CURRENT ACCOUNT DEFICIT SUSTAINABILITY IN TRANSITION COUNTRIES

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Abstract

The current account balance represents the most important measurement of a country's economic performance and it is important to keep the current account deficit within sustainable levels. Over the last decade, the importance of a sustainable current account deficit has been major concern of policy makers and investors. In this paper, we investigate the sustainability of the current account deficit in transition countries over the period from 1995:01 through 2011:03, using intertemporal solvency model. According to this approach, the existence of a cointegrating relationship between exports and imports+ (including imports, net interest payments and net transfer payments) gives that countries do not violate their intertemporal budget constraint. To achieve our objective, the cointegration test which recently developed in the presence of two potentially unknown structural breaks, is carried out. These breaks are taken into account in our analysis by considering that the long run relationship between related series might change and the shifts can occur in the cointegrating vector. The obtained results suggest that there is evidence of cointegration for selected transition countries, implying sustainability.

Keywords: *Current account deficit, Sustainability, Cointegration, Structural breaks, Transition countries*

Introduction

The current account balance represents the most important measurement of a country's economic performance. On one hand, a current account deficit is a reflection of the strength of a developing economy, in so far as it measures resources coming into the country. According to definition of Mann (2002), a current account deficit can mean that a country is an "oasis of prosperity" attracting investment from around the globe because the economy delivers higher investment returns at lower risk than other investment choices. On the other hand, a current account deficit can reflect a dangerous and unsustainable imbalance between national savings and domestic investment. This deficit can mean that a country is "living beyond its mean", because overall consumption and investment exceed the national savings of the economy (Roubini and Wachtel, 1997; Mann, 2002).

Short run or temporary current account deficits are not "bad", they reflect reallocation of capital to the country where capital is more productive. However, long run or persistent deficits can have serious effects: First, they might increase interest rates to attract foreign capital and secondly, they might impose an excessive burden on future generations as the accumulation of large external debt owing to persistent deficits will imply increasing interest payments and a lower standard of living (Wu et. al., 1996). These long run or persistent deficits can also indicate a lack of competitiveness. They signal economic vulnerability which could lead to a crisis (Ogus Binatli and Sohrabji, 2002).

It is important to keep the current account deficit within sustainable levels. A sustainable current account deficit occurs when exports and imports+ (including imports, net interest payments and net transfer payments) converge in the long run. Based on the econometric side, Hakkio and Rush (1991) and Husted (1992) suggest that the existence of a cointegrating relationship between exports and imports+ gives that countries do not violate their Intertemporal Budget Constraint (IBC). In this case, the effectiveness of the macroeconomic policies of the countries is supported. Therefore, significant changes in the policies are not necessary (Tiwari, 2012). On the other side, an unsustainable current account deficit occurs when exports and imports+ do not converge in the long run. In the existence of an inactive government implications, this situation could lead to significant increases in the interest rates.

Over the last decade, the importance of a sustainable current account deficit has been major concern of policy makers and investors. In analyzing sustainability of the current account deficit, cointegration approach with and/or without structural breaks has been used by a number of empirical studies including Husted (1992), Liu and Tanner (1995), Wu et. al. (1996), Leachman and Thorpe (1998), Fountas and Wu (1999), Apergis et. al. (2000), Arize (2002), Baharumshah et. al. (2003), Irandoust and Ericsson (2004), Kalyoncu (2005), Narayan and Narayan (2005), Gulcan and Onel (2008), Holmes et. al. (2011), Ogus Binatli and Sohrabji (2012), Tiwari (2012). These studies on different countries, different time periods and methods give mixed results, as summarized in Appendix.

The main objective of this paper is to investigate the sustainability of the current account deficit in transition countries over the period from 1995:01 to 2011:03, using intertemporal solvency model of Hakkio and Rush (1991) and Husted (1992). This objective is pursued with the use of modern time series techniques. We contribute to the existing literature in two ways: First, we consider to examine the current account sustainability for transition countries since the rise in their current account deficits has raised doubts about their sustainability. As argued by Roubini and Wachtel (1998), the current account deficits seen in transition countries reflect two important aspects (Aristovnik, 2006). One of them is that these deficits reflect the success of structural changes that have enabled capital and invesment inflows and have opened up prospects of fast economic growth. Another one is that current account deficits frequently reflect mismanaged transition processes featuring

unsustainable imbalances that are potentially a source of value or a balance of payment crisis. As a second contribution, we incorporate two structural breaks into the cointegration process by considering that the long run relationship between the series might change and the shifts can occur in the cointegrating vector. Different from previous studies, in our paper, a cointegration test which recently developed by Hatemi-J (2008) in the presence of two potentially unknown structural breaks as an extension of Gregory and Hansen (1996) cointegration procedure, is employed. To the best of our knowledge, there is no such study which examines the current account sustainability by using this test in respect of transition countries.

