THE DETERMINANTS OF TUNISIA'S TRADE DEFICIT IN RECENT YEARS: A GRAVITY MODEL APPROACH

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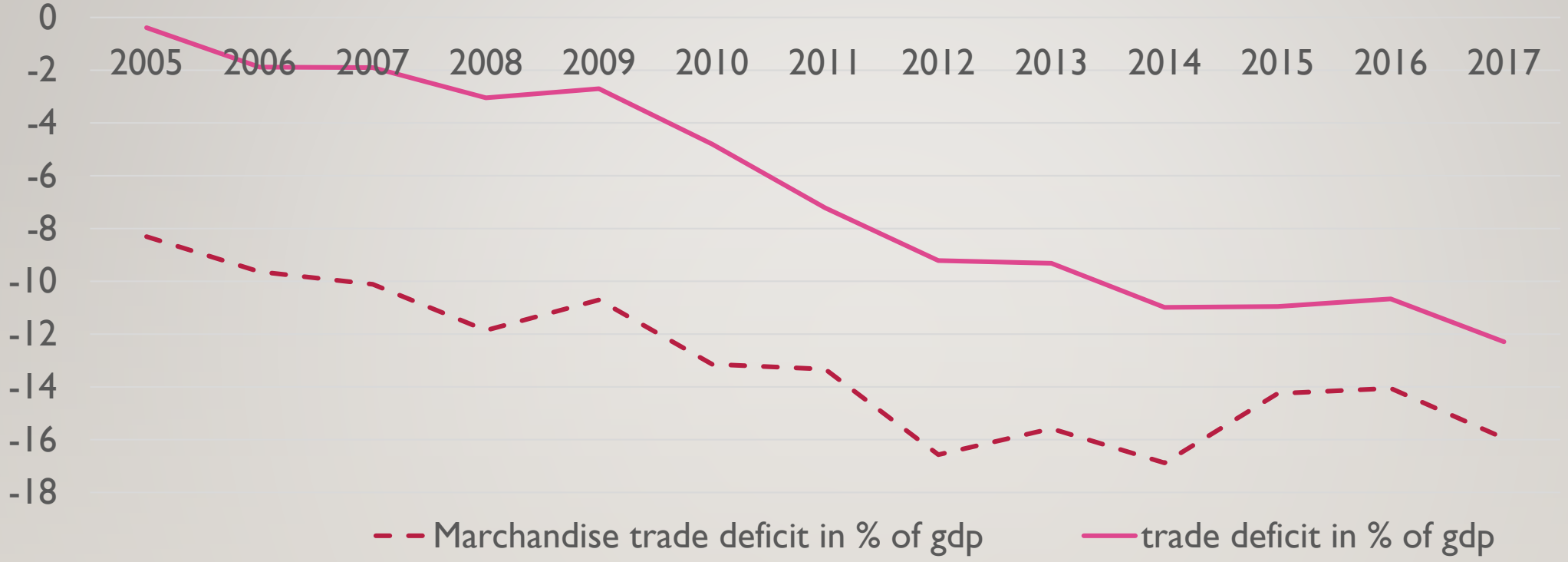
Evolution of Tunisia's trade deficit



Source: Author's calculations based on the WDI database

PROBLEMATIC

The aim of this paper is to identify the determinants of Tunisia’s trade deficit. We focus mainly on two factors, institutions and free trade agreements.

METHODOLOGY

Model: an augmented gravity model derived from Anderson and Van Wincoop (2003)

$$T_{ij} = \frac{Y_i Y_j}{Y_m}\left(\frac{\tau_{ij}}{P_i P_j}\right)^{1-\sigma} \qquad (1)$$

