

Are defence expenditures the reasons of foreign debts in Turkey?

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Abstract. *Liberalization and globalization tendencies having had domination in the world since the beginning of 1980s have facilitated the developing countries' access to external sources. So, serious increases have been seen in the countries' foreign debts. There is a common consensus in both theoretical and empirical literature that one of the reasons which lead to increase in foreign debts is defence expenditures. Based on this point of view, this study mainly aims at analyzing the relationship between foreign debts and defence expenditures as specific to Turkey by considering data of 1980-2016 period. In this regard, Toda-Yamamoto and Dolado-Lütkepohl (TYDL) tests have been utilized. Analysis findings indicate that defence expenditures are the reasons of foreign debts in Turkey.*

Keywords: security, defence expenditure, foreign debt, TYDL, Turkey.

JEL Classification: F52, H63, C22.

1. Introduction

Developing countries with inadequate domestic savings have a tendency towards external financing instruments or directly to external sources. Sources which are provided from foreign countries –a serious part of which is foreign indebtedness– increase total national savings. When foreign indebtedness is a matter of fact, there is an inflow of foreign currency or an inflow of source as goods and services in the country. Therefore, it plays a role which increases the investment, national income and foreign currency holdings. However; it may have some negative impacts on the economic indicators when foreign debts are reimbursed as capital and interest since there is an outflow of source in the country. As the country has more and more debt stocks and burden of debt, these negative impacts make themselves much more evident. Even there is no difference with regard to negative impacts which may arise in the phase of reimbursement of the debt whether foreign debts are borrowed by the state sector or private sector.

In addition to these general functions, countries may resort to foreign indebtedness because of such reasons as non-use of debts from domestic markets, financing of import which is required by industrialization and development as well as raw materials, intermediate and investment goods, financing of investments and economic reforms, financing of balance-of-payments deficit, rollover of debts due, financing of chronic budget deficits and defence expenditures. Defence expenditures are the most important expense item of public expenditures especially in developing countries (Ulusoy, 2016: 58, 60). Each activity which is carried out by a government in order to fulfill its defence requirements is called as “defence service” while all kinds of expenditures for fulfilling these services are called as “defence expenditures” (Güneş, 2011: 147). Since defence services are totally considered as exact public goods⁽¹⁾, governments are required to allocate funds from their budgets in order to fulfill defence requirements. However; if there is a huge allocation for defence expenditures from the budget, it may be a matter of debate regarding how these expenditures will be financed.

Defence expenditures have impacts on foreign debts through three channels (Smyth and Narayan, 2009: 239): First of these channels is a budget spending which is required to finance defence expenditures. If the taxes are inadequate to finance defence expenditures, there is an emergence of budget deficit. If the government cannot finance this deficit within the country, it directly resorts to external sources and debts or provokes domestic financial system to go into indebtedness from external sources. However; it does not clearly show whether the country is an arms producer or arms importer. Secondly, a part of defence expenditures may have been allocated for arms import which requires foreign currency. If the country is deprived of foreign currency, it has to go into foreign indebtedness. Thirdly, demand for foreign currency can be increased if the country produces domestic arms and other military equipment. Since domestic arms are produced by using hi-tech parts and machines, demand for the import of these parts and machines can be increased which will consequently lead to the increase of demand for foreign currency as well.

If a huge share is allocated from the budget for defence expenditures, it is of high importance to determine opportunity cost of defence expenditures in order to realize to

what extent it has an impact on other expenditures. Increasing defence expenditures are considered as opportunity cost of the expenditures other than defence purposes. In this regard, it is thought that opportunity cost of defence expenditures is high because there is a possibility of using scarce sources in developing countries for the activities other than defence purposes more efficiently and significantly (Roux, 2007: 258). Therefore; countries having scarce sources have to determine source allocation between defence expenditures and other expenditures in an optimal level. Because spending more defence expenditures can be possible only by giving up other goods and services (Giray, 2004: 186).

