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Abstract

High and persistent external imbalances have become a key concern in the global economy, particularly after the Global Financial Crisis. The issue is particularly pertinent in Europe, as it poses challenges not only for its economic cohesion but also for its political coherence and the viability of the European project at large. In this study we investigate the sustainability of external imbalances in 15 countries from the European periphery over the period 2000-2012 using quartely data. We apply a range of methods and compare across them to obtain a comprehensive picture of the patterns characterising external imbalances in this area. We find that external imbalances are on the whole large and, despite some significant adjustments in the post-crisis period, they continue to follow paths that are possibly unsustainable. Our results show a higher likelihood of confirming sustainability when looking separately at the current account and the net foreign asset position than when looking jointly at the trade and capital accounts (and thus at the overall fiscal reaction function – Bohn, 2007). This suggests, albeit tentatively, problems and vulnerabilities that go beyond simple concerns about price competitiveness and the trade performance of the countries under study.

Keywords: External imbalances, current account sustainability, European periphery, error correction

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The Sustainability of External Imbalances in the European Periphery

1. Introduction

Large imbalances in current accounts and net foreign asset positions are among the main routes via which economic and fiscal crises may emerge, both in developed and developing countries. Although temporary imbalances may stem from capital flows which occur due to differences in capital productivity, permanent imbalances may cause destructive effects on the economy (Camerero et al., 2013: 5357, 5358); while sudden changes in the international environment may also put at risk countries with substantial imbalances in their external position (Lane and Pels, 2012).

This issue has obtained an obvious relevance and urgency following the crisis in the so-called Eurozone 'south', where sizeable current account deficits and external asymmetries had accumulated over the pre-crisis period, believed to be at the root of the fiscal problems that emerged there (Sinn, 2015).[1] With this, attention to external imbalances and possible long-run problems of sustainability in the periphery of the EU – the New Member States and the candidate and associated countries in the 'eastern neighbourhood' – has been somewhat pushed to the background, despite the voluminous policy literature that had emerged with regard to this region in the period pre-dating the Eurozone crisis.

[1] Similar imbalances can be argued to have been accumulated in the 'north' of the Eurozone, for example the "excessive" current account surpluses ran by Germany.

Irrespective of these shifts in geographical focus, what is common in most policy discussions on the topic is that these are often conducted in relation to actual observations concerning the level and short-term trajectory of a country's current account (CA) position. In contrast, in the applied econometrics literature the question of the sustainability of external imbalances has been typically examined from a rather different perspective, not related directly to a country's CA position per se (and thus to possible economic constraints, e.g., with regard a country's ability to export or borrow) but in relation to the time-series properties of the CA and of its main components.

Traditionally, this involved tests for the order of integration (unit root tests) of the CA balance or, equivalently, tests for the presence of a cointegration relationship between a country's exports and imports.[2] Establishing that the two components are cointegrated, suggests that the trade balance (when using imports) or the CA balance (when using imports-augmented) is sustainable – irrespective, as a matter of fact, whether the latter is in deficit, surplus or balance. Recent contributions in the literature have noted that this approach to testing for CA sustainability is both too restrictive and too narrow. Specifically, in an influential paper Bohn (2007) has demonstrated that the cointegration approach provides a sufficient condition for CA sustainability but not a necessary one. In other words, whereas acceptance of the cointegration hypothesis implies *necessarily* that the trade balance is sustainable, rejection of this hypothesis does not necessarily imply that the trade balance is unsustainable. Furthermore, the singular focus on the trade balance is also particularly limiting (too narrow) in an environment of open capital accounts and fast capital mobility (Gourinchas and Rey, 2007). The problem here is that even with a 'sustainable' trade balance, the overall external position of a

[2] Strictly speaking, this tests sustainability in the trade balance. To look at the current account balance typically the imports series is adjusted for interest and transfer payments thus incorporating changes in the financial account ("imports-augmented").

country may be unsustainable if its net foreign asset (NFA) position is not in a sustainable trajectory. Inversely, of course, it is intiutive to argue that an 'unsustainable' trade or current account position may well be sustainable if it is permanently corrected by a mirror position in the capital account. In other words, as long as capital movements are not subject to sudden interruptions ('sudden stops'), the question of CA sustainability should not be seen as independent from the capital account position. Seen from this perspective, sustainability of the trade balance is not only not a necessary condition for the overall sustainability of external imbalances but not even a sufficient one.

Indeed, for the case of the Eurozone 'south' countries, Blanchard and Giavazzi (2002) have (in)famously argued that the significant worsening of these countries' current account positions since the establishment of EMU should not be seen as a worrying signal, since these imbalances reflect to a large extent the capital account surpluses which were, in essense, the intended outcome of monetary unification (through interest rate convergence as well as through higher capital mobility). Reflecting in part these considerations, a new approach to testing the sustainability of CA positions has emerged in the literature which provides a more comprehensive test for this. The approach takes directly into account the relationship between the current and capital accounts, through estimation of an error correction model, which tests for the presence of a long-run relationship between net foreign assets (i.e., the capital account position) and net exports (i.e., the current account position).[3]

Despite the intelectual appeal of this new approach, there are as yet few studies in the literature that examine current account sustainability under this

[3] Although this is a less restrictive – and more intuitive – condition for CA sustainability, it should be noted that it still constitutes a sufficient but not necessary condition (Bohn, 2007; Bajo-Rubio et al., 2014).

prism. Separately, as is discussed later, traditional studies in this literature, even when looking at the capital account (net foreign assets position), often make no adjustment for the possible capital gains and losses emanating from international capital movements and exchange rate changes (the so-called "valuation channel" – see Gourinchas and Rey, 2007). As the latter has been shown to be "an important source of long-term shifts in net external positions" (Lane and Milesi-Ferretti, 2007: p.224), omission of this source of external vulnerability from the analysis can produce results that are potentially unreliable or misleading. To address this issue, in this paper we use an adjusted series on net foreign assets derived from Lane and Milesi-Ferretti's (2007) External Wealth of Nations Mark II database, which correctly controls for valuation effects.

Combining the application of Bohn's (2007) methodology with the use of valuation-adjusted data, our study aims at filling an important gap in the literature, concerning the relevant empirical evidence-based on the issue of CA sustainability for the countries belonging to the so-called "EU periphery" and "super-periphery" (Bartlett and Prica, 2013; Pula, 2014).[4] As our review in the next section shows, outside a limited number of studies covering countries from Central and Eastern Europe, no comparative (multi-country) analysis exists on the theme of current account sustainability for countries in this 'periphery'. Indeed, the bulk of the empirical evidence in this body of literature derives from country-specific cases or comparative studies of OECD countries. This is an important omission, not only empirically but also analytically: as is discussed in other literatures (Noutcheva and Emerson, 2005; Dodini and Fantini, 2006; Varwick and Lang, 2007; Milcher and Slay, 2008; Bechev, 2011), countries in the EU periphery are in a quite unique position, engaging in a

[4] Namely, the EU New Member States of the 2004/13 enlargements, the current candidate countries (Western Balkans and Turkey) and countries belonging to the EU's Eastern Partnership under the European Neighbourhood Policy.

process of fast and comprehensive integration and liberalisation (openness) while at the same time lacking the capacity to compete at an international stage.[5] It thus becomes doubly important to examine the sustainability of the current account positions of these countries (and thus of the salience of their external imbalances) and to do this especially within a more holistic frame that takes into account the co-movement of the trade and foreign assets balance and the valuation effects that may affect the latter. Given its geographical focus, our analysis also covers one of the countries of the EU's 'south' periphery, Greece, which has been the most high-profile case of current account (and more generally external) imbalances.

Altogether, then, our analysis makes three main contributions to the existing literature: (1) It investigates the sustainability of external imbalances using a range of complimentary methodological approaches, including Bohn's (2007) methodology; (2) it takes into account the effect of capital gains and losses which stem from increasing international capital movements on external sustainability; and (3) it focuses on a set of countries for which the evidence-base is as yet limited and for which the sustainability of external imbalances is a critical issue for their economic stability. Our empirical results vindicate our choice to examine the issue under multiple methodologies and offer unique insights into the question of current account sustainability in the countries of the EU periphery and super-periphery. The three methods produce markedly different results, with the traditional unit root tests for the stationarity of the current account balance confirming sustainability in a majority of countries (both prior to and during the crisis); the Johansen cointegration analysis (imports-exports) confirming sustainability in a much smaller group of

[5] It is telling, in relation to this, that the EU officially considers the countries of the Western Balkans, and by implication also those of the Eastern Partnership, as not "functioning market economies" (COM, 2014: 5).

countries and mainly in the second period; and the error correction approach, which incorporates the net foreign asset position, finding sustainability for only two cases and only during the crisis period. As the less restrictive, but also less narrow, test produces the weakest evidence for sustainability, we are forced to conclude that (a) external positions in the EU periphery are largely unsustainable, even after the corrections that have occurred during the crisis; and that (b) unsustainability derives mainly from developments and fluctuations in financial aggregates (net foreign assets positions and the valuation channel) than in real aggregates (exports-imports and the trade channel). This finding suggests a particular vulnerability for the countries of the EU periphery, which links not so much to their export capacity and trade competitiveness but to the robustness of their currencies and the sustainability of (and their dependence on) foreign capital inflows.

The remainder of the paper proceeds as follows. In the next section we provide a brief review of the relevant literature on the issue of external imbalances, focusing specifically on the econometric approaches to analysing external sustainability. Section 3 presents the econometric approach of our empirical analysis, focusing on the comparative presentation of the cointegration and error-correction approaches to the issue together with the explanation of our data set. Section 4 further presents some key observations emanating from the existing literature on the issue of external sustainability for catching-up economies within the pre- and post-crisis context and discusses the data patterns for our sample countries. The results from our empirical analysis are presented in section 5. Section 6 concludes with a discussion of the policy relevance and implications of our analysis.

2. Literature Review

Since the early 1990s, a voluminous literature has emerged investigating the sustainability of external imbalances using a number of different methodologies. Existing studies in the literature can be split into three main groups: studies examining the stationarity of the current account or external debt stock applying unit-root techniques; studies focusing on the existence of a long-run relationship between exports and imports through cointegration analyses; and, more recently, studies that incorporate in their analyses the dynamics of net foreign assets, following a methodological approach relying on the non-linear estimation of an error correction model.

Two early studies in the first group examined the sustainability of external imbalances in the US, by testing for stationarity in relevant series using standard unit root tests (Dickey-Fuller and Phillips). Trehan and Walsh (1991) used annual data for 1947-1987 on the net investment position of the US and found that this was stationary over the period, thus suggesting that external imbalances (the current account deficit) were sustainable. In contrast, Wickens and Uctum (1993) assessed the sustainability of US external deficits by examining directly the stationarity of the current account balance, arriving at the opposite conclusion (non-sustainability) for their sample covering the period 1970q1-1988q4.[6] A similar ambiguity characterised the results of later studies that used more advanced unit root tests. Liu and Tanner (1996) considered the presence of structural breaks in their unit root analysis (using the Augmented Dickey-Fuller, Philips and Phillips-Perron tests) for Canada, the UK, France, Germany, Italy, Japan, and the US in the period 1970-1990.

[6] The authors, however, found evidence in favour of sustainability when testing a VAR model that allowed for a negative feedback effect between current account and external indebtedness.

They found that in the last five countries a discrete structural break existed and, under this, current account imbalances were sustainable. Using the Augmented Dickey-Fuller test and the Im-Pesaran-Shin (Im et al, 2003) test in a panel data context, for 10 OECD countries over the period 1977q1-1997q4, Wu (2000) found that CA sustainability was rejected under the ADF but was confirmed in the panel estimation under the – more robust – Im-Pesaran-Shin test. The same pattern of results (unsustainability of CA imbalances under univariate unit root tests and sustainability under a panel unit root setting) was found in the study of Lau et al. (2006) for the cases of Indonesia, Korea, Malaysia, the Phillippines and Thailand for the period 1976q1-2001q4 (and for sub-periods before/after the 1996/97 crisis). Other studies have considered in turn the potential non-linearity of CA imbalances. Christopoulos and Leon-Ledesma (2010) use quarterly US data for 1960-2004 and find stationarity only under the non-linearity condition. Chen and Xie (2015) find the same in a sample of OECD countries for the period 1970-2012 – with traditional ADF tests rejecting sustainability but tests allowing for structural breaks and non-linearities returning a sustainable current account for Australia, Belgium, the Czech Republic, Finland, New Zealand, Norway, Ireland and Portugal.

In a second stream of literature, empirical studies look not at the stationarity of the current account balance as such but rather at the long-run relationship between exports and imports. One of the earliest studies to use this approach was Husted (1992), who applied the traditional Engle-Granger cointegration methodology to examine the sustainability of external imbalances in the US over the period 1967q1-1989q4, finding evidence against sustainability. Wu et al. (1996) used the Johansen and Gregory-Hansen tests (which allows for the inclusion of one structural break into the model) and also found evidence against CA sustainability in their sample covering the US and Canada for the period 1973q4-1994q4. Using the same tests for the case of Greece (1960-1994),

Apergis et al. (2000) found instead evidence of sustainability when one structural break was allowed in the analysis. More recently this literature has extended to include panel data cointegration techniques, with results that tend to produce evidence more in line with current account sustainability. For example, Wu et al.'s (2001) analysis of G7 countries over the period 1973q2-1998q4 found evidence against sustainability on the basis of simple time series tests but in favour of sustainability on the basis of their panel cointegration results. In turn, Holmes (2006) used the Pedroni cointegration test and the FMOLS estimator, which allows for identifiying individual countries in the panel that have sustainable current account imbalances, to analyse the sustainability of current accounts in a sample of 11 OECD countries between 1980q1 and 2002q4. He found that while France, Germany, Italy, Norway and Spain had unsustainable current account imbalances the current accounts of Australia, Belgium, Canada, Japan, the UK, and the US were sustainable.

