Remittances and Disaggregated Country Risk Ratings in Tunisia: An ARDL Approach

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Abstract

Tunisia is currently facing problems of political, economic and financial stability which can affect remittances' evolution. This study is focused on examining the long and the short run relationship between workers' remittances and disaggregated country risk ratings in Tunisia such as economic, financial and political risk in both directions spanning a period from 1984 to 2016. In a bid to achieve this key objective, an ARDL approach combined with CUSUM and CUSUMSQ tests are adopted to investigate the linkage between disaggregated country risk ratings and remittances. The results of the estimates show that the presence of a long-run relationship is confirmed. In addition, it could be deduced that a decrease of economic risk appears to stimulate remittances in short- and long-term. The financial risk increases remittances because it includes variables related to remittances such as exchange rate stability. On the other hand, a higher level of remittances carries a higher level of financial risk in the short- and long-run. These results should engage policy-makers to minimize this negative effect and to channel remittances towards investment purposes. Results indicate also that the political risk decreases in responses to an increase in remittances in the short run.

Keywords: Remittances, economic risk, financial risk, political risk, co-integration, Tunisia, ARDL Approach, long-run and short- run relationship

JEL Classification: F22, F24, C22

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I. Introduction

Tunisia is becoming increasingly aware of the role played by Tunisian migrants in cultural, economic, and social development. Their participations are manifested in their remittances to Tunisia which exceeded 1,903 billion US $ in 2017, this amount is certainly below the reality of the volume of remittances because it does not count the amounts transferred through unofficial channels.

Remittances may be taken into account as a significant source of external funding. They are less volatile than other resource flows of foreign currencies such as FDI[3] and ODA[4]. Thus, they serve as a stable source external funds to decrease the deficit of the current account of the balance of payment (Mamun, K.A. and Nath H.K., 2010 and Chowdhury, M.B., 2011). Moreover, it is noticeable that these flows contribute not only to the well-being of the families back home and to the fight against poverty (Stark and Taylor, 1989; Adams, 1991; Ratha, 2003; Adenutsi, 2011; Peković, D. 2017), but also remittances have an important role in spurring economic growth (Taylor et al., 1996; Taylor, 1999; Edwards and Ureta, 2003; Rapoport and Docquier, 2006; Woodruff 2007; Giuliano and Ruiz-Arranz, 2009; Adela S. and Dietmar M., 2013). As a share of GDP, remittances in Tunisia amount to 5% in 2016, FDI on GDP and ODA on GDP represent respectively 2.2% and 1.9% implying that remittances will be an important financial source of economic development.

Tunisia is currently facing problems of political, economic and financial stability, which can affect the evolution of receiving remittances. Few studies have been injected on this issue; hence, we need to fill this gap in the literature. The purpose of this document is to shed light on the relationship between economic, financial and political risk and remittances sent to Tunisia. For that, this study adopts the Autoregressive Distributed Lag (ARDL) approach to analyze the long and the short run relationship in both directions.

The findings lead to confirm the existence of a long-run relationship among variables under-studied. In the short and long-run, remittances are positively affected by the decrease of economic risk. However, the results reveal that financial risk seeks to increase remittances. On the other hand, remittances lead to higher financial risk in the short and long-run. These results should engage policymakers to minimize this negative effect and to channel remittances towards investment purposes. The Political risk decreases in response to increased short-term remittances.

The next section reviews the findings of recent studies on the risk impact on international remittances. Section 3 describes the data and methodology used in this paper. Finally, this is followed by results and interpretation.

II. Literature review

Given the few studies on the impact of the level of country risk on remittances, we can illustrate the study conducted by Solomon B. (2009) who affirmed that governments of receiving countries can influence remittances by adopting appropriate macroeconomic policies and improving their political environments. Aydas, Neyapti, and Metin-Ozcan (2005) found that the military regime has a negative influence on remittances in Turkey. El Bouhadi and al. (2009) established that remittances depended positively on good governance and negatively affected by corruption and bureaucracy. The study of Lartey (2015), on a panel dataset comprising 90 developing and transition countries for the period 1970–2012, showed that increasing in the effectiveness of government by one percentage point would increase remittances from 1.2% to 1.6%. Also, El

[3] Foreign Direct Investment
[4] Official Development Assistance

Hamma I. (2017) found that a high level of institutional quality and low corruption are a precondition for the successful use of remittances.

However, it is equally evident from the result of Ajide K. B. and Dolapo R. (2016) limited to 14 countries in the ECOWAS region[5] spanning a period from 1996 to 2013, which indicated that both economic and political governance indices retarded the continuous inflows of remittances. They found that 10 % improvement in economic governance will escort to 1.29 % decline on remittances and a 10 % increase in political governance will reduce remittances by 1.12%. Also, Guetat I. and Sridi D. (2017) tested the effects of institutional characteristics on remittance inflows on MENA countries and they found that an increase in remittance inflows is conditioned by an increase in risk, which afforded an altruism motivation. Bettin and al. (2009) found that the amount remitted is positively affected by higher political and economic risks. By contrast, they found that remittances seem to be positively impacted by well-developed financial in the home country.