A country having scarce sources may be faced with some negative economic outcomes when it increases its defence expenditures (Hewitt, 1991: 22). Firstly; taxes increase, investment and consumption decrease when the government increases public expenditures. Public infrastructure programs and economic services may be interrupted as well. Finally; governments resort to foreign indebtedness in order to increase their defence expenditures (Willett, 1999). Additionally; some positive externalities can be created such as technology spillover effect, physical infrastructure construction and support of the modernization of health services when defence expenditures create modernization. Defence expenditures contribute to production through these positive externalities.

Globally speaking, developed countries substantially contribute to their economies by producing capital-hi tech military equipment whereas such kind of expenditures can create negative impacts (such as current deficit, budget deficit and foreign debt) on their economies in developing countries such as Turkey where defence expenditures are mostly composed of personnel expenditures and import of military equipment. Terrorism has also unignorable damages to countries' economies in addition to financial factors. Hence, fighting against terrorism seriously unsettles the budget which inevitably lead to foreign indebtedness (Işık and Kılınç, 2015: 28).

Cross-border and domestic military operations carried out for fighting against terrorism which has been available in Turkey for ages constantly lead to an increase in defence expenditures. Moreover; Turkey is the country which is affected by the state of disorder and chaos in Middle East at the highest level. Examining GDP share of Turkey's military expenditures between 1980 and 2016, which is determined as the analysis period in this study, it is seen that this there is an average rate of 3.2%. Although GDP share of Turkey's military expenditures decreases to 2% as of 2016, this rate is still above the share of many NATO countries in accordance with the data provided by SIPRI (2017).

International comparisons indicate that Turkey which has approximately 600.000 soldiers has the eleventh biggest army in the world and the second biggest army in Europe after Russia. So, it is not surprising that 75% of its military expenditures are composed of the procurement of goods and services for the personnel needs (Yentürk, 2015: 5). Thus, defence expenditures are still of high importance for Turkey. Based on this view, this study will seek for the answer to the question: "Are defence expenditures the reasons of foreign debts in Turkey?". Since there is a deficiency of studies regarding Turkish economy, this study is of high importance for its contributions to the existing literature and policy recommendations. Study will continue as follows: Second part examines the

development of foreign debts in Turkey. Third part explains the existing national and international literature. Fourth part indicates methodology, analyses and findings. Finally, fifth part delivers conclusions and suggestions.

2. Development of foreign debts in Turkey

Turkey applied economic recovery program on 24 January 1980 and adopted a more liberal and outward-oriented industrialization policy based on exportation by making a route change (by giving up the policy of import-substitution industrialization) in its economy policy. As a result of this, foreign debts rapidly increased and short-term debts increased as well. For example; public debt stock which was 18.385 million dollars in 1983 increased to 52.381 million dollars in 1990. Total foreign debt stock increased approximately three times within 7 years. Recovery programs applied for the reconstruction of economic balances which were deteriorate after 1980 (Karluk, 2009: 168), foreign trade imbalance especially after 1983 and variable interest application in foreign indebtment (Ulusoy, 2016: 184) have important roles in this development. Examining maturity structure of foreign debts in 1980-1990 period, it is seen that the share of short-term debts decrease while the share of medium-term and long-term debts increase within total debts. Share of short-term debts which was 15.4% in 1980 increased up to 26.2% in 1993. Increase of share of short-term debts within total debts caused a reimbursement problem with regard to payment period. Examining foreign debts as per the debtor in this period again, it is seen that the majority of the debts are imposed on the public sector. For example; foreign debts of the public sector was 29.446 million dollars in 1989 while foreign debts of the private sector was 6. 638 million dollars (Table 1).

Turkey's foreign debts continued to increase during 1990s and paid its debts by going into other debts. There were some reasons of this constantly increasing debts in that period. Firstly, capital movements were liberalized and capital account of balance of payments were open to foreign countries through Resolution No. 32 taken in 1989. It facilitated private sector indebtment and it was a period when foreign debts rapidly increased as a result of short-term capital movements. When the developments in the world (Southeastern Asia and Russia crises) were added to existing economic and political instabilities in the country, plenty of crises were undergone (1994, 1998, 1999, 2000, 2001) in that period. Foreign debts which were 52.381 million dollars at the beginning of that period increased up to 103.123 million dollars (almost doubled) in 1999. Share of short-term debts were at high levels in that period (21% in average between 1990 and 2000) but regressed to 14% in 2001. Table 1 indicates that public sector has the biggest share of debts in that period like in the previous periods.