As we discuss in more detail in the next section, approaches using unit root or cointegration techniques have recently been criticised for suffering from two main shortcomings. First, for imposing too strict a condition for CA sustainability, thus overlooking the fact that first-order difference-stationarity is not a necessary condition for the intertemporal budget constraint (and thus current account sustainability) to hold (Bohn, 2007). Second, because of the inability of these approaches to factor-in the effects of capital gains and losses which arise from increasing capital flows on international investment positions, what Gourinchas and Rey (2007) describe as the "valuation channel" for the adjustment of external imbalances (CA sustainability), thus focusing solely on the "trade channel", which links current foreign liabilities to future trade surpluses. In both cases, the implication is that inferences concerning current account sustainability based on traditional unit root and cointegration

tests become questionable. Responding to this criticism, a number of studies have emerged in the last few years that examine the issue of CA sustainability by including the changes in net foreign assets to the empirical analysis, as is illustrated in the next section. One of these is the study of Camerero et al. (2013) who investigate the sustainability of current accounts in 23 OECD countries over the period 1970-2012 by linking the net foreign asset position with the current account. The authors develop previous cointegration and multi-cointegration tests in order to take into account multiple structural breaks and come to the conclusion that, while the traditional flow approach indicates weak sustainability for all countries, the multi-cointegration approach shows that only six countries (Austria, the Netherlands, Portugal, Spain, Japan, and New Zealand) have sustainable external balances. In a study with broader geographical coverage, Durdu et al. (2013) draw on Bohn's (2007) methodology to examine the external solvency of 50 industrialised and emerging economies for the period 1970-2006, finding that external imbalances are sustainable in groups of countries with stronger fundamentals in terms of institutional quality, financial sector development, openness and flexibility of exchange rate regimes. The study of Schoder et al. (2013) examines instead the sustainability of external imbalances across different sub-periods, focusing on the case of the Euro area over the period 1975q2-2011q2. The authors find that external imbalances were sustainable prior to the implemantation of the EMU convergence criteria in 1997. However, after 1997 external imbalances became unsustainable – with the implication that the introduction of the Euro has aggravated the problem of external imbalances. Similar to these analyses, Bajo-Rubio et al. (2014) analyse the sustainability of external deficits in OECD countries for the period 1970-2007. By estimating error-correction type models, as suggested by Bohn (2007), for every country under investigation, the authors find that current account deficits are sustainable for Austria, Canada,

Italy and New Zealand but unsustainable for Australia, Greece, Ireland, Portugal, Spain, the United Kingdom and the United States.

3. Econometric Approach and Data

As noted previously, recent theoretical contributions have questioned the validity of traditional unit root and cointegration techniques for the analysis of current account sustainability. Specifically, in a seminal paper Bohn (2007) has shown that, unlike the implied condition of the traditional tests for first-order difference stationarity, high-order difference-stationary debt series are sufficient for the intertemporal budget constraint to hold. On this basis, he proposed an alternative methodology which is based on finite high-order stationarity of the variables involved. Although this does not overcome the identified problem of 'type-2' errors, i.e., the erroneous rejection of stationarity, it does provide a less restrictive and more integrated framework under which derived evidence for stationarity may be sufficient. In this study we use both sets of approaches (i.e., the methodology proposed by Bohn, 2007; and the traditional analyses of current account stationarity and exports-imports cointegration) as we want to obtain the fullest amount of information possible from our data.

To assess the stationarity of the current account balance, exports, imports and net foreign assets we use the generalised least squares (GLS) detrended version of the conventional Dickey-Fuller test (DFGLS or ERS test) proposed by Elliott et al. (1996) and a modified version of the tests of Phillips and Perron (1988)

proposed by Ng and Perron (2001).[7] Both of these tests perform better than the traditional unit root tests especially when the length of the series is short (Elliott et al., 1996; Ng and Perron, 2001), as is the case with our analysis. In order to investigate the cointegration relationship between exports and imports we draw on the traditional Johansen cointegration test developed by Johansen (1988) and Johansen and Juselius (1990). The Johansen test has been shown to combine both good power and good size properties in comparison to the other tests in the literature (Hubrich et al, 2001).

After this preliminary analysis, we apply the methodology of Bohn (2007), as also implemented by Bajo-Rubio et al. (2014) in their analysis of the sustainability of external imbalances in OECD countries. We first investigate the order of integration of exports, imports and net foreign assets by using the DFGLS and Ng-Perron unit root tests. Then, we estimate the following error-correction specification, for every country in our sample, by means of non-linear least squares:

$$\Delta nx_t = \alpha + \delta(nx_{t-1} - \beta nfa_{t-2}) + \theta(L)\Delta nx_{t-1} + \gamma(L)\Delta nfa_{t-1} + \varepsilon_t \qquad (1)$$

In this equation, nx represents net exports and nfa represents net foreign assets (both as a ratio to GDP) while ε, Δ and L are the error term, difference operator and lag operator respectively. This specification allows us to test directly one of the main propositions deriving from Bohn's (2007) analysis, which asserts that if there is an error-correction relationship between a country's net exports and net foreign asset position with a cointegration coefficient ϱ such that ϱ<0 and |ϱ|∈(0, 1+r), the current account balance will be sustainable (Durdu et al., 2013: 767).

[7] The modified Ng and Perron test is the M^{GLS} extension of the M tests developed by Perron and Ng (1996) that allows for GLS detrending.

To explicate the logic of the above proposition, let us briefly present the analytical framework of Bohn (2007)'s methodology. In an open economy, net foreign assets in period t are equal to the difference between exports and imports plus the principal of the previous period's net foreign assets and the interest payments:

$$NFA_t = X_t - M_t + (1 + r_t)NFA_{t-1} \quad (2)$$

where NFA, X, M and r denote net foreign assets, exports, imports and the interest rate, respectively, and t is the time subscript. Under specific assumptions concerning the interest rate[8], equation 2 implies the following expectational difference equation:

$$NFA_t = -\varphi E_t[X_{t+1} - M_{t+1} - NFA_{t+1}] \quad (3)$$

where $\varphi = \frac{1}{1+r} < 1$. According to equation 3, the intertemporal budget constraint is:

$$NFA_t = -\sum_{i=1}^{\infty} \varphi^i \, E_t(X_{t+1} - M_{t+1}) \quad (4)$$

which is valid if and only if the transversality condition $\lim_{n\to\infty} \varphi^n \, E_t[NFA_{t+n}] = 0$ holds.

[8] As Bohn (2007) notes, there are many variants of these: for example, (a) that the interest rate is positive and constant (r>0); (b) that it is identically and independently distributed with a constant conditional expectation ($E_t[r_{t+1}]=r$); or (c) that the interest rate is simply a(ny) stationary stochastic process for which the condition holds that interest-adjusted imports have similar properties as gross imports.

By using this analytical framework Bohn (2007) puts forward three propositions which satisfy the intertemporal budget constraint and the transversality condition:[9]

1- If NFA_t is integrated of order m for any finite m≥0, then NFA_t satisfies the transversality condition and NFA_t, exports and imports satify the intertemporal budget constraint.
2- If X_t is integrated of order m_x and M_t is integrated of order m_m, then NFA_t is integrated of order m with m≤max(m_x, m_m)+1 and both the intertemporal budget constraint and the transversality condition hold.
3- If $z_t = X_t - M_t - \rho NFA_{t-1}$ is integrated of order m for some ϱ<0 and |ϱ|ϵ(0, 1+r), then net foreign assets satisfy the transversality condition.

The last proposition essentially means that if the long run coefficient of net foreign assets is statistically significant and negative then the current account balance and net foreign assets move in the opposite directions and hence both of these series return to their mean in the long run. This is the proposition we test in our empirical analysis (equation 1). Our data cover countries from the European periphery and super-periphery[10] over the period 1999-2012. We are constrained in time by data availability as for most of these countries data prior to the late 1990s are either non-reliable or simply not available. To overcome the implication of this for our sample size, we use quarterly data for all of our main series (exports of goods and services, imports of goods and services, imports of goods and services augmented with interest and transfer payments, net exports and current account balance), as derived from the IMF International Financial Statistics (2014). Net foreign assets data is taken from the External Wealth of Nations Mark II database. As it is stated above, this

[9] For the proofs of these propositions see Bohn (2007: pp.1840-1845).
[10] Belarus, Bulgaria, Croatia, Cyprus, the Czech Republic, Greece, Hungary, Macedonia, Moldova, Poland, Romania, Slovakia, Slovenia, Turkey, and Ukraine.

allows to consider valuation effects resulting from international capital movements (Lane and Milesi-Ferretti, 2007). Since the series in this database are annual, we convert them into quarterly series using the Proportional First Differences Benchmarking Method developed by Denton (1971).[11] Our period of analysis covers of course the outbreak of the Global Financial Crisis, which constitutes, quite likely, a significant structural break in the current account and trade series of most of our sample countries. To examine the potential influence of this on the sustainability of external imbalances in our sample, but also to avoid more generally possible biases in our results owing to the presence of structural breaks, we split our dataset in two sub-periods[12]. Aiming at having sub-periods of equal (and sufficient) length, we allow for these sub-periods to overlap somewhat. Thus, our pre-crisis period covers the quarters 2000q1-2007q4 while the second sub-period, which includes the crisis, is between 2005q1-2012q4.[13] To examine the robustness of the obtained results we also extend this analysis in two ways. First, by pooling the data across the two sub-periods and re-estimating our relationships for the full sample, allowing for an endogenously estimated structural break. For the unit root analysis we employ the modified version of the Clemente-Montanes-Reyes (1998) test.[14] For the cointegration analysis we employ the Gregory-Hansen cointegration test

[11] The Denton Method interpolates low frequency time series with one (or more) high frequency indicator series. The two are linked through an objective function to ensure that proportional changes of the benchmarked series are as close as possible to the preliminary figures (Di Fonzo and Marini, 2012: 3). The IMF describes it "as simple, robust and suitable for wide-ranging applications" (IMF, 2001: 98). Our implementation uses the cumulative current account balance as the indicator series and is applied in Stata using the command developed by Baum and Hristakeva (2001). For the mathematical explanation of this methodology see IMF (2001: chapter 6).

[12] We also apply both the traditional analyses and the methodology of Bohn (2007) to the full period (2000q1-2012q4) by taking into account one possible structural break in the series. Furthermore, we repeat our analyses by using panel data set for the two sub-periods under investigation. The results of these analyses are explained in the robustness checks section.

[13] Although our data set starts at 1999, because our interpolation approach requires first-differencing of the relevant series, net foreign assets are not interpolated for 1999. Further, while the second sub-period covers all of the countries under investigation, Cyprus, Macedonia, Slovakia and Ukraine are not included in the first sub-period because of data limitations.

[14] We implement this using the Stata code developed by Baum (2004). We estimate the additive outlier (AO) model which allows for a sudden change in the series (i.e., an endogenous structural break in levels) (Montanes et al., 1998). Critical values are taken from Perron and Vogelsang (1992). For the first difference of the series, we use the DFGLS test.

(1996a, 1996b).[15] Finally our full-sample estimation of Bohn's error correction model incorporates a structural break by adding a dummy variable that takes the value of 1 as of the optimal break point determined by the Clemente-Montanes-Reyes (1998) test for the net export series. The second extension pools together all sample countries, while maintaining the two sub-periods distinction, and re-estimates the examined relationships in a panel data setting. Here, we use the Im-Pesaran-Shin (Im et al, 2003) and Fisher-ADF (Fisher, 1932; Choi, 2001) tests for the unit root analysis; the panel cointegration test developed by Westerlund (2007 – see also Persyn and Westerlund, 2008) and the pooled mean group estimator developed by Pesaran, Shin and Smith (1995, 1999) for the cointegration analysis; and again the Pesaran-Shin-Smith test for the nonlinear estimation of Bohn's error correction model. Before proceeding with these econometric analyses, in the next section we first examine descriptively the evolution of external imbalances for our sample countries across the two sub-periods.

4. External Imbalances in the European Periphery: Literature and descriptives

As it is widely discussed in the literature, current account imbalances are a particular potential problem in emerging and transition economies. The fast openning-up of these economies, often accompanied by extensive privatisation programmes, offers opportunities for substantial capital inflows which necessarily influence negatively the current account (Roubini and Wachtel,

[15] We implement four versions of the test (structural break in constant term only versus structural break in both the constant and the slope coefficient; and, for both versions, with and without a linear time-trend). The test requires that our series are first-difference stationary. Hence, we apply this only to the subset of countries which meet this criterion (Belarus, Bulgaria, Czech Republic, Greece, Hungary, Romania, Slovakia, Slovenia and Ukraine).

1998). This effect is often amplified by the high interest rates maintained by such countries (owing in part to their weak capital base and perceived investor risk) and the controlled-peg exchange rate policies (and thus inflation targeting) often pursued in environments of transition and current account liberalisation – leading to currency appreciation and losses in price-competititveness with regard to exports.

Thus-produced external imbalances, however, are not necessarily a problem that should be of concern to policy-makers. As long as external imbalances are underlined by trends of productivity convergence and reflect capital inflows that facilitate industrial restructuring and capital deepening in the recipient economies, the emerging external imbalances can be seen as a "blessing in disguise" as they allow for long-run gains in competitiveness and can thus be taken to be self-correcting in the long-run (Blanchard and Giavazzi, 2002; Obstfeld, 2012). As the experience from the crisis has shown, however, the presence of such external imbalances presents short- and medium-run vulnerabilities/risks – especially in relation to "sudden stops" in capital flows and unanticipated increases in perceived market risk (Obstfeld, 2012; Atoyan et al, 2013). This has been particularly the case in some countries in the European periphery – both inside the EU (e.g., Greece) and further afield (e.g., Ukraine).

