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TIE AMONG DOMESTIC INVESTMENT, TOTAL CONSUMPTION AND EXTERNAL DEBT: ECONOMIC POLICY LESSONS FROM TUNISIA

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Abstract: *This paper aimed at examining the tie between domestic investment, total consumption, and external debt in the case of Tunisia over the period 1970-2017. By applying the VECM, in the long-run, our findings recorded the fact that that external debt and domestic investment have a negative effect on total consumption. However, we found a significant negative impact of the total consumption and external debt on domestic investment. In the short run, we recorded that only total consumption and external debt cause domestic investment. Due to the importance of our insights, several lessons for Tunisia in terms of commitment towards the aims of the 14 January revolution and reforms should be undertaken.*

Keywords: Domestic investment, Total consumption, External debt, VECM, Tunisia.

1. Introduction

Since the beginning of the Arab Spring, initially through the revolution of 14th January 2011, the Tunisian economy has struggled a lot to achieve the revolution's goals in terms of employment, prosperity, and dignity. Indeed, to achieve these aims, the Tunisian government increases the volume of domestic investments, creating jobs, and stimulating consumption in detriment of the aggravation of external debt.

However, this *"go & stop"* policy has a detrimental effect on the Tunisian economy by enhancing the inflation pressure through the easier loan obtaining which enhance the demand, the absence of economic criterions in the national investments and the distributive policies

based on political agendas without any value-added in terms of real counterpart to the Tunisian community[1].

According to Adegbite and al. (2008); Tang (2008); Hill and al (2012); Almasifard (2013), among others, these aspects are the most controversial issues for a government to control, especially, in a democratic transition stage, due to their capacity to reflect the serenity of a small economy.

Hence, these indicators portray the dashboard of the economy, which influence the rating of the economy to pay back his debt and then determine the borrowing conditions in the international financial markets.

The algorithm of this article is structured as follow: Section 2 portrays the data. Section 3 discusses the modeling specification. Section 4 contains empirical results. The conclusion of the paper is given in Section 5.

2. Data

Data for domestic investment (DI), final consumption expenditure (FCE) and external debt (ED) for Tunisia was principally obtained from the World Bank Indicators for the period 1970 to 2017.

Domestic investment is held as Gross fixed capital formation (% of GDP) {see: Balassa (1978); Choe (2003); Tang (2008)}; Total consumption is taken as Final Consumption Expenditure (% of GDP) {see Bernhard (2001); and Almasifard (2013)} and to express External we use External Debt Stocks (% of GNI) {see: Collins and Park (1988); Were (2001); Adegbite and al. (2008); Hill and al (2012)}.

[1] Institut national de la statistique: Tableau de Bord Économique.
Available at : https://www.ins.tn