Turkish economy entered 2000s with two new crises (November 2000 and February 2001). Because of these crises, Turkey's foreign debt stock decreased (approximately 5 million dollars) compared to the previous year in 2001 and a recovery program called "Transition to Strong Economy" were applied in the same year. A strict financial policy was resolutely applied especially between 2002 and 2007. In that period, private sector debts rapidly increased and private sector debts outstripped the public sector debts in that

period (in 2005) for the first time. Low levels of interest rates arising out of liquidity abundance in the world were an important factor in the increase of private sector foreign debts.

Examining foreign debts as per the maturity in 2000s, it is seen that share of short-term debts which was approximately 24% in 2000 decreased up to 13.7% in 2007 but increased to 33% in 2014. Global economic crisis and high level of current deficit are of high importance in this development.

Table 1. Foreign debt 1980-2016 period in Turkey *

Years	Total	By Borrow		Date of payment		Total foreign debt stock/GNP (%)
		Public	Private	Short term	Medium and long term	
1980	16.227	-	-	2.505	13.722	28,3
1981	16.620	-	-	-	-	27,6
1982	17.850	-	-	-	-	31,2
1983	18.385	-	-	2.281	16.104	33,7
1984	20.659	-	-	3.180	17.479	36,9
1985	25.476	-	-	4.759	20.717	39,6
1986	32.101	-	-	6.349	25.752	44,6
1987	40.428	-	-	7.623	32.805	48,1
1988	40.722	-	-	6.417	34.305	46,4
1989	43.911	29.446	6.638	5.745	38.166	39,7
1990	52.381	33.268	10.770	9.500	42.881	33,4
1992	58.595	36.476	15.390	12.660	45.935	36,3
1993	70.512	39.640	23.579	18.473	52.039	38,7
1994	68.705	41.741	17.186	11.187	57.518	52
1995	75.948	42.003	21.774	15.500	60.448	44,4
1996	79.299	40.192	26.725	17.072	62.227	45,2
1997	84.356	39.068	33.523	17.691	66.665	45,3
1998	96.351	41.339	42.026	20.774	75.577	35,5
1999	103.123	44.107	48.011	22.921	80.202	40,3
2000	118.602	50.081	54.431	28.301	90.301	43,4
2001	113.592	47.129	42.112	16.403	97.189	57,8
2002	129.592	64.533	43.056	16.424	113.168	55,4
2003	144.157	70.844	48.941	23.013	121.144	47
2004	161.132	75.668	64.054	32.203	128.929	40
2005	170.733	70.411	84.896	38.914	131.819	35
2006	208.086	71.587	120.821	42.853	165.233	38,6
2007	250.019	73.525	160.692	43.145	206.874	38,8
2008	280.928	78.334	188.528	52.519	228.409	38,4
2009	268.921	83.513	172.245	48.990	219.931	43,8
2010	291.868	89.110	191.193	77.247	214.621	39,3
2011	303.817	94.280	200.203	81.580	222.237	37
2012	338.924	104.023	227.812	100.196	238.728	39,1
2013	389.115	115.944	267.937	130.422	258.693	41,4
2014	402.415	117.697	282.235	132.957	269.458	43,5
2015	396.083	113.144	281.611	101.701	293.054	46,7
2016	404.459	119.839	283.799	97.892	305.751	47,8

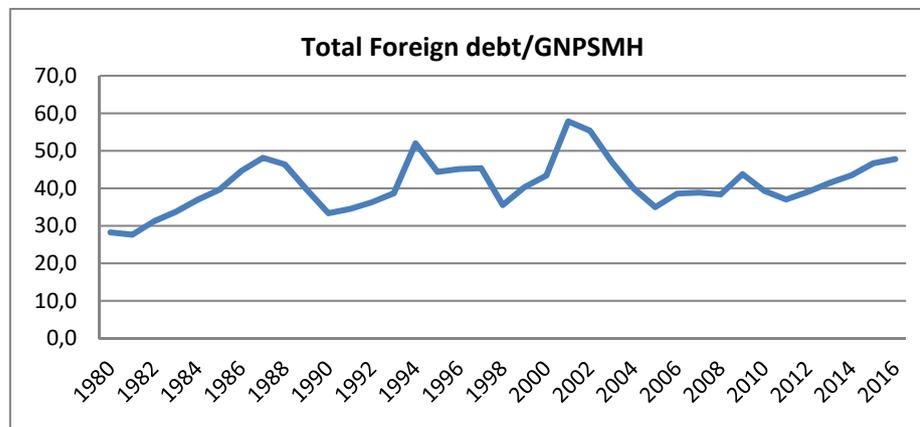
Source: Kalkınma Bakanlığı, 2015; Hazine Müsteşarlığı, 2017; World Development Indicators.