The remainder of the paper is balanced as follows: Section 2 provides the theoretical model of the intertemporal approach to the determination of the current account deficit sustainability. Section 3 briefly discusses the cointegration test in the presence of two potentially unknown structural breaks. Section 4 gives definition of the data and reports the empirical results. Section 5 contains some concluding remarks.

Theoretical Model

To determine the sustainability of the current account deficit, we adopt the intertemporal solvency model suggested by Hakkio and Rush (1991) and Husted (1992). The model starts with the following individual current-period budget constraint:

$$C_0 = Y_0 + B_0 - I_0 - (1+r_0)B_{-1} \quad (2.1)$$

where C_0 is current consumption, Y_0 is current output, B_0 is international borrowing (which could be positive or negative), I_0 is investment expenditure, r_0 is the one-period interest rate and $(1+r_0)B_{-1}$ is the initial debt size. Hakkio and Rush (1991) and Husted (1992) make several assumptions to derive a testable model and report it as follows:

$$EX_t = a + bMM_t^* + e_t \quad (2.2)$$

where EX_t is exports of goods and services and $MM_t^* = (MM_t + r_t B_{t-1})$ is imports of goods and services plus net interest payments and net transfer payments. Here, the necessary and sufficient condition for the intertemporal budget constraint is the existence of a vector (a,b) such that the process is stationary and $(a,b) = (0,1)$. In other words, EX_t and MM_t^* are cointegrated with cointegrating vector $\beta = (1,-1)$. Hakkio and Rush (1991) and Husted (1992) demonstrate that the existence of a cointegrating relationship between EX_t and MM_t^* implies that

countries do not violate their intertemporal budget constraint and therefore supports the effectiveness of their macroeconomic policies in preserving the long run equilibrium (Tiwari, 2012). Here, it is clear that Equation (2.2) provides a useful framework for testing the sustainability of the current account deficits.

Methodology

In this paper, the sustainability of the current account deficit is investigated by using recently developed cointegration test procedure in the presence of two unknown structural breaks. The reason to take into account the structural breaks in our analysis is that the long run relationship between the series might change and the shifts can occur in the cointegrating vector. On the econometric side, Gregory and Hansen (1996) argue that the cointegration tests which do not take into account the presence of structural changes or regimes shifts, have low power. Following this way, they propose a cointegration test procedure that allows for an endogenously determined break in the cointegrating relationship. In their procedure, three alternative forms of structural break are considered: level shift (model C), level shift with trend (model C/T) and regime shift (model C/S). In general, the specification of the model with regime shift (model C/S) is constructed as below:

$$Y_t = \alpha_0 + \alpha_1 D_t + \beta_0 X_t + \beta_1 (D_t * X_t) + u_t \quad (3.1)$$

where D_t is a dummy variable equal to 0 if $t \le \tau$ and 1 if $t > \tau$. Here, the unknown parameter τ denotes the timing of the change, α_1 denotes the change in the intercept coefficient at the time of the shift and β_1 represents the change in the slope of the cointegrating equation. Given that the timing of structural break is unknown a priori, Gregory and Hansen (1996) propose a suite of tests: the commonly used ADF test statistic and the extensions of the Z_t and Z_α test statistics of Phillips (1987). By using these three statistics, the null hypothesis of no cointegration is tested against the alternative of cointegration with structural break. Hatemi-J (2008) extends Equation (3.1) by considering the possibility of two structural breaks as follows:

$$Y_t = \alpha_0 + \alpha_1 D_{1t} + \alpha_2 D_{2t} + \beta_0 X_t + \beta_1 (D_{1t} * X_t) + \beta_2 (D_{2t} * X_t) + e_t \quad (3.2)$$

where D_{1t} and D_{2t} are dummy variables constructed as:

$$D_{1t} = \begin{cases} 0 & if \quad t \le \tau_1 \\ 1 & if \quad t > \tau_1 \end{cases} \text{ and } D_{2t} = \begin{cases} 0 & if \quad t \le \tau_2 \\ 1 & if \quad t > \tau_2 \end{cases}$$