The literature on current account sustainability and the determinants of external imbalances has shown in relation to the Global Financial Crisis that indeed the crisis was transmitted to a large extent through the presence of cumulative and sizeable current account imbalances. Especially in the European southern and eastern peripheries, large imbalances seemed to have accumulated over time and especially in the run-up to the crisis. Still, post-

crisis adjustment seems to have been diverse and not easily attributable to a single factor. For example, while for countries in the Eurozone south current account adjustments have been generally slow, countries of the eastern periphery were able to achieve a re-balancing of their external position rather fast in the period since 2008/09, despite the fact that these countries also operated in a fixed exchange rates regime (and were successful in defending their currency pegs). As argued by Atoyan et al (2013), to an extent such differences may be explained by domestic idiosyncratic factors, for example differences in the response of domestic savings during the crisis (deleveraging versus depletion of savings) or differences in the pace of the adjustment of wage costs (also in relation to each country's export base). Other studies have shown that current account deficits and external imbalances have been accumulating in the countries of Central and Eastern Europe well since the 1990s (Lane and Milesi-Ferretti, 2006; Bakke and Gulde, 2010; Harkmann and Staehr, 2012); while in southern Europe external imbalances have accelerated mainly during the 2000s (Barnes et al, 2010; Jaumotte and Sodsriwiboon, 2010; Chen et al, 2013). Still, even within the group of the countries of the eastern periphery (CEECs), current account dynamics have not been completely homogenous. For example, Harkmann and Staehr (2010) find that the Visegrad countries had overall more contained external imbalances and a tendency for short-lived-only deviations; while countries further afield (Baltics and the eastern Balkans) were more exposed to external shocks and had more permanent imbalances. Thus, while economic convergence (and thus the co-existence of below-potential GDP and above-equilibrium investment rates) may had been an obvious explanation for the external imbalances observed in some countries, both in the east (Aristovnik, 2008) and in the south (Lane and Pels, 2012), for some other countries external imbalances reflected deeper domestic structural problems – including perhaps a misalocation of investment

to least productive capital and a significant reduction in savings rates – and were thus more permanent.

Our data are consistent with these observations. In all of our sample countries, as is depicted in Figures A.1-A.3 in the Appendix, we observe negative current account balances and negative net foreign asset positions almost uninterruptedly throughout the period under consideration (1999-2012). For most countries (Belarus, Croatia, the Czech Republic, Hungary, Macedonia, Poland, Slovakia, Slovenia, Turkey and Ukraine) CA deficits over the period have been within 5 percentage points of GDP; but for Bulgaria, Cyprus, Greece, Moldova and Romania CA deficits were well over above this mark, not only for particular sub-periods but even as a cross-period average. For both groups, CA imbalances worsened in the run-up to the crisis, although not unifromly across space, with some countries experiencing really dramatic changes. For instance, Bulgaria's current account deficit rose from around 11.5 percent of GDP in 2005 to 27.2 percent in 2007. Similarly, Greece's current account deficit increased from 7.6 percent of GDP in 2005 to 15 percent in 2008.

Net foreign asset positions also worsened throughout the period. According to Figure A.3, almost all of the countries' net foreign assets have been negative and have had a declining trend between 2000-2012. Still, there is a sometimes large variation in the extent of these imbalances. For just over half of the countries (Belarus, Cyprus, the Czech Republic, Poland, Romania, Slovenia, Turkey and Ukraine) the average foreign debt to GDP ratio is high but below the 50% mark. For the rest (Bulgaria, Croatia, Greece, Hungary, Macedonia, Moldova and Slovakia), average foreign debt ratios are above or well-above 50% of GDP. Interestingly, the majority of countries in this group also experienced huge current account deficits just before the 2008 Global Financial

Crisis. Possibly, this suggests a cumulative relationship, whereby NFA positions deteriorate under the influence of rising CA deficits.

As has been mentioned previously, these patterns notwithstanding, from an econometric perspective the assessment of sustainability is not based on the actual size of the external imbalances but on the time-series properties of the components of the external account. We turn to the econometric investigation of these properties next.

5. Empirical Results

5.1 Evidence from traditional tests

As noted earlier, from the point of view of the traditional approach to the issue of sustainability, it sufficies for sustainability that the CA balance or NFA position is stationary. Stationarity (sustainability) of the current account balance can be tested directly by means of a unit root test but, as we discussed in previous sections, studies in the literature have also examined this by testing for the existence of a cointegration relationship between the exports and imports series (with imports augmented by interest and transfer payments). We start our analysis here from this 'cointegration' approach.

Table 1. Traditional Johansen Cointegration Analysis Between Exports and Imports (2000q1-2007q4)

Countries	Trace Statistics	0.05 Critical Value	Probability	Error-Correction Term	Long Run Coefficient
Belarus	22.36426	20.26184	0.0253	0.046418 (0.157963)	-1.262091*** (0.13888)
Bulgaria	9.929393	15.49471	0.2862		
Czech Republic	10.03179	15.49471	0.2783		
Greece	6.380597	15.49471	0.6505		
Romania	11.71393	15.49471	0.1712		
Slovenia	8.143699	15.49471	0.4502		
Turkey	34.33728	15.49471	0.0000	-1.000156*** (0.153194)	0.341236*** (0.08832)

Notes: Standard errors are in parenthesis. *** denotes the significance at 1% level. The hypothesis of Johansen Cointegration Test is H_0: r= 0, H_a= r ≥1.

Tables 1 and 2 present the results from the corresponding Johansen cointegration tests for the periods 2000q1-2007q4 and 2005q1-2012q4 respectively.[16] According to these results, a cointegrating relationship between exports and the augmented-imports series exists only for Turkey in the pre-crisis period and for Bulgaria, Croatia and Turkey post-crisis.[17] Even in these cases, however, evidence of current account sustainability appears to be of the weak form as, despite the presence of a cointegration relationship, the condition for strong-form sustainability (i.e., that the long run coefficient is equal to 1 – Baharumshah et al., 2003) is not met.

[16] Application of the Johansen cointegration test requires that our series are first-difference stationary. Hence, we apply this analysis only to the subset of countries whose export and augmented-import series meet this criterion.

[17] For Belarus, although the long-run coefficient is negative and significant, the error-correction term has the wrong sign and it is not significant statistically.

Table 2. Traditional Johansen Cointegration Analysis between Exports and Imports (2005q1-20012q4)

Countries	Trace Statistics	0.05 Critical Value	Probability	Error-Correction Term	Long Run Coefficient
Bulgaria	18.86389	15.49471	0.0149	-0.355981*** (0.081621)	0.478859** (0.17090)
Croatia	17.84039	15.49471	0.0218	-0.300440*** (0.080747)	0.894887** (0.32603)
Greece	7.848408	15.49471	0.4817		
Hungary	8.321727	15. 9471	0.4316		
Macedonia	17.66725	20.26184	0.1095		
Moldova	16.66933	20.26184	0.1454		
Poland	6.853422	15.49471	0.5948		
Slovakia	8.355167	15.49471	0.4282		
Turkey	21.61331	20.26184	0.0324	-0.536279*** (0.134880)	-0.643651*** (0.13556)

Notes: Standard errors are in parenthesis. *** denotes the significance at 1% level. The hypothesis of Johansen Cointegration Test is H_0: r= 0, H_a= r ≥1.

All in all, then, the evidence on sustainability derived so far is rather mixed. Descriptive patterns, as reviewed in the previous section, suggest significant and rather persistent imbalances in a large number of countries and negative external positions for all, throughout the period. The traditional econometric analysis of this section finds in turn sizeable evidence of sustainability – especially in its unit-root version. However, consistency in the obtained patterns, even in the econometric analysis, is rather limited: most countries appear to have *either* sustainable CA balances *or* sustainable NFA positions but not both; while no country exhibits sustainability on both measures and for both sub-periods; and only Turkey shows evidence of sustainability consistently across methods (unit root versus cointegration). There is thus an underlying ambiguity from this analysis, concerning both the diagnosis of the sustainability (or not) of external imbalances in the countries under study and the identification of any source of vulnerability with regard to their external balances. Given this, we turn the focus of our analysis to the error correction approach proposed by Bohn (2007). As has been discussed previously, Bohn's (2007) methodology provides for a more comprehensive (less narrow) and less

restrictive test for sustainability, which allows us to look jointly at the trade and capital accounts (and thus at the overall fiscal reaction function).

5.2 External sustainability in an error correction framework

As it is explained in the econometric approach and data section, according to the first and second propositions of Bohn (2007), exports, imports and net foreign assets should be integrated of a finite order in order to satisfy the intertemporal budget constraint and the transversality condition. We thus start by examining the order of integration of these series (results depicted in Tables A.1 and A.2, as previously). According to the results, all of the series are integrated of either order 1 or order 2 for both of the periods.[18] Hence, we can conclude that the first and second prepositions of Bohn (2007) hold over the two sub-periods under investigation and thus that conditions for external sustainability exist in all countries.

The third preposition of Bohn (2007) prescribes the estimation of an error-correction specification analogue to equation 1, which we estimate by use of a non-linear least squares estimator (separately for each country in our sample and for each sub-period – see Table 3). As stated earlier, in order to conclude that the external imbalances are sustainable both the error-correction and the long-run coefficient should be statistically significant and negative. In the first sub-period (first two columns of Table 3), the error correction coefficient is negative for all of the countries, but it is only significant statistically for Belarus, Croatia, the Czech Republic, Hungary, Moldova, Poland and Slovenia (and insignificant for Bulgaria, Greece, Romania and Turkey). Hence, for this

[18] Although some series are integrated of order zero this does not violate the propositions of Bohn (2007).

group of countries our results indicate that an equilibrium relationship between net exports and net foreign assets exists. However, none of these countries has a significant and negative long-run coefficient.[19] Thus, we suggest that for all 11 countries for which our data allow us to estimate equation 1 for the pre-crisis period (Belarus, Bulgaria, Croatia, the Czech Republic, Greece, Hungary, Moldova, Romania, Poland, Slovenia and Turkey), there is no conclusive evidence to suggest that their external imbalances are sustainable. Recall that in our earlier analysis for the pre-crisis period, we found evidence of weak sustainability for Turkey from the cointegration analysis and consistent evidence for sustainability (in the sense that both the CA and the NFA position appeared stationary) from the unit root analysis for Belarus, Croatia, the Czech Republic and Hungary. As the error-correction approach is less restrictive but, unlike the traditional tests, looks jointly at the co-movement of the current account (net exports) and the NFA position, intuitively this can be taken to suggest that, despite some CA and NFA series appearing stationary, cases where the two aggregates produce jointly a non-explosive long-run trajectory are much less frequent and generally weaker.

Turning to the results for the 2005q1-2012q4 period (second half of Table 3), we see that in this period evidence in favour of external sustainability is stronger. As before, the error-correction coefficient is negative for all of the countries under investigation but it is statistically significant, suggesting an equilibrium relationship between net exports and net foreign assets, only for a subset of countries (Belarus, Bulgaria, Cyprus, the Czech Republic, Macedonia, Moldova and Turkey). This time however, two of our sample countries, Macedonia and Turkey, show evidence of sustainability beyond this minimum condition, in the sense that they also return a significant and negative long-run coefficient.

[19] Although the long-run coefficient is statistically significant for the Czech Republic, Hungary, Moldova and Poland, its sign is positive.

On this evidence, the crisis seems to have, if anything, coincided with an adjustment of external imbalances for at least some of the countries under study – a result which is consistent with observations elsewhere in the literature, as reviewed in sections 2 and 4.

Table 3. Non-Linear Least Square Estimations

	2000q1-2007q4		2005q1-2012q4	
Countries	**Long-run Coefficient**	**Error-Correction Coefficient**	**Long-run Coefficient**	**Error-Correction Coefficient**
Belarus	0.0072179	-1.269695***	0.0665195	-0.429864*
	(0.0274615)	(0.4458567)	(0.0655742)	(0.2260168)
Bulgaria	0.5778937*	-0.1870058	0.1144957***	-0.3547021***
	(0.3261369)	(1434588)	(0.0220992)	(0.1226331)
Croatia	0.0067931	-1.181318***	0.0223536	-0.1133199
	(0.1735945)	(0.0063268)	(0.0699674)	(0.127408)
Cyprus			0.0125218	-0.6176266***
			(0.0078251)	(0.2166033)
Czech Rep.	0.0664756***	-0.439224***	0.0172922*	-0.7618344**
	(0.1528972)	(0.0094585)	(0.0090309)	(0.341094)
Greece	-0.0244693	-0.2443439	0.1123113	-0.0462076
	(0.0193737)	(0.1445799)	(0.3801387)	(0.1350361)
Hungary	0.022595**	-0.4947934***	0.1805709	-0.0369041
	(0.009601)	(0.1292634)	(0.3370387)	(0.0821121)
Macedonia			-0.1213015**	-0.6018725***
			(0.0465147)	(0.1876797)
Moldova	0.1258841***	-0.2825495***	0.1551959***	-0.4805722***
	(0.0997486)	(0.0386391)	(0.0552522)	(0.1621968)
Poland	0.0166343*	-0.5511516**	0.0224525	-0.28102
	(0.0091872)	(0.2383575)	(0.0197249)	(0.1752566)
Romania	-0.082419*	-0.2854791	0.0647758**	-0.1679193
	0.0411634	0.2046475	(0.0247077)	(0.1050988)
Slovakia			-0.0437007	-0.0642202
			(0.3535442)	(0.1364299)
Slovenia	-0.012999	-1.051418**		
	(0.0129567)	(0.4615551)		
Turkey	-0.0027216	-0.6189606	-0.0805475***	-0.4010862***
	(0.0316807)	(0.4616373)	(0.023923)	(0.1199406)
Ukraine			0.0536859	-0.2047898
			(0.0780155)	(0.1482598)

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. Standard Errors are in parentheses. In the second period the model for Slovenia was non-convergent. Missing estimations in the first period are due to missing data.