* The data are in millions of US dollars.

Rate of foreign debts to Gross National Product (GNP) is one of the main indicators which are used for measuring foreign indebtment level and foreign indebtment capacity

of the countries. There are some thresholds accepted by World Bank and IMF in the assessment of this rate which is also used for the measurement of general credibility of a country. If this rate is between 30-50%, it is accepted that the country has a medium-level indebtedness while it has a high-level indebtedness if the rate is above 50%. Figure 1 indicates the rate of foreign debts to GNP in Turkey during 1980-2016 Period. It is seen that foreign debts follow a fluctuating course in Figure 1. For example, crises in 1994 and 2000-2001 were important developments which caused high level of foreign indebtedness. It is observed that the highest rate of foreign debts to GNP was seen in 2000-2001 crises (57.8% and 55.4% respectively). Figure 1 also indicates that foreign debt has been consistently increasing since 2011.

Figure 1. Share of foreign debt in GNP (1980-2016)



Source: World Development Indicators.

Turkey's total foreign debt is 404.459 million dollars having a rate of 47.8% to GNP as of 2016. Turkey has a *medium-level indebtedness* but also is very close to 50% rate which is high-level indebtedness limit as of 2016.

3. Literature review

The majority of studies which search for the relationship between defence expenditures and economic variables is focused on the impacts of defence expenditures on economic growth. Carrying out leading studies in this issue, Benoit (1972; 1978) concludes that defence expenditures have positive impacts on the growth. Studies carried out in the following periods could not reach a consensus regarding the essence of the relationship between those two variables.⁽²⁾

Brzoska (1983), Looney (1987; 1989) and Dunne et al. (2004a; 2004b) launched the studies regarding the analysis of relationship between foreign debts and defence expenditures at the end of 1980s. These leading studies suggest some findings that foreign debts increase defence expenditures in developing countries. In the following years, literature studies were expanded in both national and international extent and the

results were diversified (positive and negative relationship, reverse causality, no relationship). Examples from these studies are delivered in Table 2.