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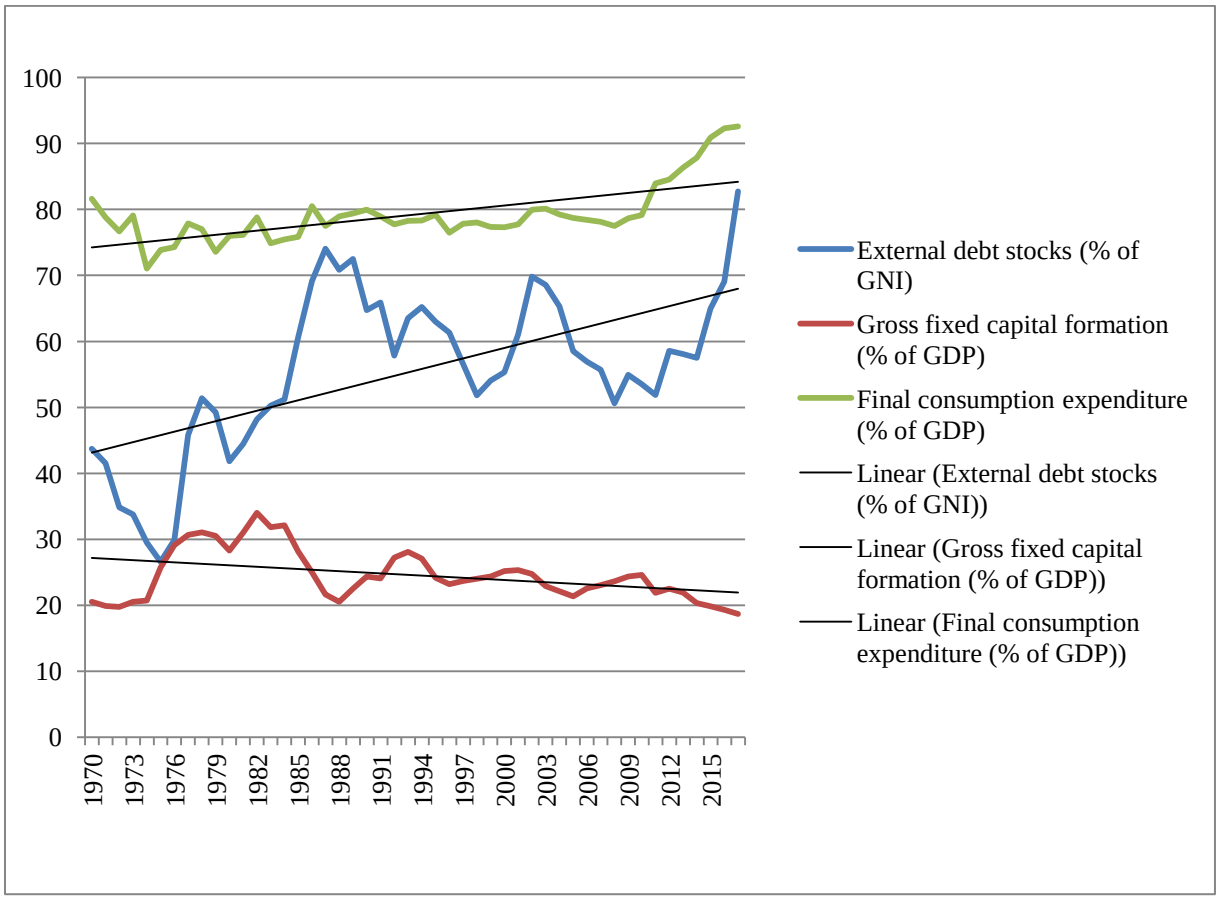
Figure 1. Stylized facts of domestic investment, external debt and total consumption in Tunisia for the period 1970 - 2017



Source: World Bank Indicators (2018)

For the period 1970 – 2017, graph n°1 shows that the trend in the share of external debt and total consumption has been largely bullish. On the other hand, the share of domestic investment has had a downward trend.

3. Econometric Model

We suggest a Vector Error Correction Model (VECM) to determine if there is a relationship between domestic investment, total consumption, and external debt, both in the short run as well as in the long run.

A VEC model can be expressed as follows:

$$\Delta Y_t = \rho + \check{S}\, Y_{t-1} + \sum_{i=1}^{p-1} \check{Z}_i \Delta Y_{t-i} + \varepsilon_t$$

Y_t: (ED, FCE, DI) is the vector of all endogenous variables as defined above, expressed in its first differences(Δ).

$\check{S}$: It is the long run part of the model, which contains the cointegration coefficients β and α.

$\check{Z}$: It is the matrix of short-term parameters.

ε_t: It is the vector residual.

ρ: It is the vector of constant terms.

4. Discussion of empirical results

We employ the Phillips-Perron (PP) test (1988) (unit root tests) to identify whether the variables contain a unit root and confirm the stationarity of each variable.

