

Testing the Existence of Ricardian or Non-Ricardian Regimes for CIS Countries

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It is important to determine the dominant fiscal regime in a country group for policy prevision. This paper examines whether the Ricardian fiscal regime or non-Ricardian fiscal regime is dominant in the Common Wealth of Independent States (CIS). We attempted to show that CIS' behavior after the debt stock increase. Using panel data method, this paper finds that Ricardian regime dominates in Kyrgyz Republic, Russian Federation, Tajikistan, Uzbekistan, Moldova and Turkmenistan's fiscal policies.

Keywords: CIS, Panel Data Analysis, Common Correlated Effect Model, Debt Stock, Ricardian Fiscal Regime

JEL Classification: C23, E62

1. Introduction

Determination of the type of fiscal regimes is very important for policy previsions and economic policies. Sims (2005) and Benigno and Woodford (2007) suggest that the fiscal policy regime has important consequences, particularly monetary policy rules for the inflation targeting. Leeper (1991) uses the terminology of “active” and “passive” for the differentiation of policies. According to Leeper (1991), an active authority does not take the consideration of government debt. On the other hand, a passive authority takes an action for government debt shocks. Aiyagari and Gertler (1985) were the first economists to define the differences between Ricardian and non-Ricardian regimes. The general principle of Ricardian regime is that when monetary authority issues government bonds, financial authority increases current and future tax rates and/or current and future expenses to pay for both the principal and interest payments. (Resende, 2007). In the case of Non-Ricardian regime, monetary policy rules are chosen independently from fiscal policy rules. When the government adapts strong fiscal discipline, it can arrange an optimal policy rule without taking consideration the fiscal policy. On the other hand, if the fiscal condition in the economy is unsteady, it would be risky to adapt a monetary policy without paying attention to the fiscal policy (Ito et al., 2011).

Ricardian and non-Ricardian regimes result in different economic policies. One of the differences between Ricardian and non-Ricardian regimes is that in a Ricardian regime, individuals know that today's lending will cause tax increase in the future. Hence changes in public budget will not lead to the changes in current or future budgets' present values. However, in a non-Ricardian regime, public authority determines the policy without considering debt stock. The other difference is that while in a Ricardian regime exchange rate

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Article History:

Received 19 February 2016 | Accepted 4 March 2016 | Available Online 11 March 2016

Cite Reference:

Pehlivan, G.G and Balli, E., 2016. Testing the Existence of Ricardian or Non-Ricardian Regimes for CIS Countries. *Expert Journal of Economics*, 4(1), pp.9-13

is determined by the monetary indicators, in a non-Ricardian regime, exchange rate is determined by the fiscal policy. In addition, in a Ricardian regime government bonds do not create net wealth effect, however, in a non-Ricardian regime, the government bonds create net wealth effect. Hence, budget deficit financing increases private sector consumptions via domestic borrowing (Uysal and Guresci Pehlivan, 2013). For the Ricardian regime, governments have to follow a strong monetary policy to have low inflation rate. An independent central bank with institutional pledge about price stability should enforce the fiscal authority to accept appropriate fiscal policy. For the non-Ricardian regime, if additional measures are not taken into consideration to limit fiscal authority's independence, an adequate monetary policy is not enough to provide low inflation (Moreira et al, 2011).

Bohn (1998) examined the sustainability of the fiscal policy for USA for the period 1916 to 1995. He found that US government has responded to increases in the debt-GDP ratio by raising the primary surplus. Cochrane (1999) found that the positive changes in budget surplus reduce the public debt using the VAR analysis for USA. According to Melitz (2000), basic budget balance and government debt have a positive and statistically significant relationship, a domination of Ricardian regime. Canzoneri et al. (2001) used a two-variable VAR analysis to test the existence of Ricardian regime for USA and, concluded that Ricardian regime dominates the United States. Creel and Sterdyniak (2001) found that Non-Ricardian regime dominates both France and Germany using panel data analysis. Sala (2004) found that that the US fiscal policy for the period of 1960 to 1979 can be classified as "Non-Ricardian", while it is "Ricardian" since 1990. Rocha and Silva (2004) showed that Ricardian regime dominates Spain because of the financial difficulties Spain faces. These financial difficulties seem to require fiscal policy interventions. Favero and Monocelli (2005) examined fiscal policy rules for the United States for the period of 1960-2002 using Markov-switching regression methods. They found that fiscal regime was active from the 1960s to 1980s, passive in the early 1990s and active in early 2001. Davig and Leeper (2007) analyzed the regime changes for monetary policy and tax policy over the post-war period in the United States and they found that U.S. monetary and fiscal policies have changed between active and passive rules. Afonso (2005) found that Ricardian fiscal regime dominates the EU-15. Moreira et al. (2011) investigated whether the Brazilian economy is hold for the Ricardian equivalence hypothesis. They found that non-Ricardian regime dominates in the Brazilian economy. Ito et al. (2011) examined fiscal policy rules in Japan, the United States, and the United Kingdom for more than a century. They found that a Ricardian or a non-Ricardian regime dominated in Japan through the entire period and the US and the UK government's fiscal behavior is characterized by Ricardian policy.