Here, τ_1 signifies the period before the first break and τ_2 signifies the period before the second break. In order to test the null hypothesis of no cointegration ADF^*, Z_t^* and Z_α^* test statistics are used. These statistics are defined as follows:

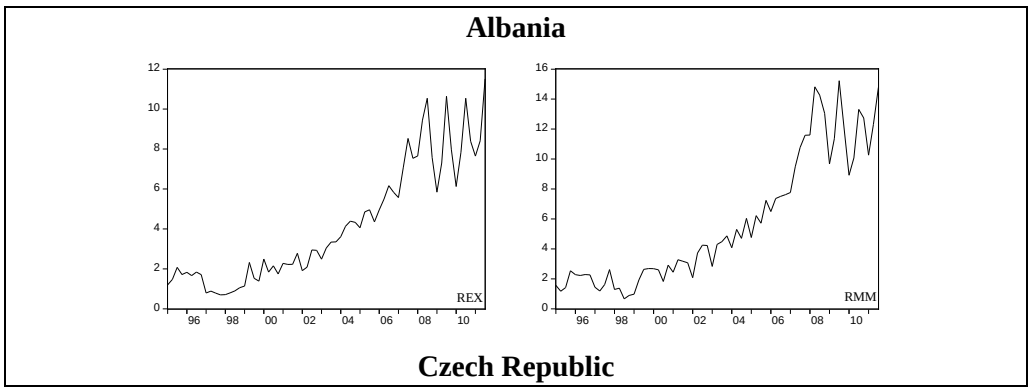
$$ADF^* = \inf_{(\tau_1,\tau_2)\in T} ADF(\tau_1,\tau_2)\ ,\ Z_t^* = \inf_{(\tau_1,\tau_2)\in T} Z_t(\tau_1,\tau_2),\ Z_\alpha^* = \inf_{(\tau_1,\tau_2)\in T} Z_\alpha(\tau_1,\tau_2)$$

where $T = (0.15n, 0.85n)$. Since these test statistics follow non-standard distribution in the presence of two structural breaks, Hatemi-J (2008) produces new critical values via simulations. The details of the test procedure can be found in Hatemi-J (2008).

Data and Empirical Results

In our analysis, we use quarterly data on exports and imports+ spanning from 1995:01 to 2011:03 for five transition countries[199]: Albania, Czech Republic, Hungary, Macedonia and Slovenia. The analyzing period for Macedonia is chosen as 1996:01-2010:04 based on data availability. The measure of exports includes exports of goods and services and the measure of imports+ includes imports of goods and services plus net interest payments and net transfer payments. Both exports and imports+ are expressed in real terms by using consumer price index and denoted as REX and RMM, respectively. All data are obtained from International Financial Statistics (IFS) database of IMF.

Figure 1 illustrates the plots of the REX and RMM series for selected transition countries.



199 Here, it is important to note that Czech Republic, Hungary and Slovenia are Central and Eastern European (CEE) countries while Albania and Macedonia are Southern and Eastern Europe (SEE) countries.