On the other hand, few macroeconomic studies have emphasized also the impact of remittance on the risk ratings in the home countries. To deal with the impact of remittance inflows on governance indices, we can start by mentioning the study of Ratha (2003) which showed that the cyclical nature of remittances had a stabilizing impact and helped countries to overcome economic shocks. Bettin and al. (2009) showed that remittances affect the institutional quality in the receiving country. Catrinescu and al., (2009) confirmed that remittances will be more likely to lead to longer-term growth in countries with good quality political and economic policies. Balli and Rana (2015) showed that about 4–6% of output shocks are smoothed via remittances which show that remittances act as a hedge against domestic output shocks in developing economies. Recently, Deonanan and Williams (2016) showed that workers' remittances constitute a spur on democratic institutions in developing countries over the period through 1972 - 2012. According to Stark (1991), remittances might also be seen as a means of reducing risk by diversifying the sources of a family's income. In this framework, this flows proceed like insurance against income shocks in the home country (Agarwal and Horowitz, 2002; Gubert, 2002).

By contrast, Abdih et al. (2008) employed empirical approaches in querying the causal link between institutional quality and remittances by a cross-section of 111 countries. They found that an increase in remittances led to a deterioration in institutional quality, especially if funds were diverted by the government for its own use. Berdiev et al. (2013) equally examined the impact of remittance on institution quality and they unraveled how an increase in remittances inflows led to deterioration in institutional quality and raised corruption for non-OECD countries. According to the World Bank 2006, financial risks can arise with remittances, particularly in markets that are not very transparent, where the legal basis is fragile and the financial system is not well stable and not very developed. Ajide and Dolapo Raheem (2016) found that the higher volatility of the exchange rate - as a component of financial risk - the higher would be the level of skepticism of migrants sending money for investment.

III. Data and econometric methodology

i. Sample and data description

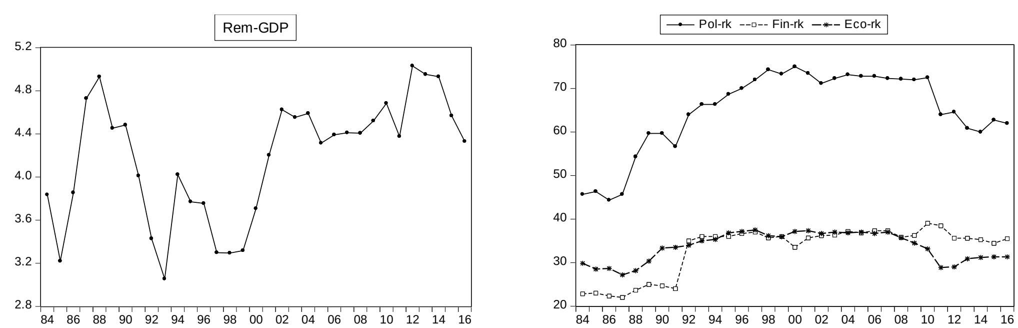
In order to study the relationship among the political, economic and financial country risk rating and Tunisian remittances, we rely on time series variables.

[5] Economic Community of West African States

This paper utilizes remittances as a percent of GDP which is extracted from the World Development Indicators, WDI (2018). Disaggregated Country Risk Ratings in Tunisia are extracted from International Country Risk Guide (ICRG). In this database, Political risk assessment provides a means to estimate political stability. According to ICRG, the political risk is composed of the government stability, investment profile, socioeconomic conditions, ethnic tensions, external conflict, internal conflict, corruption, religious tensions, a military in politics, law and order, democratic accountability, and bureaucracy quality. Secondly, the economic risk rating evaluates the country's current economic strengths and weaknesses. This aggregate index includes GDP per capita, real GDP growth, annual inflation rate, budget balance as a percentage of GDP, and current account as a percentage of GDP. Finally, the financial risk rating represents the country's ability to pay its way. This variable is constructed by the foreign debt service as a percentage of exports of goods and services, the current account as a percentage of exports of goods and services, the foreign debt as a percentage of GDP, the net international liquidity as months of import cover and finally by exchange rate stability. A higher rating of the risk ratings (theoretically ranges from 0 to 100) indicates a lower risk and conversely.

The political risk component is based on 100 points and both the financial and the economic risk components are based on 50 points. Figure 1 shows the distribution of data during the sample period.

