

An Investigation of Co-Integration and Causality between Trade Openness and Government Size in Turkey

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ABSTRACT: Validity of globalization brings out the question of whether greater openness is a booster reason to have a bigger government. This issue has been started to be discussed in relevant literature since the late 1970s. In this context, the purpose of this study is to examine the linkage between trade openness and the size of the government in Turkey over the period 1974-2011. Using residual based co-integration approach, we fail to find an evidence of a long run relationship. In addition, we do not provide causal support of compensation hypothesis in Turkish economy.

Keywords: Government size; trade openness; Turkish economy

JEL Classifications: F10; H10

1. Introduction

In macroeconomics literature, the relationship between globalization and the size of governments is a major and commonly discussed issue. It is theoretically argued that more open economies have increased government size in two ways (Epifani and Gancia, 2009): (i) a terms of trade externality, whereby trade decreases the domestic cost of taxation, (ii) the demand for insurance, whereby trade boosts risk and public transfers.

Since the end of 1970s, the nexus between the size of public sector and openness of an economy has started to be discussed in the literature without having an empirical framework. The literature has expanded towards to panel combinations of countries such as economic blocs or development levels of countries. Cameron (1978) initially examined this relationship in the eighteen OECD countries. Following this study, Ruggie (1982) who found a positive correlation between the variables in question puts forward *compensation hypothesis* describing that trade openness leads to an increase in the size of the governments¹. The literature extended as from these two seminal papers has become more attractive. Table 1 summarizes relevant literature instead of examining each of them separately. It is seen that there are limited number of papers exploring country survey investigations.

The purpose of this paper is to examine the relationship between trade openness and government size and to test whether there is an evidence of compensation hypothesis in Turkey. We therefore employ co-integration and causality approaches over the period 1974-2011. Although there exist several studies on the relationship between trade openness and aggregate output/labor productivity/growth (see, for example: Yaprakli, 2007; Sacik, 2009; Koyuncu and Cinar, 2009; Sahin, 2009; Kiran and Guris, 2011) and on government size-per capita income nexus (Eser and Genc, 2010) in the case of Turkey, to the best of our knowledge there is no published study that directly examines trade openness-government size nexus. Hence, we plan to fulfill this gap and contribute to empirical literature.

The rest of the paper is structured as follows: section 2 defines the model and data; section 3 presents empirical approaches and findings, and section 4 propounds a general review.

¹ Beyond this running, the nexus between trade openness and growth gains popularity as well (see, for example: Arif and Ahmad, 2012; Gries and Redlin, 2012), which indirectly refers to this relationship.

Table 1. Review of literature

Author(s)	Countries	Method	Period	Conclusion
Benarroch and Pandey (2012)	199 low and high income countries	Panel causality	1972-2000	little or no support of a causal relationship
Shahbaz et al. (2010)	Pakistan	FMOLS	1971-2006	Positive correlation
Ram (2009)	150 countries	Pooled OLS-Fixed effect	1960-2000	Negative correlation
Benarroch and Pandey (2008)	96 countries	Panel causality	1970-2000	government size \Rightarrow trade openness
Liberti (2007)	Europe+US +Canada+Australia	Random or Fixed Effect Models	1965-1975	Negative correlation
Garen and Trask (2005)	96 countries	Panel data	1970-2000	Negative correlation
Islam (2004)	6 OECD countries	Bound test	1992-1997	Mixed results
Molana et al. (2004)	23 industrialized OECD countries	cointegration and causality methods	1948-1998	No support for compensation hypothesis
Rodrik (1998)	23 OECD Countries	Correlation analysis	Different average time periods	Positive correlation
Cameron (1978)	18 OECD countries	Correlation analysis	1960-1975	Positive correlation

2. Model and Data

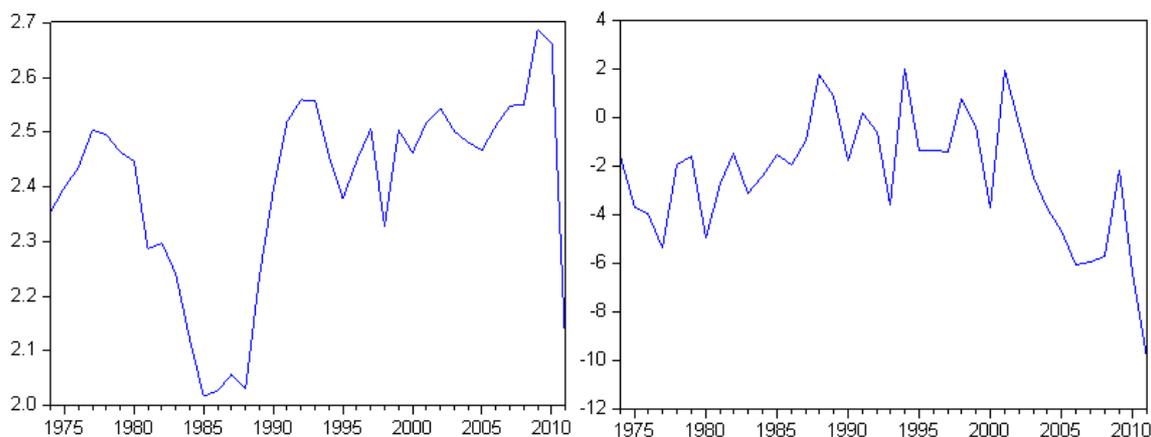
In the paper government size is described as a function of trade openness. The empirical model in the log-lin form is specified accordingly as follows:

$$\ln GS_t = \alpha_0 + \alpha TO_t + \varepsilon_t \tag{1}$$

where the left-hand-side variable (GS) is government size and right-hand-variable (TO) is trade openness. Government size is measured using general government final consumption expenditure as a percentage of GDP. On the other hand, trade openness is measured using total exports and imports relative to GDP.