Table 1. Unit root test (PP)

	Constant	Constant and Trend
FCE	(0.089659)	(2.103554)
	[8.865594]***	[10.04635]***
DI	(1.911482)	(2.198200)
	[4.507239]***	[4.664391]***
ED	(1.149136)	(1.872664)
	[4.439337]***	[4.527190]***

Note: ** and *** denote significances at 1% and 5% levels, respectively;

( ) denotes stationarity in level;

[ ] denotes stationarity in first difference;

Source: Calculations done by the authors based on the EViews 10 software.

From Table 1, we draw the conclusion that all the 3 variables become stationary at the first difference. We can conclude that they are all integrated of order 1 suggesting that we can run the Johansen Cointegration Test.

We use the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SC) and the Hannan-Quinn Information Criterion (HQ) to determine the appropriate lag lengths of the variables.

Table 2. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-307.2083	NA	350.7629*	14.37311*	14.73805*	14.50845*

2	-301.1322	10.49520	402.4234	14.50601	15.23590	14.77669
3	-298.4210	4.313233	542.2844	14.79186	15.88671	15.19788

*** indicates lag order selected by the criterion**

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Calculations done by the authors based on the EViews 10 software.

It is observed from the results of Table 2 that the optimal lag length is equal to 1 which is appropriate to get an uncorrelated and homoskedastic residual for the VAR system.

Table 3 provides the cointegration test results obtained from the Johansen (1991) method for the energy model. In the Johansen method, two tests are used to determine the number of cointegrating vectors: the Trace test and the maximum Eigenvalue test.

Table 3. Johansen Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.530086	69.06281	29.79707	0.0000
At most 1 *	0.398720	35.07857	15.49471	0.0000
At most 2 *	0.237253	12.18731	3.841466	0.0005

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.530086	33.98424	21.13162	0.0005
At most 1 *	0.398720	22.89126	14.26460	0.0017
At most 2 *	0.237253	12.18731	3.841466	0.0005

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Calculations done by the authors based on the EViews 10 software.

Results from both the Trace test and the maximum Eigenvalue test indicate that the variables in the system are cointegrated. The existence of 3 cointegrating equations relationships implies that a VECM specification is appropriate.

The target to perform an estimate based on the VECM is to detect the nexus between domestic investment, total consumption expenditure and external debt in the short term and the long term.

Table 4. Results of Vector Error Correction Model

	Equation (FCE)	**Equation (DI)**	**ED**
FCE	-	-1.000872 (0.0500)**	-6.541972 (0.1414)
DI	-0.999129 (0.1038)	-	-6.536272 (0.6291)
ED	-0.152859 (0.2291)	-0.152992 (0.0511)*	-
Lagged ECT	**[-0.596196]*** **	**[-0.574200]*** **	**[-0.015157]**

Values in brackets are estimated t-statistics for each cointegration equation.

Values in parentheses are P-values of the Granger causality test / Wald test for short-term relationships

The other values present the coefficients of the estimated variables included in the long-term relationships.

* ** ; ** and * denote significances at 1% , 5% and 10% levels respectively

Source: Calculations done by the authors based on the EViews 10 software.