Figure 1. Distributions of Remittances per GDP, political, financial, and economic risk ratings in Tunisia



Note: The political risk component is based on 100 points and both the financial and the economic risk components are based on 50 points.

According to the ICRG, the individual risk of each country can be evaluated using the following broad categories: A political risk rating of 0.0% to 49.9% point to a very high risk; of 50.0% to 59.9% indicates high risk, 60.0% to 69.9% represents moderate risk, 70.0% to 79.9% refers to low risk, and 80.0% or more shows a very low risk. For a financial and an economic risk rating of 0.0% to 24.5% indicates a very high risk, 25.0% to 29.9% represents a high risk, 30.0% to 34.9% pointed to a moderate risk, 35.0% to 39.9% indicates a low risk; and when the percentage is more than 40%, it will represent a very low risk.

Table1. Descriptive statistics

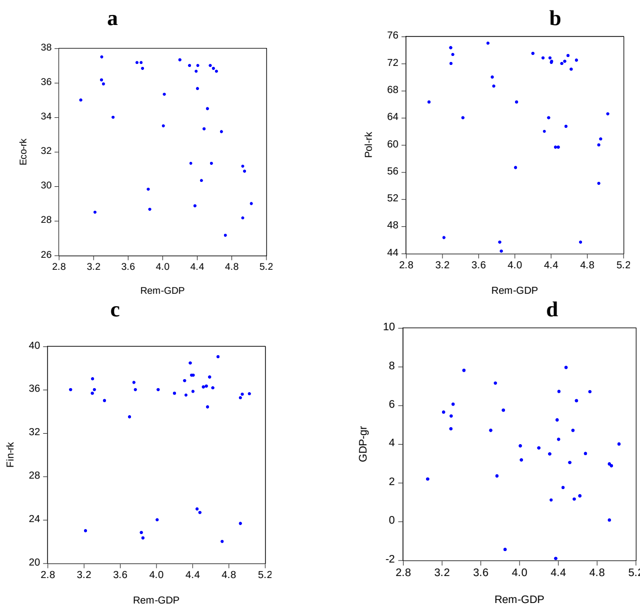
	REM	**PR**	**FR**	**ER**
Mean	4.1834	64.8901	33.0947	33.6065
Median	4.3760	66.3330	35.6670	34.5000
Maximum	5.0300	75.0000	39.0420	37.5000
Minimum	3.0550	44.3330	22.0000	27.1670
CV	0.1104	0.1424	0.17108	0.10015
Observations	33	33	33	33

Note: C.V is standard deviation\mean

The mean of political risk, financial risk and economic risk ratings in Tunisia are respectively 64.89%, 33.09%, and 33.6%, which represents a moderate risk (table 1). Political risk rating represents a low risk in 2010 (72%) and a high risk in 1987, 1991 and 1992 (respectively 46%, 57%, and 54%). Economic risk is estimated in 2011 at just 29% implying a high risk. The financial risk rating is downed to 24% in 1991 which indicate a very high-risk and it is raised to 35% in 1992 pointed to a low risk (Figure 1).

The standard deviation\ mean points to a high historical volatility for the financial risk in Tunisia, which includes the exchange rate stability. Figures 2 a, b, c, and d, from above scatter diagram analysis and the review of summary statistics, don’t allow to a concrete conclusion about the relationship between the different type of risk and workers’ remittances in Tunisia.

Figure 2 : Scatter diagram analysis



ii. Models specification

This paper makes a unique contribution to the literature with reference to Tunisia, being a pioneering attempt to investigate the relationship between disaggregated country risk ratings and workers’ remittances in Tunisia. To achieve this objective, we use a long annual time series data from 1984 to 2016 and we apply rigorous econometric techniques.

This study employs the ARDL technique recommended by Pesaran and Shin (1999) and Pesaran et al. (2001) also recognized as the bounds testing cointegration procedure that has not been used previously to analyze the relationship between the variables to be studied.

According to Emeka N., Kelvin U., 2016, cointegration is an econometric concept which reflects the existence of a long-run equilibrium among economic time series that converges over time. ARDL approach is a modern cointegration technique for examining long-run and the short-run relationships between dependent variables and its forcing variables (independent variables). The ARDL has many advantages. The other cointegration method estimates the long run relationships with various equations; however, the ARDL adopts just a single reduced form equation (Pesaran & Shin, 1995). In addition, the ARDL approach may be applied irrespective of whether the underlying variables are purely I(0), I(1) or a mixture of both[6]. However, this technique will crash

[6] Pesaran and Shin (1999).

in the presence of integrated variables of I(2) (Emeka N. , Kelvin U., 2016). Also, this model could be used with limited sample data; however, the Johansen cointegration technique needs a large sample to find a valid result (Ghatak and Siddiki, 2001). The ARDL approach is better with a small sample[7]. Additionally, in ARDL, the estimations are even feasible if the explanatory variable is endogenous[8].