Table 2. *Empirical literature with defense spending and foreign debt*

Author and publication year	Samples	Method	Basic results
Brzoska (1983)	Third World countries 1970-1979	Regression analysis	Defense spending increases the foreign debt of third world countries.
Looney (1987)	61 developing countries 1970-1982	Regression analysis	Defense spending increases the foreign debt.
Looney (1989)	61 developing countries 1970-1982	Two-stage least squares	Imports of weapons have a positive effect on foreign debts.
Dunne (2004a)	11 small industrialized economies 1960-2000	Panel data analysis, Arellano-Bond GMM	Defense spending positively affected foreign debt in the results obtained by both methods.
Dunne (2004b)	Brazil, Argentina, Chile 1970-2000	ARDL Model	Defense spending increases the foreign debt.
Sezgin (2004)	Turkey 1979-2000	Engle-Granger causality test	There is a negative relationship between defense spending and foreign debt.
Kollias et al. (2004)	Greece 1960-2001	Regression analysis	Foreign debt has been adversely influenced by military expenditure but also by the domestic political cycle.
Feridun (2005)	Argentina 1971-2002	Granger causality test	Military expenditure is not the cause of foreign debt.
Karagöl (2005)	Turkey 1955-2000	Johansen cointegration Granger causality test	There is a long and positive relationship between defense spending and foreign debt (from defense spending to foreign borrowing).
Karagöl (2006)	Turkey 1960-2002	Johansen cointegration, impulse-response and variance decomposition	Defense spending increases the foreign debt.
Azam and Feng (2007)	11 Asia countries 1990-2011	Panel Data Analysis	While the impact of military spending on foreign debt is positive, the effect of economic growth on foreign debt is negative.
Narayan and Narayan (2008)	Fiji 1970-2005	ARDL, FMOLS, DOLS, OLS	The impact of military spending on foreign debt is positive.
Karagöl and Turhan (2008)	Turkey 1960-2002	Johansen cointegration, impulse-response	The effect of defense spending on foreign debt is positive.
Smyth and Narayan (2009)	Oman, Syria, Yemen, Bahrain, Iran, and Jordan 1988-2002	Panel Data Analysis	In the long run a 1% increase in military expenditure results in between a 1.1% and 1.6% increase in foreign debt, while a 1% increase in income reduces foreign debt by between 0.6% and 0.8%, depending on the specific estimator employed. In the short run, a 1% increase in military expenditure increases foreign debt by 0.2%.
Wolde Rufael (2009)	Ethiopia 1970-2005	ARDL and Granger causality	There is a long-lasting relationship between defense spending, foreign debt and income. The effect of defense spending on foreign debt stock is positive.
Işık and Kılınc (2011)	25 developed and developing countries 1990-2011	Dynamic panel data analysis and Dumitrescu-Hurlin causality test	As defense spending and the number of military personnel increase, foreign debts increase, but as GDP increases, foreign debts decrease. There is a causal relationship between defense spending and foreign debt to GDP.
Georgantopoulos and Tsamis (2011)	Northern Africa countries (Egypt, Tunisia, Algeria and Morocco) 1988-2009	Granger causality, ECM	For Tunisia, Algeria and Morocco there is no relationship between military spending and foreign debt. However, in Egypt there is a one-way and strong causality relationship from defense spending towards foreign debt.
Sheik et al. (2013)	Pakistan and India 1972-2010	ARDL	Defense spending increased foreign debt in both countries.
Zaman et al. (2013)	Five SAARC countries 1988-2008	Pedroni panel cointegration, DOLS and FMOLS	The impact of military spending on foreign debt is positive while the effect of economic growth on foreign debt is negative.
Shahbaz et al. (2013)	Pakistan, 1973-2009	ARDL model	Military expenditures increase Pakistan's foreign debt stock.

Author and publication year	Samples	Method	Basic results
Ipek and Esener (2014)	Turkey 1971-2012	ARDL model	Defense spending increases foreign debt in both short and long term.
Farhani (2016)	India 1970-2012	ARDL, VECM	Cointegration test results show a long-lasting relationship between foreign debt, military spending, foreign debt service and economic growth. According to the results of the causality test, military spending and economic growth are the cause of foreign debt.
Dimitraki and Kartsaklas (2017)	Greece 1960-2015	OLS	Military expenditures have a significant impact on the government's foreign debt turnover.

4. Methodology and data

4.1. Methodology

As for methodology, this study uses Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) (TYDL) tests in order to analyse the relationship between defence expenditures and foreign debt. These tests are also known as Granger causality tests which are developed in the literature. Since Granger causality analysis requires null limitations to specific parameters, test statistics can be obtained by applying Wald or χ^2 test. However; F or χ^2 distributions may have non-standard asymptotic features in cases where VAR models include floating (non-stationarity) variables. More explicitly, it is known that Wald tests which are applied for Granger causality are concluded in non-standard limit distributions depending on the cointegration features of Vector Auto-Regressive (VAR) system (Lütkepohl and Kratzig, 2004, 148). Approaches which are suggested by Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) are used for the solution of this problem. Key feature of these approaches is that level values of the series are used in the estimation of VAR models and series are not sensitive to unit root and cointegration features. Toda and Yamamoto (1995) approach requires the estimation of one VAR($p+d$) model. Hence, VAR($p+d$) model which is estimated in Toda-Yamamoto approach is defined as follows:

$$Y_t = a_0 + \sum_{i=1}^{p+d} \alpha_{1(i+d)} Y_{t-(i+d)} + \sum_{i=1}^{p+d} \alpha_{2(i+d)} X_{t-(i+d)} + \varepsilon_{1t} \quad (1)$$

$$X_t = \beta_0 + \sum_{i=1}^{p+d} \beta_{1(i+d)} Y_{t-(i+d)} + \sum_{i=1}^{p+d} \beta_{2(i+d)} X_{t-(i+d)} + \varepsilon_{2t} \quad (2)$$

