsurprising given that 80% of African exports are aimed towards Europe, whereas intra-African trade, accounts for only 10 to 12% of total African trade (United Nations, 2010).

Table 1: PPML results for the augmented gravity equations

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln (Y_{it})	1.896***	2.143***	2.189***	1.922***	2.086***	2.092***	2.571***	
	(2.872)	(3.582)	(3.725)	(3.006)	(3.432)	(2.881)	(7.257)	
Ln (Y_{jt})	0.583***	0.675***	0.634***	0.577***	0.632***	0.630***	0.220	0.339**
	(16.99)	(16.06)	(14.76)	(15.99)	(15.96)	(14.84)	(1.136)	(1.987)
Ln($DIST_{ij}$)	-1.594***	-1.970***	-2.193***	-1.601***	-1.900***	-1.983***		
	(-7.609)	(-10.35)	(-10.83)	(-8.119)	(-9.939)	(-9.630)		
$LANG_{ij}$	-0.361	-0.233	-0.321	-0.338	-0.271	-0.325		
	(-1.439)	(-0.880)	(-1.233)	(-1.220)	(-1.032)	(-1.243)		
COL_{ij}	1.198***	1.123***	1.221***	1.172***	1.139***	1.097***		
	(5.841)	(5.702)	(5.905)	(5.641)	(5.615)	(5.282)		
AS_{j}	0.192	0.318*	0.352**	0.209	0.310*	0.217		
	(1.085)	(1.803)	(2.048)	(1.005)	(1.652)	(1.099)		
FTA_{ijt}	-0.828***	-0.889***	-0.973***	-0.831***	-0.867***	-0.798***		
	(-5.895)	(-5.385)	(-6.337)	(-5.923)	(-5.581)	(-5.148)		
PS_{jt}	0.0229							
	(0.279)							
CC_{jt}		0.662***						
		(8.309)						
GE_{jt}			0.893***					
			(10.34)					
RQ_{jt}				0.0837				
				(0.521)				
RL_{jt}					0.535***			
					(6.031)			

GOV_{jt}						0.564*** (4.948)	0.742*** (3.615)	0.810*** (4.076)
MRT_{jt}	-0.0392 (-0.0880)	-0.289 (-0.695)	-0.184 (-0.453)	-0.0464 (-0.105)	-0.237 (-0.565)	-0.116 (-0.235)	0.156 (0.648)	1.856*** (5.257)
Constant	-31.22* (-1.790)	-36.55** (-2.328)	-34.43** (-2.241)	-31.65* (-1.878)	-34.69** (-2.168)	-33.70* (-1.771)	-51.13*** (-6.498)	12.22** (2.397)
Country-fixed effects	No	No	No	No	No	No	Yes	Yes
Time-fixed effects	No	No	No	No	No	No	No	Yes
Observations	695	695	695	695	695	627	627	627
R-squared	0.332	0.392	0.412	0.334	0.378	0.315	0.875	0.904
RESET test	0.37	0.026	0,215	0.023	0.086	0.078	0.485	0.179

Notes:

z-statistics in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.

PS_j: political stability; CC_j: control of corruption; GE_j: government effectiveness; RQ_j: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).

3.2. Robustness checks

In the previous section, it was established that free trade agreements and institutional characteristics constitute important determinants of Tunisia's exports to SSA partners. Besides, as previously explained, our results remain robust when considering alternative specifications and using various proxies of institutions. In the current subsection, we conduct additional tests to investigate the sensitivity of our results.

First, following Álvarez et al. (2018), we introduce our proxies of institutions with a one-year lag to address the issue of endogeneity of institutional measures. Results are presented in Table 2. The inclusion of lag variables does not alter our main findings. Institutions, notably control of corruption, government effectiveness, and the rule of law, emerge as significant determinants of Tunisia's exports to SSA countries. The FTA agreement variable continues to exhibit a negative and highly significant in all specifications, suggesting that free trade agreements concluded with SSA countries exert a robust negative impact on Tunisia's exports. Concerning the other independent variables, estimates remain consistent with the original results in almost all cases.