Technically, the ARDL approach is a multiple-step procedure (M.H. Pesaran, B. Pesaran, 2009). In the beginning, the cointegration between variables is tested using the bounds-testing procedure to discover the long-run relationship(s) between the dependent variable and its forcing variables. The ARDL (p,q1,q2......qk) model approach to Cointegration testing;

$$\Delta X_t = \delta_0 \sum_{i=1}^{k} \alpha_i \Delta X_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta Y_{t-1} + \delta_1 X_{t-1} + \delta_2 Y_{t-1} + \nu_t \qquad \text{(Eq1)}$$

$$\Delta Y_t = \delta_0 + \sum_{i=1}^{k} \alpha_j \Delta Y_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta X_{t-1} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + \nu_t \qquad \text{(Eq2)}$$

Where Δ represents the first difference of the variables, K is the ARDL model maximum lag order. The coefficients α_1 and α_2 are the short-run coefficients and the δs are the long-run coefficients of the ARDL model. δ_0 and ν_t represent the intercept and the error terms, respectively.

The F-statistic is performed on the joint null hypothesis that the coefficients of the lagged (δ1 X_{t-1} δ2 Yt-1 or δ1 Yt-1 δ_2 X_{t-1}) are zero. (δ_1 - δ_2) correspond to the long-run relationship, while (α_1 – α_2) represent the short-run dynamics of the model.

The hypothesis that the coefficients of the lag level variables are zero is to be tested.

H0: $\delta_1 = \delta_2 = 0$ (the long run relationship does not exist)

H1: $\delta_1 \neq \delta_2 \neq 0$ (the long run relationship exists)

This can be denoted as follows:

$F_X (X_1 \mid Y_1, \ldots Y_k)$ (Eq 3)

$F_Y (Y_1 \mid X_1, \ldots X_k)$ (Eq 4)

The hypothesis is tested by means of the F-statistic (Wald test) in equation 3 and 4, respectively. Once the F-statistic is under the lower critical bound, we can confirm the absence of the cointegration. Similarly, if the F-test statistic exceeds the upper level of the band, the null hypothesis of no long-run relationship will be rejected. But if the F-test statistic is stuck between the two bounds, the result is inconclusive. If the F-statistics (Wald test) indicates that there is a long run relationship, an ARDL approach can be applied rather than using Johansen and Juselius approach, and vice versa.

Therefore, the next step was to determine the optimal model by identifying the optimal lag for each variable in the system based on various criteria such as Akaike Information Criteria or Schwarz Bayesian. Finally, the short-run dynamics are estimated by using the error-correction model (ECM). This coefficient confirms the existence of a long-run relationship and indicates the speed of adjustment to the equilibrium. According to Emeka N., Kelvin U. (2016**),** the ECM shows how much of the disequilibrium is being corrected. A positive coefficient designates a divergence and a negative coefficient shows a convergence. If the estimate of ECM = 1, then 100% of the adjustment takes place, or the adjustment is instantaneous and full, if the estimate of

[7] Haug (2002).
[8] Pesaran, Shin (1999) and Pesaran *et al.* (2001).

ECM = 0.5, then 50% of the adjustment is realized each period/year. ECM = 0, confirm that there is no adjustment, and the long-term relationship no longer makes sense.

Various diagnostic tests have to be applied to confirm the validity of the model. The diagnostic test and the stability test are conducted. The diagnostic test checks the serial correlation, heteroscedasticity, and normality related to the model. To test the stability of the parameters in the model, we use the stability test of the cumulative sum of recursive residuals proposed by Pesaran and Pesaran (1997) and the cumulative sum of squares of recursive residuals by Brown et al. (1975) (CUSUM and CUSUMSQ test).

IV. Results and discussion

i. Results of unit root tests

The data used in this paper was small (33 observations), which provided a justification to use ARDL to find out the existence of co-integration between variables rather than the Johansen cointegration techniques which require larger samples to obtain a valid result (Ghatak and Siddiki, 2001; Pahlavani 2005). The ARDL model was also chosen because it uses a single equation to estimate the relationships between disaggregated country risk ratings and workers' remittances in Tunisia (Pesaran & Shin, 1998). Furthermore, the ARDL model permits to apply a different number of optimal lags for each variable (Habanabakize & Muzindutsi, 2016). Some explanatory variables can be endogenous which makes our estimated coefficients biased, but the ARDL approach can avoid this problem that may take place (Pesaran et al. 2001).

The ARDL model does not require the order of integration but it confirms the non-availability of stationary at the second order i.e I(2). To verify whether this condition is confirmed, the Dickey–Fuller test (ADF) and Phillips– Perron test (PP) were conducted for all variables.