Here, d indicates maximum integration level (d_{max}) of the series. What is significant in Toda-Yamamoto test is that standard Wald tests are applied on the first p coefficient matrix for Granger causality analysis. So, null hypothesis which is stated as “There is no Granger causality from X_t variable towards Y_t ” is defined as $H_0 : \alpha_{2i} = 0$ and Wald (F-test) test is applied on it. As it can be noted, there are no limitations imposed on the parameters of d lag values in VAR model while applying causality test.

Main difference between Dolado - Lütkepohl (1996) approach and Toda - Yamamoto (1995) approach is that VAR model is estimated as VAR($p + 1$), not as VAR($p + d$) in Dolada-Lütkepohl approach. Var model which is estimated in Dolada-Lütkepohl Granger causality approach is as follows:

$$Y_t = a_0 + \sum_{i=1}^{p+1} \alpha_{1(i+1)} Y_{t-(i+1)} + \sum_{i=1}^{p+1} \alpha_{2(i+1)} X_{t-(i+1)} + \varepsilon_{1t} \quad (3)$$

$$X_t = \beta_0 + \sum_{i=1}^{p+1} \beta_{1(i+1)} Y_{t-(i+1)} + \sum_{i=1}^{p+1} \beta_{2(i+1)} X_{t-(i+1)} + \varepsilon_{2t} \quad (4)$$

Hereafter, like in Toda - Yamamoto (1995) approach, Wald tests are applied on the first p coefficient matrix for Granger causality analysis. Wald statistics obtained in Toda-Yamamoto and Dolado-Lütkepohl approaches are called as “Modified Wald: MWALD Statistics” having χ_p^2 asymptotic distribution.

4.2. Data and model

This study analyses the relationship between defence expenditures and foreign debts in Turkey through TYDL causality tests by using annual data of 1980-2016 Period based on VAR model. In the study, foreign debt stock is used in order to represent foreign debts as a dependent variable (LXDBT) while military expenditures are used in order to represent defence expenditures as an independent variable (LDFNS). Moreover; GDP per capita (LGDP) was included in the model in order to represent economic growth as a control variable. All the variables in the model are in USD currency and included in the analysis in logarithmic form. Brief information regarding these variables are included in Table 3.

Table 3. Variables Used in Analysis

Variables	Symbol of the variables	Explaining the variables	Data Source of Variables
Foreign debt	LXDBT	Foreign debt stock	WDI
Defense spending	LDFNS	Total defense spending	SIPRI
Economic Growth	LGDP	GDP per capita	WDI

Regression model specified in Equation 5 was used in order to analyze the relationship between defence expenditures and foreign debts:

$$LXDBT_t = a_0 + a_1 LDFNS_t + a_2 LGDP_t + \varepsilon_t \quad (5)$$

Although there are various conclusions in the literature regarding the relationship between defence expenditures and foreign debts, it is a common tendency to accept that there is a long term and positive relationship between defence expenditures and foreign debts. Based on this view, there is an expectation of having a causality relationship between defence expenditures and foreign debts (from defence expenditures towards foreign debts) in this study as well.

As it is known, first phase of time-series analyses is to search for stationarity of the series to be used (whether or not it has unit root). It is aimed at obtaining significant results between the variables in the analyses while making the series stationary. Otherwise;

analyses carried out with non-stationary series may lead to the assumption that there is a relationship between the variables, which is not available in reality. Augmented Dickey-Fuller (1979) (ADF) and Phillips-Perron (1988) (PP) unit root tests which are also commonly used in literature were used in this study in order to research stationarity. In both tests, H_0 hypothesis which suggests that series have a unit root (in other words, series are non-stationary) is examined. ADF and PP unit root test results of the variables are indicated in Table 4. In accordance with the results specified in Table 4, all the variables are non-stationary in their level values while they become stationary after obtaining their first variance.