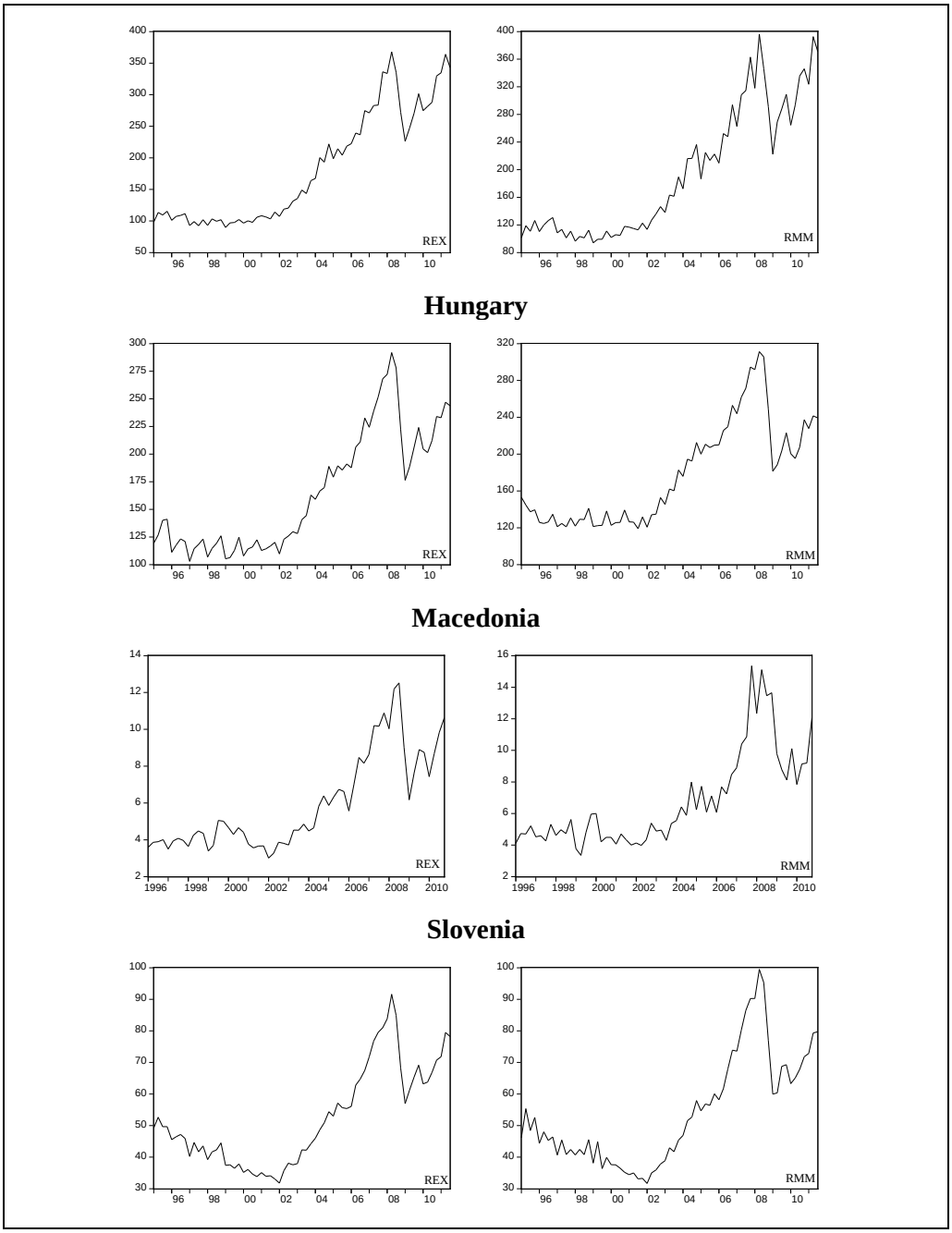


Figure 1: The plots of the *REX* and *RMM* series of five transition countries

At a glance, the plots in the figure indicate that *REX* and *RMM* series of the countries exhibit a nonstationary behavior and include some structural breaks. Since this visual inspection does not deliver clear evidence, as a first step, we investigate the stationarity properties of the *REX* and *RMM* series by using Augmented

Dickey Fuller (ADF), Phillips and Perron (PP) and Kwiatkowski-Phillips-Schmidt and Shin (KPSS) unit root tests. These tests differ in the null hypothesis: The null hypothesis of the ADF and PP tests is that a time series contains a unit root while the KPSS test has the null hypothesis of stationarity. The test results are tabulated in Table 1[200].

Table 1: The results of ADF, PP and KPSS unit root tests

Countries	Series	ADF	PP	KPSS
Albania	*REX*	-2.691	-4.118[a]	0.201[b]
	Δ*REX*	-3.936[a]	-	0.080
	RMM	-2.389	-3.292[c]	0.161[b]
	Δ*RMM*	-3.563[a]	-	0.085
Czech Republic	*REX*	-2.318	-2.331	0.125[c]
	Δ*REX*	-7.162[a]	-8.177[a]	0.120
	RMM	-2.857	-2.973	0.146[b]
	Δ*RMM*	-3.957[a]	-11.942[a]	0.114
Hungary	*REX*	-2.746	-2.452	0.139[c]
	Δ*REX*	-4.321[a]	-7.575[a]	0.152
	RMM	-3.013	-2.540	0.141[c]
	Δ*RMM*	-3.980[a]	-7.538[a]	0.097
Macedonia	*REX*	-1.903	-2.508	0.181[b]
	Δ*REX*	-8.338[a]	-6.681[a]	0.059
	RMM	-2.943	-2.847	0.121[c]
	Δ*RMM*	-4.072[a]	-11.056[a]	0.063
Slovenia	*REX*	-2.390	-2.054	0.124[c]
	Δ*REX*	-3.019[b]	-6.437[a]	0.179
	RMM	-2.646	-1.934	0.208[b]
	Δ*RMM*	-2.898[c]	-8.003[a]	0.118

Note: The sign "Δ" refers to the first differences of the series. [a, b] and [c] indicate rejection of the null hypothesis at the **1%, 5%** and **10%** significance levels, respectively. The test statistics are obtained under the case with an intercept and a linear trend for levels, as Figure 1 suggests. On the other hand, the test statistics are calculated under the case with an intercept for first differences (the figure which illustrates first differences is not reported here). Therefore, the critical values differ based on these cases.