The estimated results of unit root test indicate that the non-stationarity null hypothesis is not rejected for the level series, but it is rejected for the first-difference series and not stationary at second order I(2); thus, the ARDL approach is appropriate for the data.

ii. Long-run and Short-run relationships

We proceed to the next step by examining the presence of co-integration to look into whether a long-run relationship exists among the variables which is tested by computing the Bound F-statistic (bound test for cointegration) with and without trend component specifications. In this paper, we employed both critical bounds proposed by Pesaran et al. (2001) and Narayan (2005) but the decision is based on Narayan (2005) since critical bounds recommended by Narayan (2005) are much appropriate for small data set like in our case (33 observations). The orders of the optimal lag for each variable in the ARDL model are chosen by using the AIC.

The bounds-testing procedure identifies the long-run relationship between the political, economic and financial country risk rating and Tunisian remittances. In this framework, we construct the following regressions:

$$\Delta REM_t = \alpha_{10} + \sum_{i=1}^{k} b_{1i}\Delta REM_{t-1} + \sum_{i=1}^{k} c_{1i}\Delta ER_{t-1} + \sum_{i=1}^{k} d_{1i}\Delta FR_{t-1} + \sum_{i=1}^{k} e_{1i}\Delta PR_{t-1}$$
$$+ \delta_{11} REM_{t-1} + \delta_{12} ER_{t-1} + \delta_{13} FR_{t-1} + \delta_{14} PR_{t-1} + \nu_t \qquad \textbf{(Eq5)}$$

$$\Delta ER_t = \alpha_{20} + \sum_{i=1}^{k} b_{2i}\Delta ER_{t-1} + \sum_{i=1}^{k} c_{2i}\Delta REM_{t-1} + \sum_{i=1}^{k} d_{2i}\Delta FR_{t-1} + \sum_{i=1}^{k} e_{2i}\Delta PR_{t-1}$$
$$+ \delta_{21} ER_{t-1} + \delta_{22} REM_{t-1} + \delta_{23} FR_{t-1} + \delta_{24} PR_{t-1} + \nu_t \qquad \textbf{(Eq6)}$$

$$\Delta FR_t = \alpha_{30} + \sum_{i=1}^{k} b_{3i}\Delta FR_{t-1} + \sum_{i=1}^{k} c_{3i}\Delta REM_{t-1} + \sum_{i=1}^{k} d_{3i}\Delta ER_{t-1} + \sum_{i=1}^{k} e_{3i}\Delta FR_{t-1}$$
$$+ \delta_{31} R_{t-1} + \delta_{32} ER_{t-1} + \delta_{33} FR_{t-1} + \delta_{34} PR_{t-1} + \nu_t \qquad \textbf{(Eq7)}$$

$$\Delta PR_t = \alpha_{40} + \sum_{i=1}^{k} b_{4i}\Delta PR_{t-1} + \sum_{i=1}^{k} c_{4i}\Delta REM_{t-1} + \sum_{i=1}^{k} d_{4i}\Delta ER_{t-1} + \sum_{i=1}^{k} e_{4i}\Delta FR_{t-1}$$
$$+ \delta_{41} PR_{t-1} + \delta_{42} REM_{t-1} + \delta_{43} ER_{t-1} + \delta_{44} PFR_{t-1} + \nu_t \qquad \textbf{(Eq8)}$$

Where REM is the remittances as a percent of GDP for Tunisia, PR denotes the political risk component, FR is the financial risk component, and ER is the economic risk component of the ICRG's risk ratings. The coefficients b, c, d, and e are the short-run coefficients for the remittances and the respective risk components, and the δs are the long-run coefficients of the ARDL model. The null hypothesis of no cointegration is that δj1 = δj2 = δj3 = δj4 = 0, where j represents one of the four endogenous variables in the model. Empirical results of the long-run relationship are represented in table 3.

The results of the bounds-testing are reported in Table 2. For the equation in which the remittances are the dependent variable (F(Remittances$_t$ | Economic Risk$_t$ Financial Risk$_t$, Political Risk$_t$)), all the right side variables are the forcing variables of remittances. The value of calculated F- statistics is significant at 1 percent level of significance for the model includes a trend component, because 7.8714 is more than upper bound, which yields the existence of co-integration or long-run relationship between remittances and the economic risk, the financial risk, and the political risk ratings.

Other cointegration hypotheses are also tested for F **(**Economic Riskt | Remittances$_t$, Financial Risk$_t$, Political Risk$_t$**)**, F **(**Financial Risk$_t$ | Remittances$_t$, Economic Risk$_t$, Political Risk$_t$**)**, and F **(**Political Risk$_t$ | Remittances$_t$, Economic Risk$_t$ Financial Risk$_t$**)** when the economic risk, financial risk, and political risk components are respectively the dependent variables. Results show that the F-statistics are not significant for the equation of economic risk. This finding suggests that in the long term, increased remittance flows have no impact on economic risk.