T_{ij} denotes nominal exports from i

Y_i and Y_j are levels of nominal income

Y_m is world income

τ_{ij} is level of bilateral trade costs

P_i and P_j represent level of multilateral resistance

$\sigma > 1$ is the elasticity of substitution

Log-linearizing the structural gravity equation (1) and adding a stochastic error term, ε_{ijt} yields the following equation:

$$Ln(T_{ij}) = Ln(Y_i) + Ln(Y_j) - (Y_m) + (1-\sigma)(\tau_{ij}) - (1-\sigma)(P_i) \quad (2)$$

$$- (1-\sigma)(P_j) + \varepsilon_{ijt}$$

Following previous research using gravity model, we model the trade cost function, τ_{ij}, as follows:

$$\tau_{ij} = DIST_{ij}^{\delta_1} INST_i^{\delta_2} e^{\delta_3 LANG_{ij} + \delta_4 COL_{ij} + \delta_5 BORD_{ij} + \delta_6 AS_j + \delta_7 FTA_{ij}} \quad (3)$$

$DIST_{ij}$ is the geographical distance between the two partners;

$INST_i$ is the quality of institutions in country i;

$LANG_{ij}$, COL_{ij}, $Bord_{ij}$ are dummy variables that take one if the two countries share the same language, the same colonizer and the same border respectively;

AS_j is a dummy variable taking the value one if the partner j has a maritime border;

FTA_{ij} is a vector of regional trade agreement dummies.

Substituting equation (3) into (2) yields the following specification:

$$Ln(T_{ij}) = Ln(Y_i) + \mathrm{Ln}(Y_j) + Ln(Y_m)$$
$$+ \delta_1 ln(DIST_{ij}) + \delta_2 Ln(INST_{it}) + \delta_3 LANG_{ij} + \delta_4 COL_{ij} + \delta_5 BORD_{ij} +$$
$$\delta_6 AS_j + \delta_7 FTA_{ij}$$
$$-(1-\sigma) Ln(P_i) - (1-\sigma) Ln(P_j) + \varepsilon_{ij} \qquad (4)$$

We extend equation (4) with additional variables to assess the influence of the different trade agreements concluded by Tunisian government on trade balance:

The agreement with the EU, FTA_UE

The agreement with Turkey, FTA_TURQ

The AGADIR regional trade agreement, FTA_AGA

The PAFTA regional trade agreement, FTA_PAFTA

We introduce alternatively three institutional variables.

Index of perception of corruption, CPI

Control of corruption, COC

Political stability, PS

To deal with multilateral resistance, we follow Avom and Fankem, (2014) and introduced bilateral and time fixed effects, $\lambda_{ij} + \lambda_t$.

The econometric specification of the gravity equation that we employ to study Tunisia's trade is therefore as follows:

$$\text{Ln}\left(T_{ijt}\right) = \left(\alpha_0\right) + \alpha_1 \text{Ln}\left(Y_{it}\right) + \alpha_2 \text{Ln}\left(Y_{jt}\right) + \alpha_3 ln\left(Dist_{ij}\right)$$
$$+\alpha_4 LANG_{ij} + \alpha_5 BORD_{ij} + \alpha_6 COL_{ij} + \alpha_7 AS_j$$
$$+\alpha_8 FTA\_UE_{ijt} + \alpha_9 FTA\_TURQ_{ijt} + \alpha_{10} FTA\_AGA_{ijt} +$$
$$+\alpha_{11} FTA\_PAFTA_{ijt} + \alpha_{12} \text{Ln}\left(INST_{it}\right)$$
$$+ \lambda_{ij} + \lambda_t + \varepsilon_{ijt}$$

Estimation method: The Poisson Pseudo Maximum Likelihood

Data: the econometric analysis is based on annual data for Tunisian merchandise exports and imports from 1995 to 2016, and the sample consists of 164 Tunisia’s trading partners.

Approach :We estimate two Tunisian trade equations one for exports and one for imports, and we compare the elasticities of each of the explanatory variables in order to derive their net effect on the trade balance.

RESULTS

Standard gravity variables

	Exports			Imports		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln (Y_{it})	0.844***	1.043***	0.860***	0.531**	0.480***	0.411***
	(4.554)	(4.573)	(4.437)	(2.512)	(2.929)	(3.468)
Ln (Y_{jt})	0.510***	0.519***	0.519***	1.059***	1.054***	1.054***
	(6.021)	(5.859)	(5.859)	(21.27)	(20.62)	(20.62)
Ln(Dist_{ijt})	-2.228***	-1.655***	-1.655***	-1.991***	-1.986***	-1.986***
	(-13.73)	(-9.404)	(-9.404)	(-10.56)	(-10.38)	(-10.38)