Table 4. ADF and PP unit root test results

Değişken	ADF		PP	
	Düzyey	Birinci Fark	Düzyey	Birinci Fark
LXDBT	-0.748 (0)	-5.291 (0)	-0.817 (5)	-5.327 (6)
LDFNS	-1.026 (0)	-5.527 (0)	-1.026 (0)	-5.527 (0)
LGDP	-0.478 (0)	-6.134 (0)	-0.478 (0)	-6.135 (1)
Kritik Değer % 5	-2.945	-2.948	-2.945	-2.948

Note: Schwarz Information Criteria for the ADF test, and Barlett Kernel and Newey-West Bandwidth for the PP test. The values in parentheses indicate the lags.

5. Analysis and findings

It is required to know d_{max} which is maximum integration degree of VAR system in order to determine TYDL causality relationships. It is determined that all the series are 1st degree stationary as a result of stationarity analyses –both ADF and PP. So, it was determined as $d_{max}=1$. The next phase is to determine appropriate lag length (p) for VAR model.

Appropriate lag length was determined by creating VAR model. In accordance with the criteria specified in Table 5, all the criteria except for Schwarz Information Criterion (SC) indicate 3 lag length. In this regard, analysis continued by considering 1 lag length. Diagnostic test results regarding the estimated VAR (3) model are indicated in Annex 1. It is seen that the created VAR (3) model is consistent and there is no result violating credibility.

Table 5. Select appropriate lag

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-8.042199	NA	0.000392	0.669224	0.805270	0.715000
1	105.2188	199.0648	7.09e-07	-5.649624	-5.105440*	-5.466523
2	117.5172	19.37924	5.90e-07	-5.849525	-4.897202	-5.529098
3	129.7949	17.11448*	5.03e-07*	-6.048179*	-4.687717	-5.590425*
4	135.1248	6.460398	6.78e-07	-5.825744	-4.057144	-5.230664

Note: * indicates lag order selected by the criterion.

Given that there is no problem with diagnostic test results regarding VAR (3) model, TYDL Granger causality tests were proceeded. Since stationarity degree of the series in the model is $I(1)$ and so $d_{max} = 1$, Toda-Yamamoto causality test [VAR ($p + d$)] gives the same result with Dolado-Lütkepohl causality test [VAR ($p + 1$)]. VAR systems were estimated through SUR method and causality relationships obtained through MWALD examination are indicated in Table 6.

Table 6. TYDL causality test results

H_0 : No causality	X^2	Probability	Sonuç
LDFNS \nrightarrow LXDBT	9.232750	0.0264	H_0 ret
LGDP \nrightarrow LXDBT	8.181492	0.0424	H_0 ret
LXDBT \nrightarrow LDFNS	1.210957	0.7504	H_0 kabul
LGDP \nrightarrow LDFNS	1.627506	0.6532	H_0 kabul
LXDBT \nrightarrow LGDP	0.648166	0.8853	H_0 kabul
LDFNS \nrightarrow LGDP	3.735318	0.2915	H_0 kabul

Note: \nrightarrow denotes non-Granger causality hypothesis

In accordance with MWALD test results in Table 6, there is a unilateral causality relationship from both defence expenditures and GDP per capita considered as an indicator of economic growth towards foreign debts. Apart from it, there are no other causality relationships. Finding which suggests that defence expenditures are the reasons of foreign debts is similar to that of Brzoska (1983), Looney (1987; 1989), Azam and Feng (2007), Symth and Narayan (2009), Işık and Kılınç (2011), Sheik et al. (2013) in international literature. It is also similar to the studies of Karagöl (2005; 2006), Karagöl and Turhan (2008); İpek and Esener (2014) among few studies carried out in Turkey.