Secondly, following empirical literature, we re-estimate our equation using data gathered over 3-year intervals (Olivero and Yotov, 2012), 4-year intervals (Olivero and Yotov, 2012; Anderson and Yotov, 2016), and 5-year intervals (Baier and Bergstrand, 2007). This approach allows us to consider that adjustments to dependent and independent variables might not be immediate in the year following policy changes, such as the signing of a free trade agreement (Cheng and Wall, 2005). Similar to Arora and Vamvakidis (2005), we also re-estimate the gravity equation using five-year averages. Tables 3 through 6 present the findings, demonstrating consistent coefficients for all institution-related proxies and the FTA variable compared to our earlier results. In summary, our results indicate that improvements in controlling corruption, enhancing government effectiveness, and enforcing the rules of law in SSA countries stimulate Tunisia's exports to SSA countries, whereas free trade agreements with SSA countries do not increase Tunisia's exports. Concerning estimates of the other explanatory variables, they remain remarkably consistent across different regressions and are largely aligned with our initial results in most cases.

Table 2: Taking account of lagged effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln (Y_{it})	1.905*** (2.618)	2.045*** (3.187)	2.154*** (3.423)	1.876*** (2.740)	2.024*** (3.115)	2.057*** (2.644)	2.543*** (6.673)	
Ln (Y_{jt})	0.575*** (16.54)	0.674*** (16.10)	0.638*** (14.68)	0.576*** (15.97)	0.632*** (15.90)	0.624*** (14.61)	0.176 (0.873)	0.292* (1.651)
Ln($DIST_{ij}$)	-1.564*** (-7.401)	-1.966*** (-10.24)	-2.183*** (-10.76)	-1.591*** (-8.138)	-1.872*** (-9.720)	-1.950*** (-9.390)		
$LANG_{ij}$	-0.354 (-1.410)	-0.225 (-0.846)	-0.297 (-1.137)	-0.338 (-1.211)	-0.275 (-1.047)	-0.322 (-1.226)		
COL_{ij}	1.186*** (5.782)	1.111*** (5.651)	1.197*** (5.748)	1.166*** (5.583)	1.132*** (5.590)	1.080*** (5.177)		
AS_j	0.191 (1.059)	0.316* (1.763)	0.353** (2.063)	0.202 (0.972)	0.306 (1.602)	0.213 (1.063)		
FTA_{ijt}	-0.827*** (-5.853)	-0.898*** (-5.411)	-0.988*** (-6.310)	-0.831*** (-5;864)	-0.876*** (-5.610)	-0.796*** (-5.083)		
PS_{jt-1}	-0.000336 (-0.00400)							
CC_{jt-1}		0.647*** (7.774)						
GE_{jt-1}			0.886*** (9.933)					
RQ_{jt-1}				0.0693 (0.455)				

RL_{jt-1}					0.499*** (5.502)			
GOV_{jt-1}						0.526*** (4.458)	0.661*** (3.689)	0.725*** (3.962)
MRT_{jt}	-0.0261 (-0.0573)	-0.205 (-0.481)	-0.128 (-0.311)	-0.0332 (-0.0736)	-0.184 (-0.429)	-0.0935 (-0.185)	0.237 (0.994)	1.702*** (4.854)
Constant	-30.37 (-1.625)	-33.97** (-2.025)	-33.62** (-2.048)	-30.56* (-1.701)	-33.28* (-1.954)	-32.95 (-1.620)	-49.17*** (-5.804)	13.08** (2.472)
Country-fixed effects	No	No	No	No	No	No	Yes	Yes
Time-fixed effects	No	No	No	No	No	No	Yo	Yes
Observations	655	655	655	655	655	591	591	591
R-squared	0.324	0.383	0.412	0.326	0.368	0.305	0.881	0.908
RESET test	0.043	0.074	0.511	0.03	0.131	0.093	0.298	0.125

Notes:
z-statistics in parentheses.
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.
PS_j: political stability; CCj: control of corruption; GE_j: government effectiveness; RQj: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).