It should be noted that the cases of Macedonia and Turkey had also returned strong results in our earlier analysis. Specifically, in the 'stationarity' analysis Macedonia was found to exhibit sustainability both in its current account and NFA position; while for Turkey we found evidence for sustainability under the

unit-root test on the NFA series as well as under the 'cointegration' analysis which looks at the co-movement of exports and imports. The results for these two countries thus appear to be broadly consisent across methods and to reinforce the conclusion about sustainability derived here. These results are also consistent more broadly with inferences drawn from the descriptive analysis with regard to the economic notion of sustainability: in comparison to most of the other countries in our sample during the crisis period, Macedonia and Turkey had rather manageable current account deficits (the average current account deficit to GDP ratio is 0.047 and 0.058 for Macedonia and Turkey respectively) and debt levels (the average net foreign assets to GDP ratio is 0.58 and 0.43 for Macedonia and Turkey respectively), while during the period both countries had been rather successful in attracting foreign capital flows to finance their deficits. Among the other countries which showed some evidence of sustainability in the earlier analysis (Cyprus, the Czech Republic, Moldova and Slovakia for the current account unit root tests; Greece and Hungary for the unit root test on the NFA series; and Bulgaria and Croatia for the cointegration analysis), those that were found to have a sustainable current account balance also appear here to have negative and mostly significant error correction coefficients but non-negative or non-significant long-run coefficients, suggesting that unsustainability in these cases derives from the lack of dynamic adjustment of the trade balance to changes in net foreign assets than from the absence of an equilibrium relationship between the two aggregates in general. For all other cases, with the exception of Bulgaria, the error correction coefficient is also non-significant, rejecting the existence of an equilibrium relationship altogether.

We can look closer at the two cases of Macedonia and Turkey in order to draw some further inferences also about the speed of adjustment of external imbalances in these countries. In a recent study, Durdu et al. (2013) have

argued that countries with less developed financial markets or more acute financial frictions have to respond more intensively to changes in net foreign assets. Our results offer support to this argument. In Macedonia, which has arguably a less developed financial sector and lower levels of economic development than Turkey, both the error-correction coeffcient and the long-run coefficient are about 1.5 times larger than in Turkey (respectively, for the two coefficients, -0.602 and -0.121 in Macedonia versus -0.401 and -0.081 in Turkey). This suggests that Macedonia has to react more to changes in net foreign assets in order to maintain the sustainability of external imbalances while the adjustment of its net exports to a given change in net foreign assets has a significantly lower half-life (around 0.75 quarters versus 1.35 quarters for Turkey).[20]

5.3 Robustness Checks

So far, we investigated the sustainability of external imbalances for each country over the the pre-crisis and post-crisis periods separately. We found significant differences between the two periods, with only a handful of countries returning sustainability consistently between sub-periods (the Czech Republic for the CA unit-root test, Turkey for the cointegration test, and Greece, Hungary and Turkey for the NFA unit-root test) and no country doing so across methods or under the Bohn (2007) method in particular. To examine the further validity of these results we implement here two extentions of this analysis, in two different directions. First, by integrating the two sub-periods and repeating our analysis for each country separately under the full time-

[20] The average half life is calculated as log(0.5)/log(1-|δ|), where δ denotes the error-correction coefficient.

horizon (2000q1-2012q4), allowing for the possibility of one structural break.[21] Second, by pooling together all sample countries (but maintaining the sub-periods distinction), and repeating our analysis for the pre-crisis and post-crisis periods in a panel data context.

5.3.1 Full sample with structural breaks

The results for the full-sample cointegration analysis (Gregory-Hansen test) are reported in Table 4. The ADF and z_t tests return statistically significant results consistently for Belarus, the Czech Republic and Hungary, rejecting the null hypothesis of no cointegration in the presence of a structural break. For Bulgaria and Slovakia this is only under a sub-set of specifications; while for Greece, Romania, Slovenia and Ukraine no such evidence is found. The z_a statistic produces generally weaker results, but this time a strong cointegration relationship is found for the case of Bulgaria under the assumption of a structural break in the constant with a time-trend. The model estimates, in turn, return statistically significant error correction (speed of adjustment) terms only for Belarus and Bulgaria; but in both cases, the rong-run coefficients, although statistically significant, are positive and statistically very different from one. Thus, the full-period cointegration analysis finds evidence of only weak-form cointegration and only for two countries in our sample. This is overall consistent with the results obtained under the Johansen cointegration analysis which was implemented separately for the two sub-periods. Recall that, there, weak sustainability was found only for four countries. For two of them (Croatia and Turkey), the full-period analysis finds no evidence of first-order stationarity in the relevant series and thus the presence of a cointegration relationship cannot be formally examined. For the

[21] Since the data of Macedonia starts at 2005 it is not included in these estimations.

other two (Belarus and Bulgaria), it appears that incorporation of a structural break allows the limited evidence of weak-form cointegration (in the pre-crisis period for Belarus and post-crisis for Bulgaria) to be extended to the full period. On the whole, then, the Johansen results reported earlier appear robust to alternative treatments of the break in the series around the time of the crisis.

Turning to the unit-root analysis for the sustainability of CA and NFA positions (Table A.3 in Appendix), we find similar evidence of consistency between the sub-periods and full-period analysis. For the CA balance, evidence of sustainability in the full period, under the hypothesis of a structural break, is found for the Czech Republic, Belarus, Croatia, Hungary, Cyprus and Slovakia. In the period-specific analysis the first of these countries was found to have sustainable CA balances in both sub-periods; the next three were found to have sustainable CA balances for the pre-crisis period only; and for the last two CA sustainability was only found in the post-crisis period. Poland, Romania, Slovenia, Moldova and Macedonia, for which some evidence of CA sustainability was found in the period-specific analysis, do not return statistically significant evidence of sustainability in the full-period analysis even under the assumption of a structural break. As was the case with the sub-periods analysis, evidence of sustainability for the NFA position, in turn, is generally weaker and statistically significant only for a small sub-set of countries: Hungary (for which NFA sustainability was also found seperately for each of the sub-periods; and the only case in the full-period analysis where consistent across-measures evidence of sustainability is found), Moldova and Ukraine. For the last two countries evidence of NFA sustainability is unique to the full-period analysis, as the estimated optimal points for the structural break (2003q3 and 2009q2, respectively) are in both cases outside the 2005/07 frame under which our sample is split into sub-periods.

Table 4. Gregory-Hansen Cointegration Test Results (2000q1-20012q4 Period)

Countries	Models	ADF	Break Date	z_t	z_a	Break Date	Lags	Error-Correction Term	Long Run Coefficient
Belarus	Model 1	-5.32***	2007q4	-5.30***	-36.56*	2007q4	0	-0.9046** (0.4208)	0.7266** (0.2854)
	Model 2	-5.36**	2007q4	-5.36**	-37.17	2007q4	0		
	Model 3	-5.22**	2006q3	-5.74**	-41.32	2007q1	0		
	Model 4	-5.79**	2009q1	-5.95**	-44.50	2007q1	3		
Bulgaria	Model 1	-4.46*	2010q4	-4.65**	-31.37	2010q3	2		
	Model 2	-5.46***	2009q4	-5.55***	-38.97***	2010q1	0	-0.3995*** (0.0968)	0.2026* (0.1058)
	Model 3	-4.45	2010q4	-4.19	-27.08	2010q3	2		
	Model 4	-5.83*	2009q4	-6.00*	-41.78	2009q3	0		
Czech Rep	Model 1	-6.27***	2004q2	-6.33***	-45.79**	2004q2	0		
	Model 2	-6.19***	2004q3	-6.25***	-45.11*	2004q3	0	-0.3181 (0.4194)	0.4564 (0.6117)
	Model 3	-6.24***	2004q2	-6.30***	-45.51*	2004q2	0		
	Model 4	-6.21***	2004q2	-6.27***	-45.21	2004q2	0		
Greece	Model 1	-3.01	2010q3	-2.96	-16.57	2010q4	7		
	Model 2	-3.62	2010q1	-4.03	-27.49	2010q4	7		
	Model 3	-2.91	2010q2	-3.17	-17.78	2010q4	7		
	Model 4	-4.37	2009q1	-5.74	-40.46	2010q2	7		
Hungary	Model 1	-6.07***	2009q1	-6.13***	-43.81**	2009q1	0		
	Model 2	-5.82***	2009q1	-5.88***	-42.21	2009q1	0	-0.2174 (0.2387)	0.5896 (0.6222)
	Model 3	-5.96***	2009q1	-6.02***	-42.85*	2009q1	0		
	Model 4	-5.72**	2009q1	-5.78**	-41.96	2009q1	0		
Romania	Model 1	-2.12	2003q1	-2.21	-8.97	2010q4	8		
	Model 2	-4.13	2008q4	-4.67	-32.90	2008q3	0		
	Model 3	-2.95	2008q2	-3.37	-15.49	2008q2	0		
	Model 4	-4.96	2006q3	-5.01	-33.90	2006q3	0		
Slovakia	Model 1	-3.19	2011q1	-4.52*	-27.85	2011q1	1		
	Model 2	-4.12	2011q2	-5.05**	-32.00	2004q2	8	0.0209 (0.3660)	10.3053 (163.1716)
	Model 3	-3.75	2007q4	-4.83*	-30.19	2011q1	4		
	Model 4	-6.35***	2005q1	-6.44***	-40.81	2005q1	0		
Slovenia	Model 1	-4.00	2010q3	-3.73	-23.24	2010q3	5		
	Model 2	-3.17	2010q4	-3.31	-20.31	2010q3	0		
	Model 3	-4.07	2010q3	-3.85	-23.72	2008q3	5		
	Model 4	-4.81	2008q2	-4.98	-33.28	2007q4	7		
Ukraine	Model 1	-4.35	2006q2	-4.24	-24.91	2005q2	5		
	Model 2	-3.74	2009q3	-4.12	-23.92	2005q2	5		
	Model 3	-4.26	2008q1	-5.37**	-31.90	2006q1	0		
	Model 4	-4.09	2008q2	-4.73	-28.38	2005q2	5		

Notes: Model 1: Break in the constant term, Model 2: Break in the constant term a trend term included, Model 3: Break in the constant and slope, Model 4: Break in the constant and slope and trend. The lag length was selected using Akaike Information Criterion out of a maximum lag of 8. ***, ** and * denote significance at 1%, 5% and 10% level respectively. The null hypothesis for the Gregory-Hansen Test: No cointegration. While estimating the error correction model we add a dummy variable which takes the value of 1 as of the break date determined by the ADF test statistic. We estimated a number of models by using different dummy variables for the break dates determined by the ADF test (Some of the models could not be estimated because of the non-convergence). Since we get similar results when we use different dummy variables for the break dates here we present the results of the model in which we use the break date determined by the model 1 above.

Finally, the non-linear least squares estimation results for the full period (Table 5) return only one country, Turkey, for which external imbalances are sustainable. This is fully consistent with the sub-periods analysis, where

Turkey was the only country amongst the ones examined here[22] that showed sustainability in any of the two sub-periods. A number of other countries (Belarus, Bulgaria, Croatia, Cyprus, the Czech Republic, Moldova, Slovakia, Slovenia and Ukraine) return a statistically significant and negative error-correction coefficient but, as was the case with the sub-periods analysis, none of these countries returns a statistically significant and negative long-run coefficient. Thus, for these countries, although a long-run relationship is found to exist, deviations from this equilibrium do not seem to follow a convergent path and are thus unstable.

On the whole, then, the results from the full period analysis produce evidence which is broadly consistent with the sub-periods analysis, but in a way offer less precise insights into the patterns of external balance sustainability underpinning the different countries at different points in time. For example, in the full-period analysis we find Croatia to have a sustainable CA balance but an unsustainable NFA position (unit root analysis) and no sustainability in terms of the long-run relationship between exports and import-augmented (cointegration analysis) or exports and the NFA position (Bohn's approach) despite the presence of a significant structural break (in 2009q1). From the sub-periods analysis we see that the difference between the NFA and CA results is much more nuanced (both aggregates were sustainable in the pre-crisis period and both saw a deterioration in terms of sustainability post-crisis) and that sustainability in terms of the long-run relationship between exports and import-augmented actually increased post-crisis. Thus, although the full-period analysis increases our confidence to the validity of the results obtained in the sub-periods analysis, as the two sets of results are broadly very consistent, the latter contains significantly more detailed information

[22] Note that for the other country, Macedonia, our data go only back to 2005 and thus a full-period analysis cannot be implemented.

concerning the patterns and problems of external sustainability in the countries studied here.

Table 5. Non Linear Least Square Estimations (2000q1-2012q4 period)

Countries	Long-run Coefficient	Error-Correction Coefficient
Belarus	0.0651405	-0.7357157**
	(0.0582673)	(0.3124294)
Bulgaria	0.3476065*	-0.166324**
	(0.1898405)	(0.0780003)
Croatia	-0.0015813	-0.8828501***
	(0.0044543)	(0.1408317)
Cyprus	0.0125861	-0.6236361**
	(0.0077103)	(0.2255609)
Czech Republic	0.0241959**	-0.5131118***
	(0.0099057)	(0.1358228)
Greece	-0.0011678	-0.1767457
	(0.0225765)	(0.1840196)
Hungary	0.0434517	-0.1578339
	(0.0363206)	(0.1195242)
Moldova	0.1909568***	-0.3766724***
	(0.0689071)	(0.1049294)
Poland	0.0103581	-0.3662179*
	(0.0201445)	(0.1850277)
Romania	0.0351101	-0.1071943
	(0.114939)	(0.1018783)
Slovakia	0.0337329	-0.3523827**
	0.0268413	0.1583852
Slovenia	0.0119686	-0.3481694**
	(0.0096807)	(0.1582486)
Turkey	-0.0374988**	-0.5215042***
	(0.0161744)	(0.1682972)
Ukraine	0.0398784	-0.3680807**
	(0.0378063)	(0.1441616)

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. Standard Errors are in parentheses.