The data used in the paper consists of annual observations spanning from 1974 to 2011. They are sourced from The Government Financial Statistics (GFS) dataset provided by the International Monetary Fund (IMF) and World Development Indicators (WDI) provided by the World Bank (WB). Since trade openness dataset includes negative values, semi logarithmic specification is adopted.

Figure 1. The fluctuations in government size and trade openness of Turkey for the period 1974-2011



Note: The figure consists of two panels. While the first panel symbolizes the fluctuations in government size; the second one symbolizes the fluctuations in trade openness. Since the logarithmic form of the variable is used in modeling process, first panel shows the fluctuations in log form of the government size.

3. Methods and Findings

Before presenting empirical methodologies and results, optimum lag length have to be determined. Considering Akaike and Schwarz Information Criteria (AIC and SIC), lag length is chosen as one.

3.1. Unit Root

Perron initially shows that failure to allow for an existing structural break leads to a bias which decreasing the ability of rejecting the null of unit root. Perron suggests an exogenous structural break in the recently developed augmented Dickey–Fuller (ADF, hereinafter) test in order to overcome this matter (Perron, 1989: 1388). In that sense, Zivot and Andrews (1992) (ZA, hereinafter) propose determining the break point endogenously from the data. According to the ZA test, break point is chosen by considering where the t-statistic is minimized and it therefore gives the least favorable result for the null of unit root hypothesis (Zivot and Andrews, 1992: 254). Since the fact that when a series possesses structural break(s) the conventional unit root tests would present inconsistent result, ZA unit root test is employed in the paper.

The model in ZA includes three different models (1992: 253): model A allows for a one-time change in the level of the series, model B allows for a change in the slope of the trend function, and model C combines changes in the level and the slope of trend function of the series. The results of these three models are shown in table 2. All models indicate that while both of the variables have a unit root in their levels; they are integrated in the first difference, I(1).

Table 2. ZA unit root results

Variables	Model A	Model B	Model C
GS	-2,831[1990]	-2,373[1983]	-3,351[1989]
TO	-3,190[2004]	-3,447[1999]	-3,383[1998]
Δ GS	-4,944[1989]*	-4,462[1992]*	-5,510[1989]*
Δ TO	-7,852[2004]**	-7,728[1998]**	-7,847[1990]**

Note: Δ represents the first difference.
* and ** show significance at 5% and 1% respectively.

3.2. Co-integration

Given that integration of the two series is of the same order, we proceed testing whether the two series are co-integrated over the sample period. According to Engle and Granger (1987) (E-G, hereinafter), a linear combination of two or more non-stationary series may be stationary. However, it is very important for the series to be with the same order of integration for this methodology. Hence, the co-integration testing in E-G procedure is based on residuals. If such a stationary linear combination exists, the series are considered to be co-integrated and long-run relationships exist. Incorporating these co-integrated cases, an Error Correction Model (ECM, hereinafter) can be constructed to examine Granger causality in at least one direction. The results of E-G co-integration test are presented in table 3. It implies that there is no long-run relationship between the variables in question.

Table 3. E-G Co-integration results

<i>H₀: series are not co-integrated</i>		
τ_{τ}	τ_{μ}	Decision
-1.889[0.33]	-1.613[0.76]	H ₀ : Accept

Note: Probability values of t-statistics are in brackets.
 τ_{τ} and τ_{μ} represent the models including only intercept and intercept+trend, respectively.

3.3. Causality

In the case of absence of co-integration between the variables, there is no need to adopt the ECM to investigate the causality between variables. Granger (1969) develops a method in order to test whether there is a cause-effect relationship between the variables, regardless of there exist co-integration and in order to specify the direction of the relationship. The standard Granger causality technique is therefore employed in order to explore causality. Causality test results, reported in table 4, indicate that there is a uni-directional causal relationship from government size to trade openness.

Table 4. Granger causality results

Null Hypothesis	F-Stat.	Decision
H ₀ : to does not Granger cause gs	2.788[0.10]	H ₀ : Accept
H ₀ : gs does not Granger cause to	4.105[0.05]*	H ₀ : Reject

Note: Probability values of t-statistics are in brackets.

* shows significance at 10%.

4. Conclusion

Following Cameron (1978) and Ruggie (1982) that predict a positive relationship between trade openness and the size of the public sector, the literature commonly tests whether this argument works. In that sense, this paper investigates the relationship between trade openness and the size of government in Turkey. We employ co-integration and causality techniques for the annual period of 1974-2011. Empirical results indicate that there is no long-run relationship and there exist uni-directional causal running from the size of government to trade openness in the short run. The evidence that government size tends to affect openness implies that our results do not support compensation hypothesis. Contrary to the studies written before 2000s, the recent literature has achieved a consensus that the compensation hypothesis is not empirically proved nowadays, which coincides with the case of Turkey.

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