Table 3: Sensitivity analysis using data over 3-year intervals

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln (Y_{it})	2.186**	2.510**	2.602***	2.243**	2.415**	2.370**	2.776***	
	(2.072)	(2.549)	(2.645)	(2.127)	(2.409)	(1.962)	(5.631)	
Ln (Y_{jt})	0.593***	0.687***	0.632***	0.583***	0.641***	0.644***	0.400*	0.450**
	(9.909)	(8.756)	(7.971)	(8.741)	(8.739)	(8.237)	(1.714)	(2.150)
Ln($DIST_{ij}$)	-1.557***	-1.898***	-2.090***	-1.544***	-1.817***	-1.914***		
	(-4.361)	(-5.874)	(-6.141)	(-4.576)	(-5.606)	(-5.420)		
$LANG_{ij}$	-0.396	-0.268	-0.379	-0.367	-0.309	-0.364		
	(-1.067)	(-0.696)	(-0.973)	(-0.894)	(-0.799)	(-0.953)		
COL_{ij}	1.302***	1.245***	1.378***	1.276***	1.266***	1.220***		
	(4.226)	(4.512)	(4.501)	(4.201)	(4.291)	(4.068)		
AS_j	0.234	0.354	0.377	0.252	0.348	0.248		
	(0.799)	(1.236)	(1.317)	(0.735)	(1.128)	(0.771)		
FTA_{ijt}	-0.804***	-0.850***	-0.922***	-0.804***	-0.834***	-0.758***		
	(-3.436)	(-3.058)	(-3.657)	(-3.401)	(-3.217)	(-2.879)		
PS_{jt}	0.0385							
	(0.292)							
CC_{jt}		0.699***						
		(5.470)						
GE_{jt}			0.899***					
			(5.991)					
RQ_{jt}				0.0816				
				(0.297)				

RL_{jt}					0.549*** (3.765)			
GOV_{jt}						0.599*** (3.164)	0.962*** (3.247)	1.002*** (3.464)
MRT_{jt}	-0.136 (-0.181)	-0.424 (-0.601)	-0.316 (-0.451)	-0.137 (-0.183)	-0.325 (-0.456)	-0.204 (-0.241)	-0.0994 (-0.326)	
Constant	-40.01 (-1.403)	-46.74* (-1.791)	-45.68* (-1.758)	-40.37 (-1.441)	-43.88* (-1.646)	-41.65 (-1.304)	-65.41*** (-5.749)	0.0970 (0.0253)
Country-fixed	No	No	No	No	No	No	Yes	Yes
Time-fixed	No	No	No	No	No	No	No	Yes
Observations	244	244	244	244	244	220	220	220
R-squared	0.369	0.439	0.454	0.370	0.418	0.351	0.928	0.934
RESET test	0.263	0.211	0.593	0.213	0.401	0.393	0.633	0.646

Notes:
z-statistics in parentheses.
*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.
PS_j: political stability; CC_j: control of corruption; GE_j: government effectiveness; RQ_j: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).
MRT_{jt} was omitted in specification 8 because of collinearity.

Table 4: Sensitivity analysis using data over 4-year intervals

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Ln(Y_{it})$	1.923*	2.138**	2.076**	1.970*	2.106**	1.882	2.328***	
	(1.842)	(2.239)	(2.234)	(1.939)	(2.192)	(1.625)	(5.247)	
$Ln\ (Y_{jt})$	0.545***	0.625***	0.580***	0.538***	0.588***	0.585***	0.104	0.834**
	(8.386)	(8.117)	(7.155)	(7.499)	(7.567)	(7.114)	(0.443)	(2.246)
$Ln\ (DIST_{ij})$	-1.405***	-1.773***	-1.953***	-1.432***	-1.764***	-1.782***		
	(-3.805)	(-4.917)	(-5.275)	(-3.931)	(-4.944)	(-4.645)		
$LANG_{ij}$	-0.125	-0.0262	-0.125	-0.0951	-0.0589	-0.102		
	(-0.342)	(-0.0671)	(-0.322)	(-0.234)	(-0.152)	(-0.265)		
COL_{ij}	0.981***	0.949***	1.046***	0.944***	0.954***	0.916***		
	(3.472)	(3.810)	(3.824)	(3.438)	(3.506)	(3.316)		
AS_j	0.203	0.342	0.348	0.228	0.320	0.229		
	(0.660)	(1.069)	(1.130)	(0.617)	(0.980)	(0.660)		
FTA_{ijt}	-0.659***	-0.703**	-0.784***	-0.660**	-0.678**	-0.642**		
	(-2.592)	(-2.422)	(-2.900)	(-2.562)	(-2.444)	(-2.274)		
PS_{jt}	0.0274							
	(0.190)							
CC_{jt}		0.663***						
		(4.713)						
GE_{jt}			0.843***					
			(5.763)					