5.3.2 Panel analysis by sub-period

Panel cointegration results for the pre-crisis period are reported in Table 6. For this period, the group-mean test results (G_t, G_a) fail to reject the null hypothesis of no cointegration but the hypothesis is rejected (at the 10% level) on the basis of panel test results (P_t, P_a). Nevertheless, the pooled mean group (pmg)

estimates of the error correction model[23] show that both the error-correction term and long run coefficient ares statistically significant but have a positive sign (Table 7), indicating that there is no long run relationship between exports and imports-augmented in a panel data context over the pre-crisis period. The same conclusion applies to the post-crisis period, as in this sample the exports series does not contain a unit root and thus a cointegration analyis cannot be implemented. Both of these results are consistent with the results of our period-specific analysis, where (weak-form) sustainability was found only for one to three countries (in the first and second periods, respectively) out of a total number of 15 countrties. Besides this consistency, however, as was with the case of the full-period analysis, the panel results seem to contain less information that the country-specific results presented earlier.

Table 6. Westerlund Panel Cointegration Test (2000q1-2007q4 period)

Test Statistic	Value	Z-Value	Robust P-Value
G_t	-2.466	-2.542	0.115
G_a	-7.960	-0.498	0.205
P_t	-7.385	-2.599	0.060
P_a	-8.399	-3.115	0.063

Notes: The null hypothesis: No cointegration. The lag and lead lengths are decided according to the Akaike Information Criterion. The Bartlett Kernel window width set according to $4(T/100)^{2/9} \approx 3$. T is the time dimension of cross sections.

As was the case before, in comparison to the cointegration analysis the unit-root results (here, using the Im-Pesaran-Shin and Fisher-ADF tests) produce evidence more in line with external sustainability. In the panel analysis (Table 8) the current account is found to be stationary both with and without a trend term over both the pre-crisis and post-crisis periods; while stationarity for the NFA positions is only found in models including a time-trend. As before, this is consistent with, but less enlightening than, the country-specific results:

[23] We estimate this model with the estimator of Pesaran, Shin and Smith (1995, 1999), using the Stata code developed by Blackburne and Frank (2007). We also estimated the model using mean group estimator (mg). However, since the Hausman test indicates that pmg estimator is efficient we only present pmg results. Mg results can be provided upon request.

there, CA sustainability was found for the majority of countries, while NFA sustainability was generally weaker and limited to a smaller group of countries.

Table 7. Pooled Mean Group Model between Exports and Augmented-Imports (2000q1-2007q4 period)

Exports	Long Run	Short Run
Ec		0.1450***
		(0.0254)
Importsaug.	1.0076***	
	(0.0262)	
D1.Importsaug		0.7698***
		(0.1018)
D2.Importsaug		-1.3537***
		(0.1656)
D3.Importsaug		1.2085***
		(0.1632)
D4.Importsaug		-0.5493***
		(0.0850)
D5.Importsaug		0.1016***
		(0.0179)
Constant		0.0075***
		(0.0023)

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. Standard Errors are in parentheses. The lag length is selected according to the Final Prediction Error (FPE), Akaike and Hannan-Quinn Criteria.

Table 8: Panel Unit Root Tests

	2000q1-2007q4						2005q1-2012q4					
	Im-Pesaran-Shin Test (Without trend)	Im-Pesaran-Shin Test (With trend)	Fisher-ADF Test (Without trend)		Fisher-ADF Test (With trend)		Im-Pesaran-Shin Test (Without trend)	Im-Pesaran-Shin Test (With trend)	Fisher-ADF Test (Without trend)		Fisher-ADF Test (With trend)	
			Fisher Chi-Square	Choi Z-Stat	Fisher Chi-Square	Choi Z-Stat			Fisher Chi-Square	Choi Z-Stat	Fisher Chi-Square	Choi Z-Stat
Exports	-1.61003*	-0.65582	36.5254**	-1.34043*	29.8371	-0.36848	-0.91852	-0.46476	31.0860	-0.85408	31.9642	-0.11608
Imports	-1.71800**	-1.62492*	51.6638***	-1.44341*	39.8368**	-1.40314*	-2.50131***	-0.99074	43.4474*	-2.59235***	29.2686	-0.99446
Importsaug.	-1.39758*	-1.97392**	52.2835***	-1.20012	45.0195***	-1.73411**	-2.72831***	-2.61667***	47.2738**	-2.73878***	46.5666**	-2.52644***
Net Exports	-1.10307	-4.98772***	41.0826***	-0.90438	75.8820***	-4.10141***	-0.82416	-2.13390**	38.1718	-0.75762	43.3105*	-2.03401**
Net Foreign Assets	1.72877	-1.96219**	16.4401	2.08090	40.7088***	-1.52872*	-0.04704	-4.54946***	28.0404	0.16860	68.4232***	-4.47819***
Current Account Balance	-1.69198**	-4.87348***	52.1881***	-1.51480*	76.0582***	-4.07804***	-2.42393***	-2.87694***	62.8722***	-2.04343**	60.0411***	-2.51429***
Δexports	-9.26780***	-7.68994***	130.615***	-8.26208***	104.848***	-6.52206***	-13.1922***	-11.2670***	211.465***	-11.5331***	167.528***	-9.58263***
Δımports	-13.1365***	-11.8344***	181.920***	-11.1656***	152.845***	-9.88285***	-12.2026***	-9.84102***	189.033***	-11.0946***	139.185***	-8.84350***
ΔImportsaug.	-12.6024***	-11.2619***	176.802***	-10.9507***	148.328***	-9.55748***	---	---	---	---	---	---
ΔNet Exports	-19.5026***	-14.7635***	267.943***	-14.4023***	212.973***	-12.0041***	-18.2007***	-16.3581***	297.144***	-14.6022***	252.268***	-12.9472***
ΔNet Foreign Assets	-6.68851***	-6.06281***	88.5501***	-6.43403***	74.4320***	-5.67292***	-9.53006***	-6.73973***	146.458***	-9.17575***	97.1654***	-6.51283***
ΔCurrent Account Balance	---	---	---	---	---	---	---	---	---	---	---	---

Notes: The null hypothesis: All individuals follow a unit root process. ***, **, * denote significance at 1%, 5% and 10% respectively. Lag length is selected according to the Akaike Information Criterion.

Broadly speaking, the same applies to the set of results obtained when applying Bohn's (2007) error correction specification (Table 9).[24] According to these, both the error-correction term and the long run coefficient are statistically significant but they are invariantly positive. This implies an exploding path for deviations from the long-run external position thus suggesting that the latter is unsustainable. Here, too, the results are consistent with those of the country-specific analysis (section 5.2) where only two countries (Macedonia and Turkey) appeared to have sustainable external imbalances (and only in the second period) while all other countries failed the test of sustainability.

Table 9. Pooled Mean Group Model between Net Exports and Net Foreign Assets

	2000q1 – 2007q4		2005q1 – 2012q4	
Net Exports	**Long Run**	**Short Run**	**Long Run**	**Short Run**
Ec		0.0949**		0.1362***
		(0.0372)		(0.0217)
Net For. Assets	0.0320***		0.0112***	
	(0.0055)		(0.0028)	
D1. Net For. Assets		0.0178		-0.0447**
		(0.0143)		(0.0197)
D2. Net For. Assets		0.0221		0.1805**
		(0.0357)		(0.0707)
D3. Net For. Assets		-0.0717		-0.3595**
		(0.0531)		(0.1423)
D4. Net For. Assets		0.0585		0.4324**
		(0.0384)		(0.1804)
D5. Net For. Assets		-0.0174		-0.3314**
		(0.0110)		(0.1503)
D6. Net For. Assets				0.1596**
				(0.0811)
D7. Net For. Assets				-0.0446*
				(0.0258)
D8. Net For. Assets				0.0056
				(0.0036)
Constant		-0.0009		0.0081*
		(0.0009)		(0.0049)

Notes: ***, **, * denote significance at 1%, 5% and 10% respectively. Standard Errors are in parentheses. The lag length is selected according to the Sequential Modified LR test statistic, Schwarz and Hannan-Quinn Criteria.

[24] As with the panel cointegration analysis, we only report the results from the Pesaran-Shin-Smith pooled mean group estimator and not the mean group estimator (results available upon request) because the former is found to be efficient using the relevant Hausman test.

Wrapping up, we conclude in the case of the panel analysis too that the evidence for sustainability is stronger for the unit-root tests, especially for the case of the current account, and weakest in the error correction approach which looks jointly at the capital and current accounts and thus offers a more comprehensive (albeit statistically less restrictive) view of sustainability. As was noted above, this pattern of results is obtained consistently across the three sets of analysis, namely the country- and period-specific analysis reported on sections 5.1 and 5.2; the full-period analysis reported in section 5.3.1; and the panel analysis reported in this section. Across all tests, we find that (a) sustainability is limited to a few cases (countries, periods, tests) and (b) generally applies more to the current account than to the net foreign assets position or, jointly, to the exports balance and the NFA position. We discuss the implications of these findings in the concluding section.

6. Conclusion

In this study, we investigated the sustainability of the current account imbalances over the period 2000q1-2012q4 in 15 countries of the broader European periphery, which have experienced continued negative balances in their external account and significant challenges of adjustment during the recent crisis. Our analysis provides fresh evidence for a set of countries which are relatively under-studied but are collectively of systemic importance; and it does so in an extensive way, utilising alternative but complimentary approaches to testing for sustainability. Moreover, the analysis incorporates measures and techniques which are designed to address recently identified problems with the traditional approaches to the issue: our core analysis (a) takes into account the impact on external sustainability emanating from

changes in capital gains and losses (Gourinchas and Rey, 2007) and (b) employes a specification that allows us to look jointly at the trade and capital accounts and thus at the overall fiscal function (Bohn, 2007). Further, our analysis examines how the sustainability of external imbalances has changed in our sample countries with the crisis, by testing sustainability separately across two sub-periods and, alternatively, by allowing for – endogenously estimated – structural breaks in the long-run relationship examined.

Despite the presence of significant imbalances as revealed by simple inspection of the raw data, according to the results of the traditional unit root analysis a large number of countries appear to meet the sufficiency condition for sustainability (stationary CA or NFA series). This includes Belarus, Croatia, the Czech Republic, Greece, Hungary, Poland, Romania and Slovenia in the pre-crisis period and Cyprus, the Czech Republic, Greece, Hungary, Macedonia, Moldova, Slovakia and Turkey in the period around the crisis. However, the results of the Johansen cointegration test only find a narrower set of countries meeting the criterion of sustainability, and still only in its weak form (not meeting the $\rho=1$ criterion) – namely Turkey in the first period and Bulgaria, Croatia and Turkey in the second period.

As we explained in the text, despite the appeal and wide use of these approaches to testing for sustainability of external imbalances, both suffer from a number of limitations. This concerns both methodological issues (e.g., the critique on the restrictive condition for first-order difference stationarity applied by Bohn, 2007) and analytical ones (relating in particular to the fact that investigating the sustainability of the current account balances and NFA positions separately fails to take into account the interlinkage between the two and thus also the possibility that, with increasing international capital flows, the financing of current account deficits depends increasingly not only on the

size of these deficits but also on creditors' willingness to invest in the country under consideration). When taking these considerations on board, we find current account sustainability to be less prevalent in our sample countries, with none of them showing evidence of sustainability in the pre-crisis period and only Macedonia and Turkey having sustainable current accounts after the crisis.

This finding, whereby we obtain fewer cases with sustainable current accounts in a statistically less restrictive (but otherwise more intuitive and comprehensive) framework, seems to us to reinforce the concerns implied by the above considerations about the validity and information value of the traditional approaches to the issue. It appears that, at least in the context of the European periphery and super-periphery, even in cases where current account balances are not explosive (i.e., they are stationary), the sustainability of external imbalances is not warranted. As these countries have typically low domestic savings ratios and limited capital bases, they are open to substantial vulnerabilities in relation both to the continuity of capital inflows and to changes in capital gains and losses emanating from international capital movements and exchange rate changes. Methodologically, this seems to support the critique applied by Bohn (2007), both with regard to the estimation of sustainability and with regard to the need for sustainability to be assessed on the grounds of the economic (and political) realities characterising the countries under study and their international environment. In terms of policy, our results suggest that the countries of the European periphery and super-periphery face problems and vulnerabilities that go beyond simple concerns about price competitiveness of exports and trade performance at large and rather concern the ability of these countries to maintain sustainable levels of foreign and domestic investment that will allow the continuing financing of

their external deficits in their path to economic development and catch-up with the development levels of the European core.

To conclude, concerns about the sustainability of external imbalances in the European periphery and super-periphery appear to be well founded on the grounds of both the descriptive and the econometric evidence. Although all of the econometric tests applied here examine (various versions of) a sufficient condition for sustainability, and in this sense failure to accept sustainability does not *necessarily* imply unsustainability, it appears warranted to conclude that most of the countries under study have been, and still are, in a rather vulnerable position with regard to their external balances. Given the relatively low levels of development of these countries and their continuing dependence on international trade (exports) and investment (capital inflows), it appears of paramount importance that policy efforts continue to pay attention to the fiscal and financial stability of these countries not only in the current climate but also prospectively in the period after the full recovery from the problems still facing today the international economy.