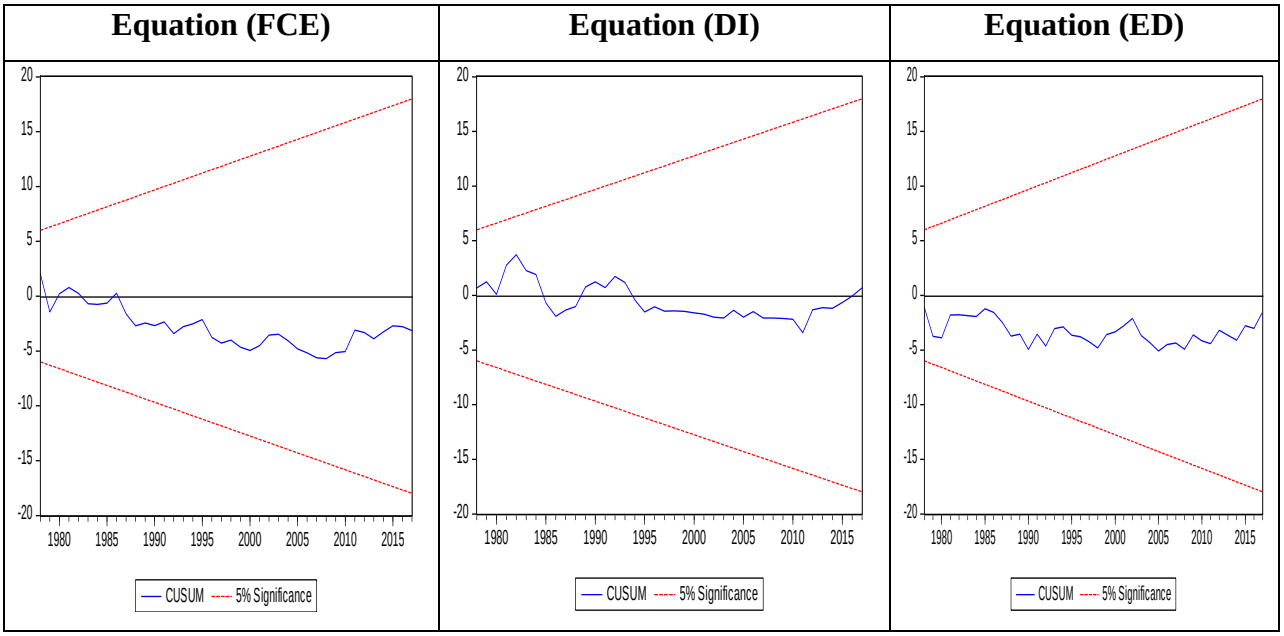
Table 4 shows that external debt and domestic investment have a negative effect on total consumption in the long run. Indeed, these facts could be justified, during the revolution, the Go & Stop gained momentum through the local investment and the external debt has no significant impact on consumption, due to the pressure exerts from the external on the consumption which constitutes a penalty for the consumption.

Also, we found that total consumption and external debt have a negative effect on domestic investment. This implies that the Tunisian capacities (consumption and the external capacities) are oriented toward non-productive activities and distributive policies for specific lobbies without any real counterpart for the whole Tunisian community.

In the short run, Table 4 shows that only total consumption and external debt cause domestic investment. This implies that the consumption and the external debt constitute the driving force behind the domestic investment due to the weak domestic capacity to enhance investment and job creation.

Finally, we will apply to use the test CUSUM, this test makes it possible to study the stability of the model estimated over time.

Graph 2. Stability VECM (CUSUM Test)



The test result of the stability VECM (CUSUM Test) show that the Modulus of all roots is less than unity and lie within the unit circle. Accordingly, we can conclude that our model the estimated VECM is stable and stationary.

5. Conclusion

In the context of the democratic transition of the political regime in Tunisia since the 14 January 2011 revolution, some conflicting issues are appear such as the domestic investment,

external debt sustainability, and the consumption level. We attempt to examine the relationships between domestic investment, total consumption and external debt by applying the Vector Error Correction Model (VECM) for the Tunisian economy over the period 1970 - 2017. Our findings revealed that external debt and domestic investment have a negative effect on total consumption in the long run. In addition, our insights pointed out that total consumption and external debt have a negative effect on domestic investment. In the short run, we recorded that only total consumption and external debt cause domestic investment.

From this perspective, the Tunisian government invited to lunch ambitious strategy towards productive activities with high value-added which leads to creating jobs help the Tunisian economy to be more competitive. In addition, the external debt issue should be taken seriously in terms of sustainability and channelized in the right way towards a development. Tunisia should show his commitment towards the aims of the 14 January revolution and several reforms should be undertaken in order to create an environment of trust and favorable to spillover which helps and encourage domestic and foreign investments.

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