While the dependent variable is changed by the financial risk and political risk ratings, the results yield a significant F-statistic with and without deterministic trends. In that case, the variables are supposed to have a long-run relation. This reveals the degree of the sensitivity of the financial risk and political risk ratings to worker's remittances.

In the final step, the outcome of the short-run dynamic coefficients is procured from the ECM equation are represented in Table 4. The coefficients of the ECM are negative and significant in all equations, which confirm the long-run relationship among the variables in our models. These coefficients also indicate a very speedy convergence to long-run equilibrium.

The results indicate that among the three risk rating factors, economic and financial conditions have respectively a significant positive and negative impact on remittances, in the short- and long-run (Table 3 and 4, column 1). Remittances are positively affected by economic risk rating which mainly captures real GDP growth and annual inflation rate. The highest overall rating indicates the lowest risk and the lowest rating indicates the highest risk. During periods of unrest, Tunisian migrants prefer to keep money in the host country. These results provide evidence of self-interest behavior and investment purposes which, predicts that remittances and the home country's business cycle move in tandem. If investment opportunities in the home country become appealing, then Tunisian migrants will closely track expansionary economic periods in order to profit from investment opportunities.

Table 2. ARDL bounds Testing Analysis

	Without trend	With trend
$F(Rem_t \| ER_t, FR_t, PR_t)$	3.452958	7.871457***
$F(ER_t \| Rem_t, FR_t, PR_t)$	2.5822	3.3841
$F(FR_t \| Rem_t, ER_t\ PR_t)$	5.1615**	5.4430*
$F(PR_t \| Rem_t, ER_t\ FR_t)$	14.05211***	9.0701***

Note: ***Represents significanceat1%. ** Represents significanceat5%. ***Represents significanceat10% level of significance..

Table 3. Estimated long-run coefficients

	Rem	F R		PR	
	With trend ARDL(3,4,4,0)	**Without trend ARDL(4,0,3,4)**	**With trend ARDL(4,0,1,4)**	**Without trend ARDL(1,3,2,0))**	**With trend ARDL(2,3,2,1)**
REM		-2.0339*	-2.4518**	-1.3492	-2.6272
ER	0.1643*	-0.9995	0.1680	1.8579***	2.0574***
FR	-0.1674***			0.1482	-0.1813
PR	-0.0226	0.8437**	0.2627**		
c	3.9330***	20.7875**	18.3549**	4.7333	9.6785
@TREND	0.0993***		0.1800**		0.2564*

Note: ***Represents significanceat1%. ** Represents significanceat5%. ***Represents significanceat10% level of significance..

Table 4. Error correction representation for the selected ARDL model

	D(Rem)	D(FR)		D(PR)	
	With trend ARDL(3,4,4,0)	**Without trend ARDL(4,0,3,4)**	**With trend ARDL(4,0,1,4)**	**With trend Ardl(1,3,2,0))**	**Without trend ARDL(2,3,2,1)**
D(REM)			-2.6490**	-1.0738	-0.8311
D(REM(-1))	0.2819**			-0.6168	-0.1531
D(REM(-2))	0.4961***			2.2025	2.4184***
D(ER)	0.0930***	-0.7406**	-0.3591	1.2152	1.3141***
D(ER(-1))	-0.1336***	0.6546*		-1.3274	-1.5654***
D(ER(-2))	-0.0849**	1.0381**			
D(ER(-3))	-0.1400***				
D(FR)	-0.0409**				0.0733
D(FR(-1))	0.0824***	0.2154	0.2670		
D(FR(-2))	0.1191**	0.5141**	0.4426**		
D(FR(-3))	0.0331**	0.5275**	0.4437**		
D(PR)		0.4073**	0.1703		
D(PR(-1))		-0.3882**	-0.3184**		0.2021*
D(PR(-2))		-0.7097***	-0.4318***		
D(PR(-3))		-0.4935***	-0.4113**		
C	3.4293***	20.1303***	19.830***	2.7488***	6.3091***
@TREND	0.0866***		0.1945**		0.1671**
ECM(-1)	-0.8719***	-0.9683***	-0.1804***	-0.5807***	-0.6518***

Note: ***Represents significanceat1%. ** Represents significanceat5%. ***Represents significanceat10% level of significance.

Moreover, the financial risk increases remittances because the financial risk group includes variables that have connections involving remittances such as the exchange rate stability. This suggests that the depreciation of the local home currency against the dollar leads to increase remittance since it brings more local currency. Faini (1994) argued that the real exchange rate appreciation reduces remittances flows marginally more in developing rather than developed countries.