RQ_{jt}				0.130 (0.451)				
RL_{jt}					0.570*** (3.876)			
GOV_{jt}						0.551*** (2.817)	0.981*** (3.090)	0.772*** (2.985)
MRT_{jt}	0.239 (0.336)	0.0231 (0.0346)	0.207 (0.321)	0.220 (0.312)	0.0740 (0.111)	0.284 (0.359)	0.740** (2.252)	
Constant	-32.04 (-1.170)	-36.30 (-1.459)	-31.63 (-1.305)	-32.79 (-1.242)	-34.64 (-1.377)	-28.41 (-0.941)	-40.65*** (-3.436)	-5.851 (-0.879)
Country-fixed effects	No	No	No	No	No	No	Yes	Yes
Time-fixed effects	No	No	No	No	No	No	No	Yes
Observations	203	203	203	203	203	183	183	146
R-squared	0.351	0.418	0.439	0.355	0.408	0.338	0.936	0.959
RESET test	0.497	0.618	0.867	0.461	0.909	0.713	0.104	0.07

Notes:

z-statistics in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.

PS_j: political stability; CC_j: control of corruption; GE_j: government effectiveness; RQ_j: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).

MRT_{jt} was omitted in specification 8 because of collinearity.

Table 5: Sensitivity analysis using data over 5-year intervals

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Ln(Y_{it})$	3.033 (1.624)	3.707** (2.135)	3.938** (2.187)	3.097* (1.685)	3.608** (2.079)	3.515* (1.672)	4.489*** (4.520)	
$Ln\ (Y_{jt})$	0.564*** (7.306)	0.650*** (7.187)	0.604*** (6.557)	0.552*** (6.832)	0.611*** (7.115)	0.628*** (6.584)	0.253 (0.689)	1.454*** (2.620)
$Ln\ (DIST_{ij})$	-1.698*** (-3.421)	-2.026*** (-5.006)	-2.268*** (-5.369)	-1.765*** (-4.060)	-1.989*** (-4.846)	-2.123*** (-4.606)		
$LANG_{ij}$	-0.724 (-1.434)	-0.593 (-1.083)	-0.747 (-1.377)	-0.674 (-1.249)	-0.623 (-1.184)	-0.682 (-1.293)		
COL_{ij}	1.622*** (3.973)	1.565*** (3.914)	1.731*** (4.023)	1.565*** (3.931)	1.560*** (3.938)	1.533*** (3.810)		
AS_{j}	0.338 (0.844)	0.453 (1.172)	0.506 (1.338)	0.378 (0.844)	0.465 (1.133)	0.391 (0.902)		
FTA_{ijt}	-0.873*** (-3.116)	-0.900*** (-2.707)	-0.986*** (-3.282)	-0.879*** (-3.064)	-0.890*** (-2.830)	-0.855*** (-2.713)		
PS_{jt}	0.0396 (0.197)							
CC_{jt}		0.731*** (4.192)						
GE_{jt}			1.005*** (4.927)					

RQ_{jt}				0.284 (0.884)				
RL_{jt}					0.642*** (3.052)			
GOV_{jt}						0.683*** (2.577)	1.505*** (3.235)	1.850*** (2.994)
MRT_{jt}	-0.572 (-0.473)	-1.087 (-0.975)	-1.088 (-0.938)	-0.571 (-0.469)	-1.023 (-0.912)	-0.896 (-0.668)	-0.934 (-1.306)	
Constant	-58.97 (-1.206)	-75.54* (-1.674)	-77.86* (-1.673)	-59.55 (-1.237)	-72.42 (-1.598)	-69.03 (-1.266)	-100.4*** (-3.943)	-19.76 (-1.355)
Country-fixed effects	No	No	No	No	No	No	Yes	Yes
Time-fixed effects	No	No	No	No	No	No	No	Yes
Observations	163	163	163	163	163	147	143	105
R-squared	0.361	0.430	0.451	0.372	0.419	0.354	0.900	0.953
RESET test	0.331	0.176	0.472	0.260	0.332	0.428	0.498	0.042

Notes:

z-statistics in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.