The results in the table show that both *REX* and *RMM* series are nonstationary in levels and stationary in first differences for Czech Republic, Hungary, Macedonia and Slovenia. The test results differ for Albania. According to ADF and KPSS unit root tests, both series are found nonstationary in levels. On the other hand, PP unit

200 The unit root properties of the series are also investigated by using unit root tests with structural breaks. Since the results are similar, we do not report them here. They are available on request.

root test results point to the stationarity in levels for REX and RMM series. In the case of contradiction between ADF and PP unit root tests, the results of KPSS test give evidence to final decision. Thus, our results generally support our expectations that both REX and RMM series are integrated of order one ($I(1)$). The implication of this evidence is that the relationship between REX and RMM series, hence the sustainability of the current account deficit can be investigated in the context of cointegration method for considered countries. In achieving this aim, Hatemi-J (2008) cointegration test in the presence of two unknown structural breaks is used. The structural breaks are taken into account in our analysis by considering that the long run relationship between REX and RMM series might change and the shifts can occur in the cointegrating vector. The test results for the model specification with regime shifts can be seen in Table 2.

Table 2: The results of Hatemi-J cointegration test with two unknown structural breaks

Countries	**Test statistics**	**Statistic value**	τ_1	τ_2
Albania	ADF^*	-7.994[a]	2006:01	2006:02
	Z_t^*	-8.056[a]	2006:01	2006:02
	Z_α^*	-67.398[c]	2006:01	2006:02
Czech Republic	ADF^*	-5.089	2000:03	2002:04
	Z_t^*	-8.506[a]	1999:03	2006:03
	Z_α^*	-70.092[c]	1999:03	2006:03
Hungary	ADF^*	-4.768	2004:04	2006:02
	Z_t^*	-8.164[a]	2002:03	2006:03
	Z_α^*	-62.015[c]	2002:03	2006:03
Macedonia	ADF^*	-7.706[a]	1999:03	2003:03
	Z_t^*	-6.784[a]	2001:01	2005:01
	Z_α^*	-53.073[c]	1999:03	2005:01
Slovenia	ADF^*	-6.938[a]	1998:01	2004:04
	Z_t^*	-8.828[a]	2000:04	2006:03
	Z_α^*	-70.251[c]	2000:04	2006:03

Note: [a, b] and [c] indicate statistically significance at the 1%, 5% and 10% levels, respectively. The critical values for ADF^*, Z_t^* and Z_α^* test statistics are collected from Hatemi-J (2008). These are -6.503, -6.015 and -5.653 for ADF^* and Z_t^* statistics and -90.794, -76.003 and -52.232 for Z_α^* statistic at the 1%, 5% and 10% significance levels, respectively.

According to the results in the table, ADF^*, Z_t^* and Z_α^* statistics give evidence in favour of the existence of a long run relationship between REX and RMM series for all considered countries, implying sustainability of the current account deficit. When the attention is given to the identified structural breaks, it can be seen that the results are mixed based on three statistics. Here, we decide to choose the break points according to Z_t^* statistic as this statistic has the largest power (Gregory and Hansen, 1996). The first breaks for Czech Republic, Hungary and Slovenia (which are European Union (EU) countries), are found to be at 1999:03, 2002:03 and 2000:04 respectively. We consider that these breaks are related to economic and monetary integration process[201] of these countries to be able to a member of EU. On the other hand, the identified second breaks for mentioned countries are the same (2006:03) which refer to the process after accession of these countries (2004) to the EU. When we give our attention to the identified breaks for Albania (which is a candidate country for EU accession), it is clear that these breaks are very close to each other (2006:01 and 2006:02). Our conjecture is that these breaks refer to the date when the Stabilisation and Association Agrement[202] is signed (June 2006) with Albania. This agreement entered into force on April 2009. It also supersedes the Interim Agreement on trade and trade-related aspects, which entered into force in December 2006. Finally, we need to interpret the structural breaks for Macedonia (which is a candidate country for EU accession). The first break occurs at 2001:01 while the second break occurs at 2005:01. This first break corresponds to the date when the Stabilisation and Association Agrement is signed (2001) with Macedonia. It may also refer to the date (2001) when the Interim Agreement on trade and trade-related aspects entered into force. For the second break (2005:01), it can be said that Macedonia is granted candidate country status for EU membership in this year. When the structure of the countries is considered totally, the identified significant breaks clearly indicate that it is necessary for our analysis to take into account these breaks.