The rest of the paper is organized as follows. Section two presents the theoretical model on Ricardian regime. In section three, econometric methodology and empirical findings are discussed. Section four concludes.

2. Theoretical Model on Ricardian Regime

Theoretical model that is developed to employ in this paper is shown below:

$$s_{it} = \beta_i + \delta s_{it-1} + \theta b_{it-1} + u_{it} \quad (1)$$

i indicates the country; t indicates the period; β_i is the individual effects which is estimated for each country; s_{it} is current account balance as a percentage of GDP for country; s_{it-1} is previous period of current account balance as a percentage of GDP for country; b_{it-1} , general government net debt-to GDP ratio in the period ($t-1$); u_i is disturbances. According to the fiscal policy rule the current account balance of this year depends on the current account balance of the previous year.

To determine which regime is dominant in CIS (Ricardian or non-Ricardian) the following two conditions are answered:

1. If $\theta = 0$, current account balance depends on the level of public debt in which case the non-Ricardian fiscal regime is applied,
2. If $\theta > 0$, in response to the current public debt, governments attempt to improve the current account balance. In this case, Ricardian fiscal regime is applied.

3. Econometric Methodology and Empirical Findings

In this paper panel data method is employed. Panel data consists of time series and cross-sectional data. When we use panel data technique, we will face with the same problems as time series. It has to be

examined whether variables include unit root or not. If the variables are not stationary, regression estimates obtained will be spurious. In order to obtain correct estimate values, panel unit roots tests are applied. Before applying unit root tests for the series, heterogeneity and cross sectional dependence tests are used. According to these results first or second generation unit root and cointegration tests are used. The annual data set covers from the period 2000 to 2011. The data was obtained from the IMF, World Economic Outlook Database.

Table 1 presents the codes of countries which are used in this paper.

Table 1. Country Codes

1	Ukraine
2	Kazakhstan
3	Kyrgyz Republic
4	Russian Federation
5	Tajikistan
6	Uzbekistan
7	Azerbaijan
8	Moldova
9	Turkmenistan

Pesaran and Yamagata (2008) developed Delta test to examine the heterogeneity between cross section units. According to the Delta test, null hypothesis and alternative hypothesis are shown like below:

$$H_0: \beta_1 = \beta_2 = \dots = \beta_n$$

$$H_1: \beta_1 \neq \beta_2 \neq \dots \neq \beta_n$$

The series are homogeneous in the case of the null hypothesis cannot be rejected. The null hypothesis for all β_i is identical; alternative hypothesis at least for one i is shown different. If the null hypothesis can be rejected, it indicates that at least one series is different from the others and the series are not homogeneous. The results of Delta test are shown in the following table.