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Appendix

Table A.1. Unit Root Test Results (2000q1-2007q4 Period)

Countries	Variables	DFGLS Test (ERS)	Ng-Perron Test			
		t-Statistics	MZa	MZt	MSB	MPT
Belarus	Exports	-2.439099	-8.49339	-1.81764	0.21401	11.4656
	Imports	-1.605363	-3.56915	-1.32050	0.36998	6.86248
	Importsaug.	-1.642001*	-3.70489	-1.35563	0.36590	6.61422
	Net exports	-4.317292***	-14.2794***	-2.67145***	0.18708**	1.71794***
	Net For. Assets	-2.657235	-44.2172***	-4.60969***	0.10425***	2.52677***
	Current Acc. Bal.	-4.141136***	-14.0457***	-2.64299***	0.18817**	1.77116***
	ΔExports	-5.706986***	-14.3391***	-2.48871**	0.17356	2.39810**
	ΔImports	-7.978150***	-12.8013**	-2.50900**	0.19600**	1.99404**
	ΔImportsaug.	-7.945269***	-12.8403**	-2.51248**	0.19567**	1.98960**
	ΔNet exports	---	---	---	---	---
	ΔNet For. Assets	-1.956694**	---	---	---	---
Bulgaria	Exports	-1.737778	-5.32023	-1.52927	0.28744	16.7557
	Imports	-1.597292	-4.63593	-1.28611	0.27742	18.0497
	Importsaug.	-1.176726	-2.38281	-0.82400	0.34581	27.8357
	Net exports	-4.087146***	-13.3366	-2.45531	0.18410*	7.52482
	Net For. Assets	-1.171730	-2.60520	-1.13771	0.43671	9.38770
	Current Acc. Bal.	-0.662566	-1.15605	-0.44774	0.38730	36.5129
	ΔExports	-5.089210***	-14.9393***	-2.69302***	0.18026**	1.78931**
	ΔImports	-5.230456***	-14.3087***	-2.37071**	0.16568***	2.79767**
	ΔImportsaug.	-5.095204***	-14.4337***	-2.52408**	0.17487**	2.29247**
	ΔNet exports	---	-14.0161***	-2.52360**	0.18005**	2.20662**
	ΔNet For. Assets	-4.326795***	-14.3255***	-2.66696***	0.18617**	1.74563***
Croatia	Exports	-4.670204***	-15.0774***	-2.74505***	0.18206**	1.62728***
	Imports	-0.493353	-0.42520	-0.24250	0.57031	20.8430
	Importsaug.	-1.688480*	-2.66747	-0.94830	0.35550	8.40180
	Net exports	-4.191795***	-13.0943	-2.55847	0.19539	6.96063
	Net For. Assets	-2.558776	-1028.46***	-22.6590***	0.02203***	0.11036***
	Current Acc. Bal.	-3.205041***	-10.7118**	-2.22714**	0.20792**	2.61925**
	ΔExports	---	---	---	---	---
	ΔImports	-7.101350***	-32.7724***	-3.99283***	0.12184***	0.91071***
	ΔImportsaug.	-7.849646***	-12.7876**	-2.47721***	0.19372**	2.11136**
	ΔNet exports	---	-14.5417***	-2.69531***	0.18535***	1.68913
	ΔNet For. Assets[1]	-1.147019	---	---	---	---
Czech Republic	Exports	-2.604819	-9.18998	-2.14204	0.23308	9.92168
	Imports	-2.695488***	-9.42043**	-2.11597**	0.22462**	2.80742**
	Importsaug.	-2.030160**	-6.49204*	-1.65090*	0.25430*	4.25615*
	Net exports	-2.203513	-7.22769	-1.89285	0.26189	12.6201
	Net For. Assets	-4.640861***	-90.1955***	-6.71549***	0.07445***	1.01031***
	Current Acc. Bal.	-1.813686*	-11.5214**	-2.39914**	0.20823**	2.13038**
	ΔExports	-4.881684***	-14.5804****	-2.69958***	0.18515**	1.68208***
	ΔImports	---	---	---	---	---

	ΔImportsaug.	-5.128042***	-14.7867***	-2.69718***	0.18241**	1.73897***
	ΔNet exports	-5.593221***	-14.9673***	-2.71715***	0.18154**	1.70608***
	ΔNet For. Assets	---	---	---	---	---
Greece	Exports	-2.294769**	-8.16355**	-1.95347*	0.23929*	3.24722*
	Imports	-0.745146	-3.10597	-1.02570	0.33024	7.53104
	Importsaug.	-0.094063	-0.28394	-0.09507	0.33483	11.8430
	Net exports	-1.682480*	-5.71192*	-1.51684	0.26556*	4.77367
	Net For. Assets	-3.359596**	-8937.23***	-66.8466***	0.00748***	0.01065***
	Current Acc. Bal.	-0.524105	-1.73672	-0.50657	0.29168	8.94615
	ΔExports	---	-14.7813***	-2.60513***	0.17624**	2.07562**
	ΔImports	-3.563263***	-13.3909**	-2.40559**	0.17964**	2.50058**
	ΔImportsaug.	-5.512433***	-14.4785***	-2.34678**	0.16209***	2.90796**
	ΔNet exports	-7.249244***	-13.7378**	-2.61750***	0.19053**	1.79619**
	ΔNet For. Assets	---	---	---	---	---
Hungary	Exports	-0.508854	-1.10187	-0.48344	0.43875	13.3370
	Imports	-0.849155	-2.07099	-0.83012	0.40083	10.1412
	Importsaug.	-0.751235	-1.79815	-0.73317	0.40774	10.8731
	Net exports	-2.082281**	-7.35597*	-1.77521*	0.24133*	3.82470*
	Net For. Assets	-1.863383*	-83.1207***	-6.44402***	0.07753***	0.30020***
	Current Acc. Bal.	-2.896959***	-10.2269**	-2.25298**	0.22030**	2.42785**
	ΔExports[2]	-1.823291*	-4.68459	-1.49560	0.31926	5.29946
	ΔImports	-3.687795***	-12.6082**	-2.51017**	0.19909**	1.94560**
	ΔImportsaug.	-4.350032***	-14.1355***	-2.65166***	0.18759**	1.75921***
	ΔNet exports	-6.193852***	-14.6703***	-2.68462***	0.18300**	1.75909***
	ΔNet For. Assets[3]	-0.989864	---	---	---	---
Moldova	Exports	-2.183128**	-6.85733*	-1.63835*	0.23892*	4.26946*
	Imports	-1.737882*	-5.38093	-1.57414	0.29254	4.72914
	Importsaug.	-2.135091**	-4.64972	-1.50731	0.32417	5.30352
	Net exports	0.052206	0.15989	0.09092	0.56860	23.3245
	Net For. Assets	-0.570009	-4.25433	-1.21263	0.28503	19.1433
	Current Acc. Bal.	-2.043051**	-5.48956	-1.64414	0.29950	4.49815
	ΔExports	-5.589606***	-14.5592***	-2.69475***	0.18509**	1.69530***
	ΔImports	-5.628235***	-14.6806***	-2.70086***	0.18398**	1.70061***
	ΔImportsaug.[4]	0.264873	0.38536	0.77644	2.01482	226.884
	ΔNet exports	-9.320615***	-11.2320**	-2.36948**	0.21096**	2.18257**
	ΔNet For. Assets	-4.498991***	-14.9858*	-2.73622*	0.18259*	6.08711*
Poland	Exports	-1.918021	-5.65135	-1.61350	0.28551	15.9559
	Imports	-2.582101	-7.93193	-1.98713	0.25052	11.4992
	Importsaug.	-3.094737*	-18.0702**	-2.99850**	0.16594**	5.08649**
	Net exports	-1.625244*	-3.93772	-1.38558	0.35187	6.23503
	Net For. Assets	-2.508791	-14.3621*	-2.67801*	0.18646*	6.35472*
	Current Acc. Bal.	-1.999174**	-11.1141**	-2.18249**	0.19637**	2.85372**
	ΔExports[5]	-1.569651	-4.04324	-1.40239	0.34685	6.07800
	ΔImports	-3.686203***	-10.5917**	-2.28945**	0.21615**	2.35851**
	ΔImportsaug.	-3.487545***	-11.0199**	-2.34714**	0.21299**	2.22400**
	ΔNet exports	-4.963318***	-12.9711**	-2.52089**	0.19435**	1.98655**
	ΔNet For. Assets	-2.914298**	-10.4671**	-2.11140**	0.20172**	2.99270**
Romania	Exports	-1.770237*	-6.32340*	-1.76215*	0.27867	3.92646*
	Imports	-1.606807	-2.11576	-0.90494	0.42771	10.4958
	Importsaug.	-1.558475	-2.51858	-0.94986	0.37714	8.89228
	Net exports	-3.450706**	-12.5592	-2.49456	0.19862	7.31706
	Net For. Assets	0.876821	2.18524	1.18532	0.54242	29.9180
	Current Acc. Bal.	-3.593284**	-13.0798	-2.54424	0.19452	7.03908
	ΔExports	-2.899748**	-9.56153**	-2.18284**	0.22829**	2.57642**
	ΔImports[6]	-1.417671	-3.62481	-1.34622	0.37139	6.75898
	ΔImportsaug.	-4.751710***	-14.4373***	-2.67904***	0.18556**	1.72612***
	ΔNet exports	-7.238237***	-13.6490**	-2.61200***	0.19137**	1.79642**
	ΔNet For. Assets	-4.082443***	-13.8809***	-2.59362***	0.18685**	1.91914**
Slovenia	Exports	-1.952399	-7.48161	-1.93377	0.25847	12.1805
	Imports	-1.384152	-2.97933	-1.17585	0.39467	29.3973
	Importsaug.	-1.512327	-3.52256	-1.27883	0.36304	25.0240
	Net exports	-2.208128**	-6.48087*	-1.79233*	0.27656	3.80627*
	Net For. Assets	-2.890814*	-19.8789**	-3.08109**	0.15499**	5.00892**
	Current Acc. Bal.	-2.171159**	-7.77310*	-1.86705*	0.24019*	3.52604*
	ΔExports	-3.321095***	-11.9391**	-2.35342**	0.19712**	2.39299**
	ΔImports	-5.162690***	-14.9733***	-2.73617***	0.18274**	1.63628***
	ΔImportsaug.	-5.117600***	-14.9587***	-2.72194***	0.18196**	1.68618***

	ΔNet exports	-7.192344***	-13.6465**	-2.56951**	0.18829**	1.95652**
	ΔNet For. Assets[7]	-1.682633*	---	---	---	---
Turkey	Exports	-2.158133**	-6.78612*	-1.84090*	0.27127*	3.61418*
	Imports	-3.517327**	-11.9525	-2.43535	0.20375	7.67263
	Importsaug.	-4.230292***	-14.5688*	-2.65918*	0.18253*	6.48284*
	Net exports	-1.404621	-3.96631	-1.32788	0.33479	6.24401
	Net For. Assets	-2.470131**	-19.9852***	-3.11923***	0.15608***	1.37214***
	Current Acc. Bal.	-1.580781	-4.73913	-1.47289	0.31079	5.30585
	ΔExports	-4.479190***	-14.4177***	-2.68474***	0.18621**	1.70001***
	ΔImports	-6.984973***	-14.0080***	-2.64589***	0.18888**	1.75134***
	ΔImportsaug.	---	-13.5766**	-2.60087***	0.19157**	1.82198**
	ΔNet exports	-4.851681***	-14.7188***	-2.71235***	0.18428**	1.66631***
	ΔNet For. Assets	---	---	---	---	---

Notes: All series are seasonally adjusted by using Census X12 additive method. ***, **, * denotes the significance at 1%, 5% and 10% levels respectively. It is decided to add a constant and a time trend to the estimations after examining the graphs of the series. [1] The second difference of Net Foreign Assets passes the critical value of DFGLS test at 10% level. [2] The second difference of Exports passes the critical value of DFGLS test at 1% level. [3] The second difference of Net Foreign Assets passes the critical value of DFGLS test at 1% level. [4] The second difference of Imports Augmented passes the critical value of Ng-Perron and DFGLS test at 5% level. [5] The second difference of Exports passes the critical value of DFGLS test at 5% level. [6] The second difference of Imports passes the critical value of DFGLS test at 1% level and the critical value of Ng-Perron test at 5% level. [7] The second difference of Net Foreign Assets passes the critical value of DFGLS test at 1% level.