In addition, remittances are more affected in the short run (table 4) by the negative impact of the economic risk than the positive impact of the financial risk (0.099 > 0.04), which explain the decline of these flows in these last years (Appendix 3).

In other hand, remittances lead to higher financial risk in the short- and long-run. Remittances unlikely can cause stability problems for financial institutions and remittances can cause real exchange rate depreciation. In fact, remittances can help soften individuals' financing; hence, they can guide to a lower demand for credit and reduce bank deposits. These results are similar to those of World Bank (2006) when financial risks can arise with remittances, particularly in markets that are not very transparent, where the legal basis is fragile, or where the financial system is not well developed. According to Barajas, Chami, Hakura and Montiel (2011), Chami et al. (2003) and Acosta et al. (2009), the massive inflow remittances can be related with a real exchange rate appreciation and a decline of international competitiveness, which could guide to a decrease in the national production, causing the Dutch disease. These results should engage policymakers to minimize this negative effect and to channel remittances towards financial development and reduce financial risk in Tunisia. However, the study of Demirguc-Kunt, Lopez-Cordova, Peria, and Woodruff (2010) showed that remittances have a positive impact on financial development and showed that remittances are powerfully associated with better banking breadth and depth and raise the ratio of deposits to GDP in Mexico.

The political risk decreases in responses to an increase in remittances in the short run. These results suggest that the increase in remittances volume will decrease the political risk in Tunisia. The results also suggest that remittances are relevant to political variables such as government stability, socioeconomic conditions, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tension, democratic accountability, and bureaucratic quality. As a result, if remittances are assigned to productive projects and not badly employed, for example in terrorist activities or money laundering, it will rather decrease the political risk in Tunisia.

iii. Diagnostic tests

The results in Appendix 2 point to the absence of any instability of the coefficients because the CUSUM and CUSUMSQ statistics exceed the 5% critical bounds of parameter stability. Indeed the models are free from problems associated with serial correlation, heteroskedasticity, model misspecification and no stability of the parameters, as can be witnessed from the results in Appendix 1. This implies the suitability of the selected ARDL models and the reliability of the cointegration estimates.

V. Conclusion and policy implications

The ARDL results recommend the reject of the null hypothesis of no cointegration for the models; F (Rem_t| PR_t, FR_t, ER_t) with trend, F (PR_t |Rem_t, FR_t, ER_t) and F (FR_t | Rem_t, PR_t, ER_t) with and without trend - when remittances, political risk, and financial risk are respectively the dependent variables - because the values of the F- statistic are greater than upper bound critical. This indicates a long-run equilibrium relationship for these three equations. For F (ER_t |Rem_t, PR_t, FR_t), when the economic risk is the dependent variable and remittances are one of the forcing variables, the F-statistics is not significant. This indicates that the primary incentive of remittances is altruism motivation of the migrants to help their family and also to secure their future when they returned back to their native nation and not for investment purposes.

The results indicate that, in the short- and long-run, the economic and financial risk ratings have respectively a positive and negative effect on remittances, where a higher percent of the risk ratings indicates a lower risk and conversely. The economic prosperity of Tunisia is found to fuel remittance inflows. This is particularly visible across the positive impact of less economic risk, which mainly captures real GDP Growth and annual inflation rate. During periods of unrest, Tunisian migrants prefer to keep money in the host country because of a lack of confidence in the economic development of their countries. This indicates that good economic conditions and investment opportunities encourage migrants to send more funds, which suggests the motivation of " self-interest" of remittances This finding is consistent with, Agarwal and Horowitz (2002) for Guyana, Osaki (2003) for Thailand, Ncube and Brixiova (2013) for Africa, Yang, D., and Choi, H. (2005) and Fonchamnyo (2012). Moreover, the financial risk increases remittances because the financial risk group includes variables that are related to remittances such as the exchange rate stability. In fact, depreciation of the local home currency against the dollar leads to increase remittance since it brings more local currency (Singh et al., 2009).

In addition, remittances are more affected in the short run by the negative impact of the economic risk than the positive impact of the financial risk, which explain the decline of these flows in these last years.

On other hand, remittances lead to higher financial risk in the short- and long-run. In fact, workers' remittances can affect the exchange rate volatility (Bourdet and Falck, 2003; Hyder and Mahboob, 2005; Mandelman F., 2013; and KhurshidA., Kedon Y., Cantemir A., Khan K., 2017.) In addition, the desire of migrants to send money home at the lowest cost leads them to use informal methods or non-bank institutions which increase financial risk. Also, remittances can help soften individuals' financing; hence, recipients of remittances can guide to a lower demand for credit and reduce bank deposits which negatively affect financial development. These results should engage policymakers to minimize this negative effect and to channel remittances towards investment purposes. The political risk decreases in responses to an increase in remittances in the short run.