Table 2. Delta Test Results

Test	Test Statistics	Probability
Δ	3.42	0.01
Δ_{adj}	4.19	0.01

Table 2 represents Pesaran and Yamagata (2008) Delta test results. According to these results H_0 hypothesis is rejected. It indicates that these series are heterogeneous. It is important to determine the cross sectional independence before implementing the unit root tests. In order to determine the cross sectional independence, we used CD_{LM} test of Pesaran (2004). The test statistics is computed in the following way (Pesaran, 2004, p.5):

$$CD_{LM} = \frac{1}{N} \sum_{i=1}^N \sum_{j=1}^N \hat{\rho}_{ij}$$

and

$$\hat{\rho}_{ij} = \frac{\sum_{t=1}^T \hat{\epsilon}_{it} \hat{\epsilon}_{jt}}{\sqrt{\sum_{t=1}^T \hat{\epsilon}_{it}^2 \sum_{t=1}^T \hat{\epsilon}_{jt}^2}}$$

The assumptions for the computed test statistics are:

$$H_1: \rho_{ij} = \rho_{ji} \neq 0$$

H_0 indicates that there is no cross sectional dependency between cross sections; H_1 indicates that there is dependency between cross sections. The cross sectional independence test results are shown in the Table 3.

Table 3. Cross Sectional Dependence Test (CD_{LM} Test)

Variable	Test Statistic	Probability
s	2.727	0.003
b	7.664	0.001

There is a cross sectional dependence between series in the case of the null hypothesis is rejected. Therefore, it requires to use the unit root tests which take into consideration of the cross sectional dependence. Otherwise, the results will be biased. The results of tests indicate that there is heterogeneity and cross section dependence. Therefore, Pesaran (2007) CADF (Covariate Augmented Dickey-Fuller) can be used as a unit root test. The computed test statistics values require to be compared to Pesaran (2007) table values when we used this test. For the CADF panel unit root tests, null hypothesis and alternative hypothesis are shown below.

$$H_0 : \beta_i = 0$$

$$H_1 : \beta_i < 0$$

According to CADF unit root test and CIPS statistics all series have unit root. As in panel unit root tests, in panel cointegration tests, tests which take the consideration of cross sectional dependence are known as a second generation panel cointegration tests. Westerlund (2008) proposed the Durbin–H which allows more powerful results than the other panel cointegration tests. It is more convenient to apply Durbin-H Panel if there is homogeneity and cross section dependence between cross section units. If there is a heterogeneity and cross sectional dependence between cross section units Durbin-H group tests are applied. Therefore we used Durbin-H group test. The assumptions of model are listed below:

H_0 : no cointegration

H_1 : cointegration

The null hypothesis is no cointegration against the alternative hypothesis of cointegration. The test statistics which computed in Durbin-H group cointegration analysis is compared to the critical value of normal distribution value which is 1.645. H_0 is rejected if computed test statistics is bigger than critical value. It indicates that there is a cointegration. Table 4 represents Durbin-H (2008) Group results.

Table 4. Durbin-H (2008) Group Test Results

	Test Statistics	Probability
Durbin-H Group	11.535	0.002

Durbin-H group test results show that there is a cointegration between our variables. Then we used Common Correlated Effect Model which was suggested by Pesaran (2006) to determine the country specific effects in the long run. The results show that there is a positive relationship between primary balance and gross debt to GDP ratio in Kyrgyz Republic, Russian Federation, Tajikistan, Uzbekistan, Moldova and Turkmenistan. These countries' governments determine their policies with considering present debt stocks. This is consistent with the Ricardian regime. In these countries, public authorities get some precautions according to changes in debt to GDP ratio. However, Ukraine, Kazakhstan and Azerbaijan government policies are consistent with the non-Ricardian regime. On the other hand, there is a positive relationship between debt to GDP ratio and primary balance in Ukraine, Kazakhstan and Turkmenistan. However, there is a negative relationship between debt to GDP ratio and primary balance in Kyrgyz Republic, Russian Federation, Tajikistan, Uzbekistan, Moldova and Azerbaijan.

4. Conclusion

In this paper, we analyzed the existence of Ricardian or Non-Ricardian fiscal regimes for CIS' fiscal policies using the annual data from 2000 to 2011 for the nine countries of CIS. Given the data set and econometric techniques employed, the results show that Ricardian regime dominates in Kyrgyz Republic, Russian Federation, Tajikistan, Uzbekistan, Moldova and Turkmenistan' fiscal policies. It indicates that these countries attempt to decrease their debt to GDP ratio with obtaining a surplus in the budgets. When public debt increases, governments take some precautions. The paper improves upon the existing empirical studies on the determination of the fiscal regimes in a group country, particularly for CIS countries. The findings show that all countries of CIS do not exhibit the similar fiscal policies. There are some different preferences with determining the fiscal policies in these countries.

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