Table A.2. Unit Root Test Results (2005q1-2012q4 Period)

Countries	**Variables**	**DFGLS Test (ERS)**	**Ng-Perron Test**			
		t-Statistics	**MZa**	**MZt**	**MSB**	**MPT**
Belarus	Exports	-2.541882**	-14.7763***	-2.71745***	0.18391**	1.66056***
	Imports	-1.907758*	-5.20938	-1.61369	0.30977	4.70361
	Importsaug.	-1.622040	-3.87213	-1.37478	0.35505	6.33806
	Net exports	-1.798138*	-4.57749	-1.51274	0.33048	5.35250
	Net For. Assets	-1.772125	-4.90515	-1.45381	0.29639	17.9512
	Current Acc. Bal.	-1.855898*	-4.14467	-1.42203	0.34310	5.93227
	ΔExports	---	---	---	---	---
	ΔImports	-5.486921***	-14.2340***	-2.27620**	0.15991***	3.09568**
	ΔImportsaug.	-5.416359***	-14.3879***	-2.33175**	0.16206***	2.94133**
	ΔNet exports	-2.619443**	-79.4063***	-6.29308***	0.07925***	0.32486***
	ΔNet For. Assets	-3.874791***	-13.7538**	-2.52008**	0.18323**	2.16330**
Bulgaria	Exports	-1.367661	-3.58899	-1.24959	0.34817	6.82056
	Imports	-2.297217**	-17.0804***	-2.91862***	0.17088***	1.44807***
	Importsaug.	-1.203420	-2.50965	-1.11186	0.44304	9.71820
	Net exports	-0.667289	-1.38658	-0.65484	0.47227	13.5157
	Net For. Assets	-2.381219	-11.2925	-2.37123	0.20998	8.09441
	Current Acc. Bal.	-1.558204	-12.4247**	-2.43923**	0.19632**	2.17511**
	ΔExports	-4.969428***	-14.9052***	-2.72762***	0.18300**	1.65245***
	ΔImports	---	---	---	---	---
	ΔImportsaug.[1]	-2.159515**	-6.12284*	-1.69211*	0.27636	4.18090*
	ΔNet exports	-6.031999***	-14.5138***	-2.64238***	0.18206**	1.88061**
	ΔNet For. Assets	-3.115593***	-11.1920**	-2.35294**	0.21023**	2.23795**
Croatia	Exports	-2.273791**	-8.25933**	-1.93758*	0.23459*	3.31317*
	Imports	-1.352342	-4.05278	-1.34555	0.33201	6.12364
	Importsaug.	-1.446497	-4.13749	-1.35374	0.32719	6.01961
	Net exports	-1.130663	-3.16464	-1.00841	0.31865	7.39855
	Net For. Assets	-1.686806	-4.61416	-1.44903	0.31404	19.2364
	Current Acc. Bal.	-1.747507*	-6.21127*	-1.57515	0.25360*	4.51491
	ΔExports	-6.963659***	-14.0379***	-2.64817***	0.18864**	1.74969***
	ΔImports	-4.172555***	-13.9705***	-2.64108***	0.18905**	1.76085***
	ΔImportsaug.	-5.395128***	-14.8755***	-2.69824***	0.18139**	1.75539***
	ΔNet exports	-6.911998***	-14.0712***	-2.65244***	0.18850**	1.74126***

	ΔNet For. Assets	-4.272925***	-14.2569***	-2.65663***	0.18634**	1.76867***
Cyprus	Exports	-2.572809**	-9.43755**	-2.07469**	0.21983**	2.96358**
	Imports	-1.733232*	-5.56049	-1.58489	0.28503	4.63535
	Importsaug.	-3.814628***	-13.7390**	-2.58887***	0.18843**	1.90491**
	Net exports	-2.821259***	-10.1777**	-2.25498**	0.22156**	2.41057**
	Net For. Assets	-2.486857	-10.4785	-2.24629	0.21437	8.89389
	Current Acc. Bal.	-4.062419***	-14.1420***	-2.65887***	0.18801**	1.73342***
	ΔExports	---	---	---	---	---
	ΔImports	-5.165775***	-14.9157***	-2.72884***	0.18295**	1.65032***
	ΔImportsaug.	---	---	---	---	---
	ΔNet exports	---	---	---	---	---
	ΔNet For. Assets	-2.504399**	-8.53735**	-2.06464**	0.24184*	2.87519**
Czech Republic	Exports	-0.640060	-1.10821	-0.45887	0.41407	12.6054
	Imports	-1.088352	-4.54051	-1.28645	0.28333	5.77134
	Importsaug.	-2.727731***	-954.511***	-21.8222***	0.02286***	0.04049***
	Net exports	-2.548340**	-9.32432**	-2.07745**	0.22280**	2.93613**
	Net For. Assets	-0.859925	-0.95513	-0.44680	0.46778	14.6689
	Current Acc. Bal.	-5.211492***	-15.4168***	-2.77421***	0.17995**	1.59736***
	ΔExports	-3.739044***	-12.5097**	-2.46230**	0.19683**	2.10627**
	ΔImports	-2.983823***	-9.88331**	-2.22136**	0.22476**	2.48520**
	ΔImportsaug.	---	---	---	---	---
	ΔNet exports	---	---	---	---	---
	ΔNet For. Assets	-4.708140***	-40.6559***	-4.50718***	0.11086***	0.60665***
Greece	Exports	-0.714367	-1.96046	-0.68741	0.35064	9.53660
	Imports	-1.532492	-3.93681	-1.39661	0.35476	6.22838
	Importsaug.	-1.988448**	-6.39277*	-1.73511*	0.27142*	4.00385*
	Net exports	-0.950377	-2.53232	-0.90935	0.35910	8.67109
	Net For. Assets	-1.030941	-11.7550**	-1.99756**	0.16993***	3.59244*
	Current Acc. Bal.	-0.493680	-1.27703	-0.56309	0.44093	12.9406
	ΔExports	-4.478545***	-14.5015***	-2.68942***	0.18546**	1.70195***
	ΔImports	-4.311452***	-14.3115***	-2.66217***	0.18602**	1.76042***
	ΔImportsaug.	-6.939791***	-14.0537***	-2.64289***	0.18806**	1.77338***
	ΔNet exports	-6.909308***	-14.0039***	-2.61490***	0.18673**	1.86739**
	ΔNet For. Assets	-3.332869***	-12.4470**	-2.39417**	0.19235**	2.34785**
Hungary	Exports	-1.797559	-5.34479	-1.47963	0.27684	16.5066
	Imports	-1.534753	-2.87909	-1.17221	0.40715	8.43105
	Importsaug.	-1.779016*	-5.84680*	-1.68977*	0.28901	4.25065*
	Net exports	-2.761237	-9.87504	-2.11576	0.21425	9.67782
	Net For. Assets	-2.738993***	-15.1680***	-2.75060***	0.18134**	1.62765***
	Current Acc. Bal.	-0.897115	-1.63876	-0.76626	0.46759	12.6351
	ΔExports	-4.214063***	-14.1554***	-2.55550**	0.18053**	2.12065**
	ΔImports	-4.483567***	-14.4760***	-2.65798***	0.18361**	1.81402**
	ΔImportsaug.	-4.134654***	-13.9666***	-2.64225***	0.18918**	1.75548***
	ΔNet exports	-4.877963***	-14.9640***	-2.52754**	0.16891***	2.38807**
	ΔNet For. Assets	---	---	---	---	---
Macedonia	Exports	-1.767560*	-5.34968	-1.62484*	0.30373	4.60829
	Imports	-1.860968*	-5.64795	-1.61900	0.28665	4.51333
	Importsaug.	-1.769168*	-5.28832	-1.61151	0.30473	4.67120
	Net exports	-2.856154**	-9.56839**	-2.11723**	0.22127**	2.82655**
	Net For. Assets	-2.495886**	-14.6502***	-2.61500***	0.17850**	2.01188**
	Current Acc. Bal.	-2.437677**	-8.40586**	-2.04952**	0.24382*	2.91683**
	ΔExports	-4.653228***	-14.5956***	-2.69679***	0.18477**	1.69610***
	ΔImports	-4.714041***	-14.4188***	-2.68480***	0.18620**	1.70006***
	ΔImportsaug.	-4.552072***	-14.4790***	-2.68744***	0.18561**	1.70415***
	ΔNet exports	---	---	---	---	---
	ΔNet For. Assets	---	---	---	---	---
Moldova	Exports	-1.309418	-2.06027	-0.98034	0.47583	11.5490
	Imports	-1.543818	-4.17129	-1.44360	0.34608	5.87421
	Importsaug.	-1.709342*	-4.82643	-1.53989	0.31905	5.10587
	Net exports	-1.896292*	-5.54155	-1.64011*	0.29597	4.48997
	Net For. Assets	-1.145636	-3.29619	-0.98956	0.30021	7.16839
	Current Acc. Bal.	-2.632101**	-8.12787**	-2.00873**	0.24714*	3.04116**
	ΔExports	-4.986987***	-14.8562***	-2.69485***	0.18140**	1.76362***
	ΔImports	-3.680670***	-12.8201**	-2.49282**	0.19445**	2.05968**
	ΔImportsaug.	-5.029974***	-14.7839***	-2.69755***	0.18247**	1.73694***
	ΔNet exports	-4.516534***	-14.3120***	-2.65899***	0.18579**	1.77253***

	ΔNet For. Assets	-4.546918***	-14.6761***	-2.64246***	0.18005**	1.91668**
Poland	Exports	-1.469411	-3.61602	-1.33359	0.36880	25.0180
	Imports	-2.268462	-10.4415	-2.26775	0.21719	8.80674
	Importsaug.	-1.764715	-4.16334	-1.37219	0.32959	21.1388
	Net exports	-1.425684	-3.99459	-1.30703	0.32720	6.22704
	Net For. Assets	-1.014050	-2.27123	-0.83714	0.36858	9.25330
	Current Acc. Bal.	-1.757929*	-4.74898	-1.49839	0.31552	5.24735
	ΔExports	-4.306898***	-13.6941**	-2.59750***	0.18968**	1.86194**
	ΔImports	-3.127777***	-10.8162**	-2.32089**	0.21457**	2.28312**
	ΔImportsaug.	-4.457129***	-14.2699***	-2.61599***	0.18332**	1.92354**
	ΔNet exports	-4.976231***	-14.9068***	-2.73001***	0.18314**	1.64386***
	ΔNet For. Assets	-4.945185***	-38.3859***	-4.38021***	0.11411***	0.64041***
Romania	Exports	-0.965583	-2.45950	-0.94093	0.38257	9.07075
	Imports	-2.187006**	-9.63770**	-2.19517**	0.22777**	2.54218**
	Importsaug.	-2.092067**	-9.25615**	-2.14606**	0.23185**	2.66697**
	Net exports	-0.650463	-1.31686	-0.63886	0.48514	14.1103
	Net For. Assets	-0.523288	-0.21236	-0.12567	0.59180	22.9335
	Current Acc. Bal.	-1.053782	-2.44341	-1.02011	0.41749	9.54589
	ΔExports	-4.786583***	-14.8187***	-2.70183***	0.18233**	1.72897***
	ΔImports	---	---	---	---	---
	ΔImportsaug.	---	---	---	---	---
	ΔNet exports	-4.450381***	-14.4288***	-2.65076***	0.18371**	1.83017**
	ΔNet For. Assets	-4.562770***	-14.6072***	-2.69560***	0.18454**	1.70329***
Slovakia	Exports	-1.257952	-5.48333	-1.42190	0.25931*	5.07546
	Imports	-1.727638*	-7.59289*	-1.84873*	0.24348*	3.58122*
	Importsaug.	-1.485714	-5.27992	-1.53560	0.29084	4.86883
	Net exports	-1.454795	-4.85540	-1.24059	0.25551*	5.68113
	Net For. Assets	-1.584836	-5.85172*	-1.58833	0.27143*	4.54421
	Current Acc. Bal.	-7.503306***	-19.3506**	-3.10502**	0.16046**	4.74207**
	ΔExports	-3.504162***	-12.3511**	-2.46148**	0.19929**	2.07413**
	ΔImports	-3.469699***	-12.1264**	-2.44773**	0.20185**	2.07672**
	ΔImportsaug.	-4.978563***	-14.6143***	-2.68968***	0.18404**	1.72719***
	ΔNet exports	-7.744314***	-13.1224**	-2.56148**	0.19520**	1.86706**
	ΔNet For. Assets	-3.715934***	-24.5624***	-3.48096***	0.14172***	1.07464***
Slovenia	Exports	-1.302722	-9.59446**	-1.95536*	0.20380**	3.41175*
	Imports	-2.511865**	-14.1838***	-2.62630***	0.18516**	1.86591**
	Importsaug.	-2.363570**	-11.2829**	-2.34945**	0.20823**	2.27075**
	Net exports	-0.697551	-2.32612	-0.65338	0.28089	8.15819
	Net For. Assets	-2.659475	-36.1766***	-4.24365***	0.11730***	2.56973***
	Current Acc. Bal.	-0.600854	-1.76713	-0.55975	0.31676	9.29296
	ΔExports	-2.657610***	-9.41878**	-2.16435**	0.22979**	2.62332**
	ΔImports	---	---	---	---	---
	ΔImportsaug.	---	---	---	---	---
	ΔNet exports	-5.701032***	-14.9351***	-2.71772***	0.18197**	1.69649***
	ΔNet For. Assets	-3.679009***	---	---	---	---
Turkey	Exports	-1.705992*	-6.07851*	-1.52747	0.25129*	4.66964
	Imports	-1.772024*	-6.90032*	-1.77248*	0.25687*	3.83940*
	Importsaug.	-1.116831	-2.56221	-1.01388	0.39570	9.01255
	Net exports	-2.075229**	-8.98182**	-2.11844**	0.23586*	2.73055**
	Net For. Assets	-1.000771	-8.91961**	-1.78012*	0.19957**	3.91461*
	Current Acc. Bal.	-1.631961*	-4.54088	-1.50549	0.33154	5.39783
	ΔExports	-6.494910***	-14.3796***	-2.68081***	0.18643**	1.70595***
	ΔImports	-3.735396***	-13.1321**	-2.55672**	0.19469**	1.88749**
	ΔImportsaug.	-4.116573***	-13.9630***	-2.63317***	0.18858**	1.78911**
	ΔNet exports	---	---	---	---	---
	ΔNet For. Assets	-3.119899***	-11.6853**	-2.32690**	0.19913**	2.43945**
Ukraine	Exports	-1.726880*	-3.07109	-1.20759	0.39321	7.91742
	Imports	-1.906764*	-6.20078*	-1.71410*	0.27643	4.09921*
	Importsaug.	-1.701660*	-5.28638	-1.54420	0.29211	4.84461
	Net exports	-1.721181*	-3.32110	-1.13767	0.34256	7.24565
	Net For. Assets	-1.663855*	-6.99499*	-1.75854*	0.25140*	3.88221*
	Current Acc. Bal.	-2.792508	-6.52809	-1.79942	0.27564	13.9596
	ΔExports[2]	-0.646222	-0.93304	-0.67188	0.72010	25.6276
	ΔImports	-4.988458***	-14.8516***	-2.71450***	0.18277**	1.68919***
	ΔImportsaug.	-5.151070***	-14.9028***	-2.68640***	0.18026**	1.80553**
	ΔNet exports[3]	-1.828714*	-5.97682*	-1.70263*	0.28487	4.17925*

	ΔNet For. Assets	-3.061696***	-11.0465**	-2.34938**	0.21268**	2.22094**

Notes: All series are seasonally adjusted by using Census X12 additive method. ***, **, * denotes the significance at 1%, 5% and 10% levels respectively. It is decided to add a constant and a time trend to the estimations after examining the graphs of the series. [1] The second difference of Imports Augmented passes the critical value of Ng-Perron test at 5% level. [2] The second difference of Imports Augmented passes the critical value of Ng-Perron and DFGLS test at 1% level. [3] The second difference of Net Exports passes the critical value of Ng-Perron and DFGLS test at 5% and 1% level respectively.