6. Results

There is a need for foreign indebtment in the countries which have inadequate domestic sources and foreign currency. There are various reasons of foreign indebtment of the countries (non-use of debts from domestic markets, financing of import which is required by industrialization and development as well as raw materials, intermediate and investment goods, financing of investments and economic reforms, financing of balance-of-payments deficit, rollover of debts due, financing of chronic budget deficits and defence expenditures). Majority of theoretical and empirical studies not only put forward that defence expenditures are one of these reasons but also suggest that defence expenditures increase/negatively affect foreign debts. This study aims at questioning whether defence expenditures are the reasons of foreign debts in Turkey or not. Using TYDL causality analysis as its method, this study also uses data of 1980-2016 Period. Defence expenditures are the reasons of foreign debts in Turkey in accordance with the analysis findings. Moreover; it is seen that economic growth which is included in the model as a control variable also leads to foreign indebtment. Given that the variable of economic growth is a reason of foreign debts, it can be construed that growth depends on foreign debts in Turkey.

Considering that defence expenditures are the reasons of foreign debt, it can be a policy proposal that Turkey should decrease its defence expenditures. However; it is required for Turkey to allocate even much more funds for defence expenditures as it faces with cross-border and domestic security threats arising out of its geographical location. In this regard, Turkey's defence purchase strategy should focus on decreasing foreign-source dependency and supporting much more domestic production. Thus, this policy has recently been handled. Such kind of a policy may lead to an increase in foreign debts in short term because of the construction of technological infrastructure, but it will positively affect foreign indebtment in long term as it will decrease external financing

which is required for military equipment and arms importation. Furthermore; it is obvious that the development of hi-tech defence industry will have significant positive externalities on the other sectors as well.

Notes

- (¹) Government have some liabilities to fulfill. The most important liability is to produce exact public (social) goods and services. Exact public goods and services impose no additional costs on the people who use these goods and services. Nobody is excluded from the use of these goods and services. They have benefits for the whole society and there is no superiority among the beneficiaries. Therefore, they have to be produced by the governments (Holcombe, 1997:1).
- (²) To see more literature Hou and Chen, 2013.

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Annex 1

Table A1. *Inverse Roots of AR Characteristic Polynomial*
Inverse Roots of AR Characteristic Polynomial

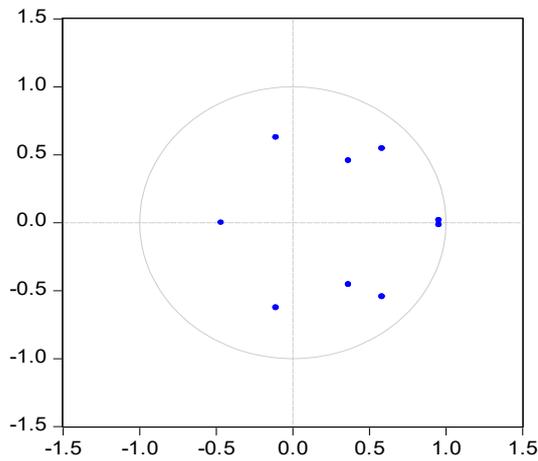


Table A2. *VAR Residual Normality Tests*

Component	Jarque-Bera	df	Prob.
1	1.429809	2	0.4892
2	0.963025	2	0.6178
3	1.061186	2	0.5883
Joint	3.454021	6	0.7501

Table A3. *VAR Residual Serial Correlation LM Tests*

Lags	LM-Stat	Prob
1	7.470000	0.5883
2	8.789775	0.4569
3	5.048990	0.8300
4	11.36226	0.2517
5	4.678347	0.8614
6	11.18050	0.2635
7	5.862924	0.7536
8	13.25095	0.1516
9	4.649516	0.8637
10	4.402851	0.8830
11	12.36654	0.1934
12	8.035640	0.5306

Probs from chi-square with 9 df.

Table A4. VAR Residual Heteroskedasticity Tests

Joint test:					
Chi-sq	df	Prob.			
104.0028	108	0.5909			
Individual components:					
Dependent	R-squared	F(18,15)	Prob.	Chi-sq(18)	Prob.
res1*res1	0.732653	2.283716	0.0561	24.91021	0.1274
res2*res2	0.677046	1.747013	0.1400	23.01956	0.1898
res3*res3	0.621498	1.368326	0.2724	21.13092	0.2729
res2*res1	0.709700	2.037263	0.0847	24.12981	0.1508
res3*res1	0.671745	1.705345	0.1506	22.83934	0.1968
res3*res2	0.712839	2.068638	0.0803	24.23652	0.1474