PS_j: political stability; CC_j: control of corruption; GE_j: government effectiveness; RQj: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).

MRT_{jt} was omitted in specification 8 because of collinearity.

Table 6: Sensitivity analysis using averaged data over 5-year periods

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Ln(Y_{it})$	2.333 (1.572)	2.891** (2.236)	2.989** (2.288)	2.382* (1.650)	2.740** (2.091)	2.659 (1.639)	3.322*** (4.606)	
$Ln(Y_{jt})$	0.607*** (9.155)	0.688*** (8.573)	0.638*** (8.008)	0.591*** (8.218)	0.647*** (8.381)	0.651*** (7.872)	0.0996 (0.438)	1.055*** (3.271)
$Ln\ (DIST_{ij})$	-1.590*** (-4.091)	-1.947*** (-5.731)	-2.149*** (-6.168)	-1.580*** (-4.207)	-1.906*** (-5.630)	-1.964*** (-5.324)		
$LANG_{ij}$	-0.312 (-0.799)	-0.172 (-0.419)	-0.278 (-0.678)	-0.282 (-0.647)	-0.188 (-0.462)	-0.250 (-0.620)		
COL_{ij}	1.226*** (4.373)	1.134*** (4.452)	1.241*** (4.439)	1.191*** (4.198)	1.140*** (4.257)	1.108*** (4.074)		
AS_j	0.227 (0.677)	0.364 (1.104)	0.382 (1.147)	0.253 (0.637)	0.354 (1.016)	0.252 (0.679)		
FTA_{ijt}	-0.814*** (-3.222)	-0.850*** (-2.843)	-0.929*** (-3.472)	-0.814*** (-3.194)	-0.837*** (-2.973)	-0.772*** (-2.764)		
PS_{jt}	0.0530 (0.338)							
CC_{jt}		0.719*** (5.163)						
GE_{jt}			0.892*** (5.652)					
RQ_{jt}				0.113 (0.363)				

RL_{jt}					0.606*** (3.897)			
GOV_{jt}						0.620*** (2.968)	1.057*** (3.069)	0.665** (2.018)
MRT_{jt}	-0.379 (-0.394)	-0.802 (-0.935)	-0.708 (-0.832)	-0.388 (-0.406)	-0.685 (-0.793)	-0.517 (-0.491)	-0.112 (-0.239)	
Constant	-43.32 (-1.119)	-56.53* (-1.683)	-55.67* (-1.647)	-44.23 (-1.175)	-52.03 (-1.523)	-49.17 (-1.168)	-72.90*** (-3.704)	-10.65 (-1.253)
Country-fixed effects	No	No	No	No	No	No	Yes	Yes
Time-fixed effects	No	No	No	No	No	No	No	Yes
Observations	165	165	165	165	165	149	149	111
R-squared RESET test	0.366 0.363	0.443 0.285	0.453 0.631	0.368 0.290	0.427 0.547	0.351 0.474	0.957 0.266	0.979 0.228

Notes:

z-statistics in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, against the hypothesis that the coefficient equals zero.

PS_j: political stability; CC_j: control of corruption; GE_j: government effectiveness; RQ_j: regulatory quality; RL_j: rule of law; GOV_j: arithmetic mean of the individual indices (PS_j, CC_j, GE_j, RQ_j, and RL_j).

MRT_{jt} was omitted in specification 8 because of collinearity.

4. Conclusion

This paper has examined the flow of Tunisian exports to SSA countries. This analysis enabled us to identify the factors determining these flows. To achieve this end, we estimated an augmented gravity model that included economic, geographical, cultural, and institutional characteristics of 42 countries in the sub-Saharan region beyond the bilateral exports from Tunisia to countries in sub-Saharan Africa. The estimation of a gravity model by the PPML method over the 2000-2016 period has led to the following results:

First, our estimates provide evidence of the relevance of the gravity model for Tunisia. Indeed, export flows exhibit positive correlations with the sizes of both domestic and partner markets, while displaying a negative correlation with distance, in line with traditional theoretical analysis.