These results suggest that the increase in remittances volume will decrease the political risk in Tunisia, if remittances are assigned to productive projects and are not badly employed, for example in terrorist activities or money laundering. In this case, political shocks are smoothed through remittance inflows.

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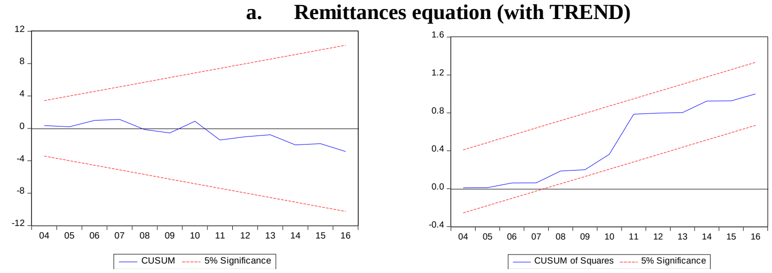
Appendix1: Diagnostic tests

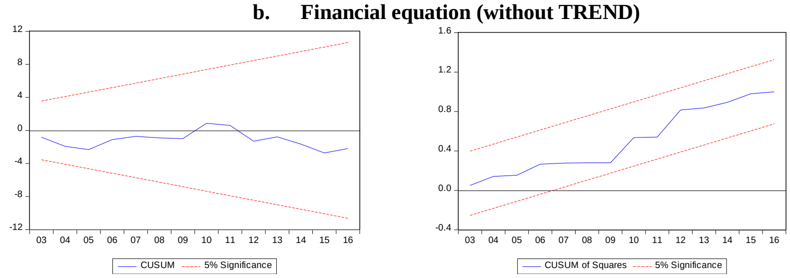
	Rem	FR		PR	
	With trend	Without trend	With trend	With trend	Without trend
Heteroskedasticity Test	0.8611	0.6640	0.6694	0.6695	0.6172
Serial Correlation LM Test	0.07	0.3578	0.4027	0.3741	0.1108
Normality test	0.28033	0.4707	0.8919	0.5030	0.8266
Correlogram of residuals squared	0.602	0.563	0.374	0.123	0.364
Correlogram of residuals	0.259	0.282	0.759	0.349	0.762

Appendix2: Stability tests (Plot of CUSUM Plot of CUSUM SQ)

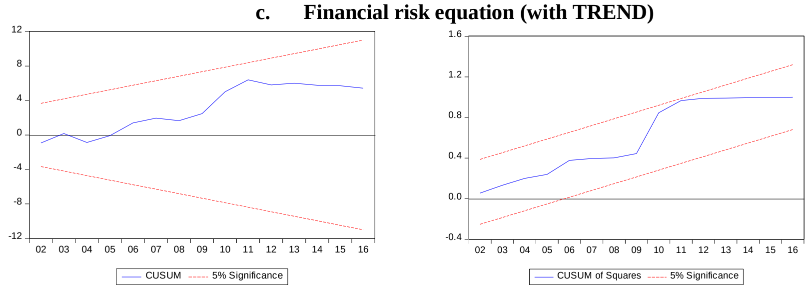
a. Remittances equation (with TREND)



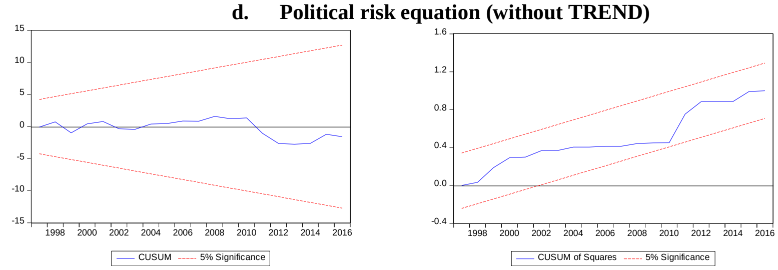
b. Financial equation (without TREND)



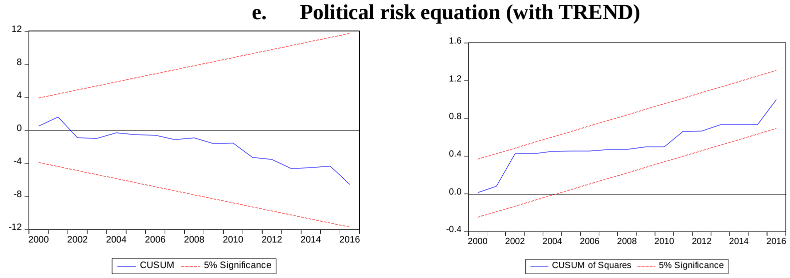
c. Financial risk equation (with TREND)



d. Political risk equation (without TREND)



e. Political risk equation (with TREND)



Appendix 3: Remittances received (Million US $)