Conclusions

This paper investigates the current account sustainability in five transition countries (Albania, Czech Republic, Hungary, Macedonia and Slovenia) by using quarterly

201 This process is known a pre-accession phase which the countries have a free hand in the choice of their exchange rate regimes. In this phase, they have to adopt some reforms (completely liberalise capital flows, make their central banks independent, prohibit direct financing of the government by the central bank and prohibit privileged access of the government to financial institutions) (Lavrac and Zumer, 2003).

202 In meetings with countries that have expressed a wish to join the EU, the Association Agreements in exchange for commitments to political, economic, trade or human rights reform in that country, are typically concluded. In exchange, the country may be offered tariff-free access to some or all EU markets (industrial goods, agricultural products, etc.), and financial or technical assistance.

data over the period from 1995:01 through 2011:03. For this purpose, the intertemporal solvency model of Hakkio and Rush (1991) and Husted (1992) which requires the existence of a cointegrating relationship between exports and imports+ (including imports, net interest payments and net transfer payments) for the intertemporal budget constraint, is followed. On the econometric side, we apply Hatemi-J (2008) cointegration test in the presence of two potentially unknown structural breaks. The obtained results support the evidence of cointegration, hence, current account deficit sustainability for selected transition countries.

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APPENDIX

Table: Summary of the previous studies on the current account deficit sustainability

Study	Countries (period)	Methodology	Result
Husted (1992)	US (1967:01-1989:04)	Engle - Granger cointegration test	No sustainability (in the case of no structural break) Sustainability (with a structural break)
Liu and Tanner (1995)	US (1982:01-1994:04)	Maximum likelihood cointegration test	Sustainability (with a break)
Wu et. al. (1996)	US and Canada (1973-1994)	Johansen (1995) and Gregory-Hansen (1996) cointegration tests	No sustainability
Leachman and Thorpe (1998)	Australia (1959:03-1983:04 and 1984:01-1996:01)	Cointegration and Multicointegration tests	Sustainability
Fountas and Wu (1999)	US (1967-1994)	Engle – Granger and Gregory-Hansen (1996) cointegration tests	No sustainability
Apergis et. al. (2000)	Greece (1960-1994)	Johansen-Juselius (1990) and Gregory-Hansen (1996) cointegration tests	Sustainability
Arize (2002)	50 countries (1973:02-1998:01)	Johansen (1995), Stock-Watson (1988) and Hansen (1992) tests	Sustainability (in 35 countries)
Baharumshah et. al. (2003)	Indonesia, Malaysia, the Philippines and Thailand (1961-1999)	Johansen (1995) and Gregory-Hansen (1996) cointegration tests	Unsustainability (except Malaysia - prior to the Asian crisis) Sustainability (except Malaysia - in the post crisis period)
Irandoust and Ericsson (2004)	Industrialized countries	Johansen-Juselius (1990) cointegration	Sustainability (for Germany, Sweden

	(1971:01-1997:04)	test	and the USA)
Kalyoncu (2005)	Turkey (1987:01-2002:04)	Johansen-Juselius (1990) cointegration test	Sustainability
Narayan and Narayan (2005)	22 least developed countries (1960-2000)	Bounds test for cointegration	Sustainability (for only 6 countries)
Gulcan and Onel (2008)	Turkey (1992:01-2007:01)	Johansen-Juselius (1990) and Gregory-Hansen (1996) cointegration tests	No sustainability
Holmes et. al. (2011)	India (1950-2003)	Johansen (1995), Saikkonen-Lutkepohl (2000), Breitung (2002) cointegration tests	Sustainability (in the late 1990s) Unsustainability (for the prior period)
Ogus Binatli and Sohrabji (2012)	Turkey (1987-2009)	Johansen (1995) and Gregory-Hansen (1996) cointegration tests	No sustainability
Tiwari (2012)	India (1970-2007)	Johansen et. al. (2000) cointegration test with structural breaks	Sustainability