Second, regarding the determinants of Tunisian trade flows to sub-Saharan Africa, the post-colonial links tend to facilitate exchanges between Tunisia and its partners in sub-Saharan Africa. In addition, Tunisian trade with this region is not affected by the geographical position of the two partners and their connection to the sea. However, bilateral agreements have a negative effect on trade flows, which could be explained by the fact that these agreements, concluded by Tunisia with certain countries of the region, have not made it possible to stimulate intra-regional trade in goods over the study period, but a trade diversion seems to outweigh these deals. These agreements seemed to us rather empty shells because the countries of sub-Saharan Africa maintain economic relations oriented toward the developed countries rather than south-south relations.

The quality of the institutions of the importing country, and specifically government effectiveness, control of corruption, and rule of law have a positive effect on Tunisian export flows. This implies that institutional failure seems to be a significant barrier to trade between Tunisia and its partners in sub-Saharan Africa.

Overall, the growth of Tunisia-sub-Saharan Africa trade is limited by several factors, mentioned in the analysis of trade determinants, such as production capacity, distance, institutional failure in SSA countries, and the presence of large frictions in the north-south regional relationship.

Therefore, building production capacity, the development of trade-related infrastructure (establishment of road, rail, air, and waterway networks), and reviewing or creating new free trade arrangements would stimulate Tunisia's exports to SSA partner countries.

Concerning institutions, Tunisian businesses should keep a close eye on the institutions in SSA countries. It could be crucial for companies to monitor news related to government effectiveness, control of corruption, rule of law, political change, and other relevant factors in SSA. Analyzing such developments could help them understand their potential implications.

Furthermore, the results suggest that Tunisia's exports benefit when trading with SSA partners that have higher level of government effectiveness, control of corruption, and rule of law. Therefore, Tunisian policymakers might consider trade policies aimed at promoting liberalized trade, particularly with partners that adhere to high governance standards.

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References

African Development Bank (2014). "Tunisia: Interim Country Strategy Paper 2014 2015", African Development Bank, Abidjan.

Álvarez, I., Barbero J., Rodriguez-Pose A., and Zofio J. (2018), "Does Institutional Quality Matter for Trade? Institutional Conditions in a Sectoral Trade Framework," World Development, 103, 72 – 87.

Anderson, J., and Marcouiller D. (2002), "Insecurity and the Pattern of Trade: An Empirical Investigation," The Review of Economics and Statistics, 84 (2), 342-352.

Anderson J., and Yotov Y.V. (2016), "Terms of Trade and Global Efficiency Effects of Free Trade Agreements, 1990–2002," Journal of International Economics, 99 (C), 279–298.

Arora, V., Vamvakidis A. (2005), "How Much Do Trading Partners Matter for Economic Growth?" IMF Staff Papers, 52(1), 24-40.

Atif, R. M., Haiyunand L., and Mahmood H. (2017), "Pakistan's agricultural exports, determinants and its potential: an application of stochastic frontier gravity model," The Journal of International Trade & Economic Development, 26 (3), 257-276.

Avom, D., and Fankem G.S.G. (2014), "Qualité du cadre juridique, corruption et commerce international: le cas de la CEMAC," Revue d'économie politique, 124, 101-128.

Avom, D., and Mignamissi D. (2017), "Pourquoi le commerce intra-CEEAC est-il si faible ?" Revue française d'économie, XXXII (3), 136 - 170.

Awad, A., and Yussof I. (2017), "Africa's economic regionalism: is there any other obstacle?" Journal of Economic Studies, 44 (3), 344-361.

Baier, S.L., and Bergstrand J.H. (2007), "Do Free Trade Agreements Actually Increase Members' International Trade?" Journal of International Economics, 71 (1), 72–95.

Baita, K. (2019), "Intégration régionale et échanges commerciaux : Une analyse empirique dans les pays de la Communauté Economique des Etats de l'Afrique de l'Ouest," Available at http://dx.doi.org/10.2139/ssrn.3405310.

Baldwin, R., and Taglioni D. (2006), "Gravity for Dummies and Dummies for Gravity Equations," National Bureau of Economic Research Working Paper No. 12516.

Ben Ali M., and Mdhillat M. (2015), "Does Corruption Impede International Trade? New Evidence from the EU and the MENA Countries," Journal of Economic Cooperation and Development, 36 (4), 107-119.

Ben Doudou, M. (2022), "The effect of free trade agreements on Tunisia's trade balance: a gravity model approach," Journal of Economic Cooperation and Development, 43 (4), 131-162.