*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Free trade agreements

	Exports			Imports		
	(1)	(2)	(3)	(4)	(5)	(6)
FTA_UE_{ij}	0.300*** (2.965)	0.354*** (2.987)	0.354*** (2.987)	-	-	-
FTA_TURQ_{ij}		-	-	0.112*	0.133**	0.133**
				(1.745)	(2.050)	(2.050)
FTA_PAFTA_{ij}	-	-	-	-	-	-
FTA_AGA_{ij}	0.278***	0.266***	0.266***	-	-	-
	(3.560)	(3.391)	(3.391)			

*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Institutions

	Exports			Imports		
	(1)	(2)	(3)	(4)	(5)	(6)
IPC_i	0.300***			-		
	(3.375)					
COC_i		-0.808***			-	
		(-3.492)				
PS_i			0.215***			-
			(3.492)			
Constant	-2.410	-11.63**	-6.931*	-10.15*	-8.078*	-6.284*
	(-0.597)	(-2.403)	(-1.696)	(-1.664)	(-1.870)	(-1.932)
R-squared	0.988	0.988	0.988	0.984	0.984	0.984

*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Conclusion

We conclude that main causes of Tunisia’s trade deficit are:

-The fall of Tunisian GDP during and after the arab spring,

-The fall of the demand in the EU market during the international crisis,

-The negative effect of the agrement with Turkey on trade balance,

-The increase in corruption and political instability in Tunisia following the Arab Spring associated with insufficient measures of control of corruption

THANK YOU FOR YOUR ATTENTION

Appendix

Appendix 1. Source of variables

Variables (definition and unity)	Sources
$Export_{ijt}$ is the volumes of aggregate exports from Tunisia to country j at time t (measured in current US dollars).	DOTS database
$Import_{ijt}$ is the volume of imports from country j to Tunisia at time t (measured in current US dollars).	DOTS database
Y_{it}: Tunisia's GDP in year t (measured in current US dollars).	WDI database
Y_{jt}: GDP of country j in year t (measured in current US dollars).	WDI database
$Dist_{ij}$: geographical distance between Tunisia and country j (measured in km).	CEPII database
$LANG_{ij}$: dummy variable equal to one if the two partners share common language, zero otherwise.	CEPII database
COL_{ij} : it takes one if the two trading partners have the same colonizer; zero otherwise.	CEPII database
$BORD_{ij}$: it takes one if both partners share the same border; zero otherwise.	CEPII database
AS_j : dummy variable accounting for access to sea. It takes one if the partner country has maritime borders; zero otherwise.	CEPII database
FTA_UE_{ijt}: dummy for EU – Tunisia's trade agreement. It takes one if the trading partner and Tunisia are involved in the EU regional trade agreement at time t; zero otherwise.	World Trade Organization database
FTA_TURQ_{ijt} : agreement dummy taking one if Tunisia and Turkey are members of a bilateral free trade agreement at time t; zero otherwise.	World Trade Organization database
FTA_AGA_{ijt}: dummy for membership in AGADIR agreement. It takes one 1 if Tunisia and the partner country are engaged in the AGADIR regional trade agreement at time t; zero otherwise.	World Trade Organization database
FTA_PAFTA_{ijt}: dummy for membership in PAFTA agreement. It takes 1 it Tunisia and the	World Trade Organization database

partner country are member at time t; zero otherwise.	
IPC_{it} : index of perception of corruption. It is ranked from 0 to 10, with 10 denoting a low level of corruption.	Transparency International publications
COC_{it} : control of corruption. It is ranked from -2.5 (weak) to 2.5 (strong).	World Governance Indicators database
PS_{it}: political stability. It is ranked from -2.5 to 2.5, with 2.5 indicating a high level of stability.	World Governance Indicators database

Appendix 2. List of free trade agreements concluded by Tunisia

Agreement	**Year of entry into force**	**partners**
EU - Tunisia	1998	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom
Pan-Arab Free Trade Area (PAFTA)	1998	Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, United Arab Emirates, Yemen
Turkey - Tunisia	2005	Turkey
Agadir Agreement	2007	Egypt, Jordan, Morocco