Berthou, A. (2008), "An Investigation on the Effect of Real Exchange Rate Movements on OECD Bilateral Exports," European Central Bank Working Paper Series No. 920.

Bottasso, A., Conti M., De Sa Porto P.C., Ferrari C., and Tei A. (2018), "Port infrastructures and trade: Empirical evidence from Brazil," Transportation Research Part A: Policy and Practice, 107, 126-139.

Cheng, I., Wall H.J. (2005), "Controlling for Heterogeneity in Gravity Models of Trade and Integration," Federal Reserve Bank of St. Louis Review, 87 (1), 49–63.

Crozet, M., Koenig P., and Rebeyrol V. (2008), "Exporting to Insecure Markets: A Firm-Level Analysis," Working Paper No. 2008-13, Centre d'Etudes Prospectives et d'Informations Internationales (CEPII), Paris.

De Sousa, J., and Lamotte O. (2009), "Séparation politique et désintégration commerciale," Revue économique, 60 (4), 891-903.

Dorakh, A. (2020), " A Gravity Model Analysis of FDI across EU Member States," Journal of Economic Integration, 35(3), 426-456.

Ejones, F., Agbola F.W., and Mahmood A. (2021), "Do regional trade agreements promote international trade? New empirical evidence from the East African Community," The Journal of International Trade & Economic Development, 30, 1020-1053.

Fankem, G.S.G. (2018), "Régime politique et commerce international en Afrique centrale," Revue d'économie du développement, 26(1), 139-167.

Ghazi, T., and Msadfa Y. (2016), Potentiel du commerce extérieur entre le Maroc et ses partenaires africains : application d'un modèle de gravité. In : El Abbassi I, Ghazi T, Oulhaj L, and Ragbi A (ed), Équilibres externes, Compétitivité et Processus de Transformation Structurelle de l'Economie Marocaine. OCP Policy Center, Rabat, 113 – 153.

Kaufman, D., Kraay, A., Mastruzzi M. (2017), "Worldwide Governance Indicators: A Summary of Methodology, Data and Analytical" Issues," Policy Research working Paper No. 5430, World Bank, Washington, DC.

Kugler, P. (1991), "Growth, exports and cointegration: an empirical investigation,". Weltwirtschaftliches Archiv, 127: 73–82.

Levchenko, A. (2007), "Institutional Quality and International Trade," Review of Economic Studies, 74 (3), 791–819.

Martinez-Zarzoso, I, and Marquez-Ramos L. (2019), "Exports and governance: Is the Middle East and North Africa region different?" World Econ 42(1): 143–174.

Millogo, A., and Oulmane O. (2012), "Potentiel de commerce dans l'espace maghrébin." Mondes en développement, 158, 115-126.

Nunn, N. (2007), "Relationship-Specificity, Incomplete Contracts and the Pattern of Trade," The Quarterly Journal of Economics, 122 (2), 569–600.

Olivero, M. P., and Yotov Y.V. (2012), "Dynamic Gravity: Endogenous Country Size and Asset Accumulation," Canadian Journal of Economics, 45, 64–92.

Oparanya, A. W., Mdadila K.P., and Rutasitara L.K. (2019), "The Determinant of Bilateral Trade in the East African Community: Application of the Gravity Model," International Journal of Economics and Finance, 11(4), 1- 15.

Osabuohien, E. S., Efobi U.R., Odebiyi J.T., Fayomi O.O., and Salami A.O. (2019), "Bilateral Trade Performance in West Africa: A Gravity Model Estimation," African Development Review, 31 (1), 1- 14.

Pavel M., Burhan S.R., and Papiya T. (2019), "Should Bangladesh Export to Countries with Better Institutional or Comparatively Similar Institutional Form?" International Economic Journal, 33 (1), 9-26.

Santos Silva, J., and Tenreyro S. (2006), "The Log of Gravity," The Review of Economics and Statistics, 88 (4), 641–658.

Shepherd, B. (2010), Geographical Diversification of Developing Country Exports." World Development, 38 (9), 1217–1228.

United Nations (2010). Assessing Regional Integration in Africa IV : Enhancing Intra-African Trade. Addis Ababa : © UN. ECA.

World Bank (2022), "Overview," https://www.worldbank.org/en/region/afr/overview, accessed on 22/02/2022.

Xu, T. (2019), "Economic freedom and bilateral direct investment," Economic Modelling, 78, 172-179.

Yotov, Y.V., Piermartini, R., Monteiro, J.A. and Larch, M. (2016), "An advanced guide to trade policy analysis: The structural gravity model," World Trade Organization, Geneva.

APPENDIX

Appendix 1: List of countries included in the data set

1. Angola	17. Equatorial Guinea	33. Senegal
2. Benin	18. Guinea-Bissau	34. Seychelles
3. Botswana	19. Guinea	35. Sierra Leone
4. Burkina Faso	20. Kenya	36. Somalia
5. Burundi	21. Liberia	37. Swaziland
6. Cameroon	22. Madagascar	38. Tanzania
7. Cape Verde	23. Malawi	39. Togo
8. Chad	24. Mali	40. Uganda
9. Comoros	25. Mauritania	41. Zambia
10. Congo, Republic	26. Mauritius	42. Zimbabwe
11. Ivory Coast	27. Mozambique	
12. Eritrea	28. Namibia	
13. Ethiopia	29. Niger	
14. Gabon	30. Nigeria	
15. Gambia	31. Rwanda	
16. Ghana	32. Sao Tome and Principe	

Appendix 2: Summary statistics

Variables	Mean	Std. Dev.	Min	Max
X_{ijt}	5837671	1.18E+07	0	1.21E+08
Ln (Y_{it})	24.306	.271	23.790	24.586
Ln (Y_{jt})	22.434	1.435	18.095	27.066
Ln ($Dist_{ij}$)	8.421	0.291	7.907	8.993
$LANG_{ij}$	0.5	0.500	0	1
COL_{ij}	0.357	0.479	0	1
AS_j	0.690	0.462	0	1
FTA_{ijt}	0.190	0.392	0	1
PS_{jt}	-0.454	0.889	-3.314	1.282
CC_{jt}	-0.623	0.612	-1.868	1.216
GE_{jt}	-0.750	0.593	-2.445	1.049
RQ_{jt}	-0.687	0.625	-2.645	1.127
RL_{jt}	-0.692	0.653	-2.606	1.077
GOV_{jt}	-0.629	0.628	-2.560	0.914
MRT_{jt}	-2.478	0.358	-3.034	-2.001

Appendix 3: correlation matrix

	$Ln(Y_{it})$	$Ln(Y_{jt})$	$Ln(Dist_{ij})$	$LANG_{ij}$	COL_{ij}	AS_j	FTA_{ijt}	PS_{jt}	CC_{jt}	GE_{jt}	RQ_{jt}	RL_{jt}	GOV_{jt}	MRT_{jt}
$Ln(Y_{it})$	1													
$Ln(Y_{jt})$	0.333	1												
$Ln(Dist_{ij})$	-0.000	0.0070	1											
$LANG_{ij}$	0.000	-0.058	-0.262	1										
COL_{ij}	0.000	0.028	-0.445	0.745	1									
AS_j	0.000	-0.083	-0.034	0.051	0.069	1								
FTA_{ijt}	0.000	0.350	-0.004	-0.121	0.018	0.193	1							
PS_{jt}	-0.001	-0.212	0.270	-0.099	-0.062	0.103	-0.079	1						
CC_{jt}	-0.023	-0.173	0.319	-0.142	-0.174	-0.064	-0.153	0.678	1					
GE_{jt}	-0.061	0.089	0.308	-0.147	-0.176	-0.083	0.024	0.662	0.844	1				
RQ_{jt}	-0.026	0.160	0.191	-0.052	0.008	-0.088	-0.050	0.622	0.722	0.867	1			
RL_{jt}	-0.003	-0.013	0.284	-0.130	-0.125	-0.081	-0.116	0.770	0.876	0.911	0.870	1		
GOV_{jt}	-0.025	-0.025	0.306	-0.078	-0.057	-0.022	-0.120	0.851	0.900	0.931	0.891	0.971	1	
MRT_{jt}	0.939	0.342	0.000	0.000	0.000	-0.000	-0.000	-0.004	-0.020	-0.052	-0.009	0.007	-0.019	1