Table A.3. Unit Root Test Results (2000q1-2012q4 Period)

Countries	*Variables*	*Optimal Break Point*	*Coefficient for the Break Point*		*Clemente-Montanes-Reyes Test*	*DFGLS Test (ERS)*
Belarus	Exports	2012q1	0.1136*	(1.724)	-0.978	
	Imports	2010q4	0.1039***	(3.608)	-4.264**	
	Importsaug.	2010q4	0.1766***	(6.200)	-3.324	
	Net exports	2011q3	0.1036***	(4.153)	-4.349**	
	NFA	2009q2	-1.0862***	(-16.534)	-2.060	
	CA Balance	2007q3	-0.0641***	(-4.606)	-4.538**	
	ΔExports					-1.963693**
	ΔImports					---
	ΔImportsaug.					-3.971818***
	ΔNet exports					---
	ΔNFA					-0.861450
Bulgaria	Exports	2011q2	0.1154***	(4.688)	-2.308	
	Imports	2007q2	0.0250	(0.924)	-0.961	
	Importsaug.	2007q2	0.0565*	(1.759)	-1.171	
	Net exports	2010q1	0.1085***	(5.865)	-2.270	
	NFA	2010q3	-1.4287***	(-9.774)	-1.169	
	CA Balance	2010q1	0.1052***	(4.076)	-1.843	
	ΔExports					-3.540246***
	ΔImports					-3.015418***
	ΔImportsaug.					-3.040370***
	ΔNet exports					-1.672215*
	ΔNFA					-3.922769***
Croatia	Exports	2009q1	-0.0107	(-1.406)	-4.993**	
	Imports	2008q4	-0.0729***	(-12.073)	-1.042	
	Importsaug.	2009q1	-0.0520***	(-6.124)	-2.873	
	Net exports	2009q1	0.0604***	(7.835)	-6.686**	
	NFA	2005q4	-2.1050***	(-16.441)	-2.769	
	CA Balance	2009q2	0.0424***	(4.542)	-5.757**	
	ΔExports	---	---		---	---
	ΔImports					-5.921074***
	ΔImportsaug.					-7.682366***
	ΔNet exports					---
	ΔNFA					-5.272531***
Cyprus	Exports	2008q2	-0.0448***	(-5.812)	-4.996**	
	Imports	2008q1	-0.0329**	(-2.690)	0.799	
	Importsaug.	2008q4	-0.0549	(-3.052)	-5.232**	
	Net exports	2006q1	-0.0298**	(-2.470)	-1.499	
	NFA	2009q2	-2.6444***	(-9.475)	-1.524	
	CA Balance	2008q4	0.0066	(0.339)	-4.410**	
	ΔExports					---
	ΔImports					-5.189619***
	ΔImportsaug.			---	---	---
	ΔNet exports					-5.745290***
	ΔNFA					-2.353867**
Czech Rep.	Exports	2011q2	0.1135***	(5.979)	-2.931	

	Imports	2011q2	0.0741	(4.141)	-2.741	
	Importsaug.	2010q4	0.0885***	(5.275)	-3.290	
	Net exports	2004q2	0.05584***	(16.998)	-3.839**	
	NFA	2007q3	-0.9263***	(-9.061)	-3.153	
	CA Balance	2004q1	0.0264***	(4.772)	-4.206**	
	ΔExports					-5.379142***
	ΔImports					-2.931255***
	ΔImportsaug.					-2.603044**
	ΔNet exports	---		---	---	---
	ΔNFA					-5.910800***
Greece	Exports	2011q3	0.0401***	(4.726)	-2.994	
	Imports	2007q4	-0.0034	(-0.396)	-1.663	
	Importsaug.	2007q2	0.0321***	(3.239)	-0.081	
	Net exports	2011q3	0.0521***	(5.163)	-2.775	
	NFA	2005q3	-1.5240***	(-10.576)	-2.533	
	CA Balance	2011q3	0.0569***	(3.626)	-1.870	
	ΔExports					-7.079011***
	ΔImports					-5.537720***
	ΔImportsaug.					-8.977332***
	ΔNet exports					-9.409108***
	ΔNFA					-1.228043
Hungary	Exports	2007q1	0.1442***	(8.773)	-2.128	
	Imports	2006q2	0.0881***	(6.476)	-3.269	
	Importsaug.	2006q2	0.0984***	(6.905)	-3.254	
	Net exports	2007q4	0.0674***	(11.108)	-3.121	
	NFA	2004q4	-1.1556***	(-7.934)	-3.759**	
	CA Balance	2009q2	0.08270***	(15.228)	-4.328**	
	ΔExports					-4.355550***
	ΔImports					-4.453068***
	ΔImportsaug.					-4.774622***
	ΔNet exports					-7.258514***
	ΔNFA					---
Moldova	Exports	2008q1	-0.1536***	(-11.188)	-4.568**	
	Imports	2007q3	-0.0669**	(-2.329)	-2.910	
	Importsaug.	2008q4	-0.1346***	(-6.698)	-5.737**	
	Net exports	2004q1	-0.15770	(-7.326)	-3.157	
	NFA	2003q3	1.6188***	(12.790)	-3.825**	
	CA Balance	2005q2	-0.0827***	(-5.388)	-1.893	
	ΔExports					---
	ΔImports					-5.899187***
	ΔImportsaug.					---
	ΔNet exports					-8.127374***
	ΔNFA					---
Poland	Exports	2004q3	0.1012***	(9.056)	-3.053	
	Imports	2004q3	0.0888***	(8.050)	-3.606**	
	Importsaug.	2004q3	0.1118***	(8.228)	0.088	
	Net exports	2009q2	0.0161***	(4.157)	-2.717	
	NFA	2009q2	-0.7785***	(-7.622)	-1.551	
	CA Balance	2005q4	-0.01608***	(-4.166)	-3.087	
	ΔExports					-1.446711
	ΔImports					---
	ΔImportsaug.					-4.496182***
	ΔNet exports					-6.489558***
	ΔNFA					-5.283207***
Romania	Exports	2011q2	0.0493***	(3.793)	-2.982	
	Imports	2009q2	-0.01925	(-1.668)	-4.123**	
	Importsaug.	2008q3	-0.0320***	(-2.835)	-3.551	
	Net exports	2009q3	0.0369***	(3.892)	-2.562	
	NFA	2009q2	-1.3588***	(-9.518)	-1.128	

	CA Balance	2009q3	0.0280**	(2.645)	-2.463	
	ΔExports					-3.961125***
	ΔImports					---
	ΔImportsaug.					-4.595293***
	ΔNet exports					-1.225987
	ΔNFA					-5.877329***
Slovakia	Exports	2011q2	0.1465***	(5.374)	-2.378	
	Imports	2011q2	0.0860***	(3.251)	-2.176	
	Importsaug.	2008q4	0.0008	(0.033)	-2.473	
	Net exports	2011q1	0.0518***	(5.468)	-3.491	
	NFA	2006q2	-0.8823***	(-7.808)	-2.826	
	CA Balance	2011q1	0.05602***	(4.211)	-4.145**	
	ΔExports					-5.718735***
	ΔImports					-4.908075***
	ΔImportsaug.					-2.547010**
	ΔNet exports					-8.047024***
	ΔNFA					-3.828204***
Slovenia	Exports	2006q2	0.0995***	(7.642)	-2.650	
	Imports	2004q3	0.1003***	(8.133)	-3.472	
	Importsaug.	2004q4	0.1181	(9.473)	-2.958	
	Net exports	2011q4	0.0512***	(5.061)	-3.536	
	NFA	2009q2	-1.1041***	(-9.020)	-2.174	
	CA Balance	2011q3	0.0445***	(3.917)	-2.663	
	ΔExports					-3.394396***
	ΔImports					-4.551828***
	ΔImportsaug.					-3.865331***
	ΔNet exports					-7.920693***
	ΔNFA					-2.892736***
Turkey	Exports	2011q4	0.0339***	(3.639)	-3.614**	
	Imports	2011q2	0.0660***	(6.216)	-2.196	
	Importsaug.	2010q1	0.0547***	(6.790)	-2.630	
	Net exports	2004q1	-0.0420***	(-5.697)	-2.729	
	NFA	2010q3	-0.3480***	(-4.399)	-3.511	
	CA Balance	2004q2	-0.0326***	(-4.905)	-2.585	
	ΔExports					---
	ΔImports					6.641634***
	ΔImportsaug.					7.164340***
	ΔNet exports					5.534057***
	ΔNFA					4.652084***
Ukraine	Exports	2005q3	-0.1170***	(-8.904)	-2.933	
	Imports	2011q2	0.0480**	(2.797)	-1.063	
	Importsaug.	2011q2	0.0647***	(4.097)	-2.972	
	Net exports	2005q3	-0.0930***	(-7.937)	-2.998	
	NFA	2009q2	-0.4684**	(-5.626)	-3.700**	
	CA Balance	2005q4	-0.1113***	(-9.501)	-2.756	
	ΔExports					4.297427***
	ΔImports					5.696310***
	ΔImportsaug.					5.717461***
	ΔNet exports					-2.081808**
	ΔNFA					---

Notes: All series are seasonally adjusted by using Census X12 additive method. ***, **, * denotes the significance at 1%, 5% and 10% levels respectively. The null hypothesis for both of the unit root tests: The series contains a unit root.

Figure A.1. Current Account Balance/GDP (2000q1-20012q4 period)

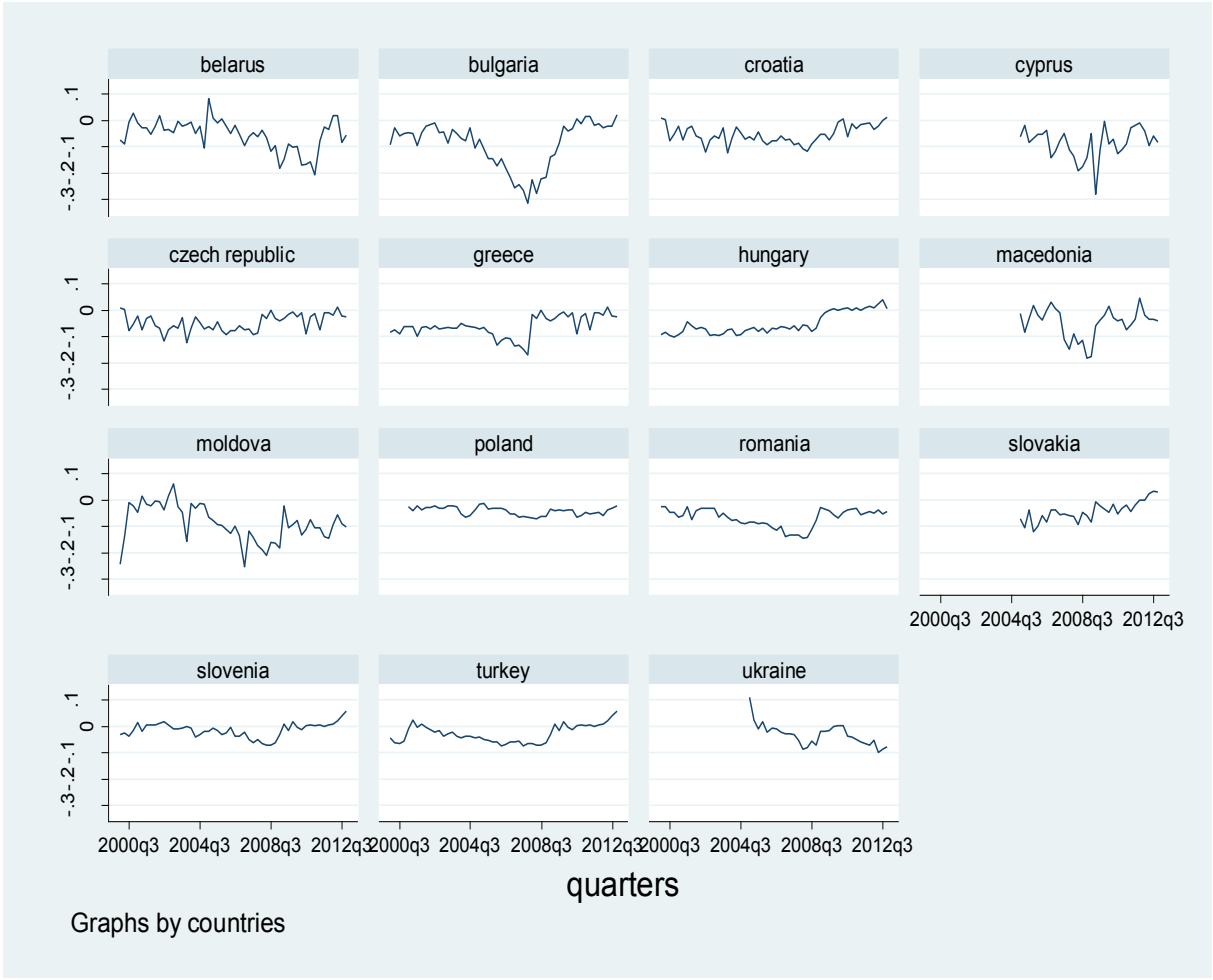
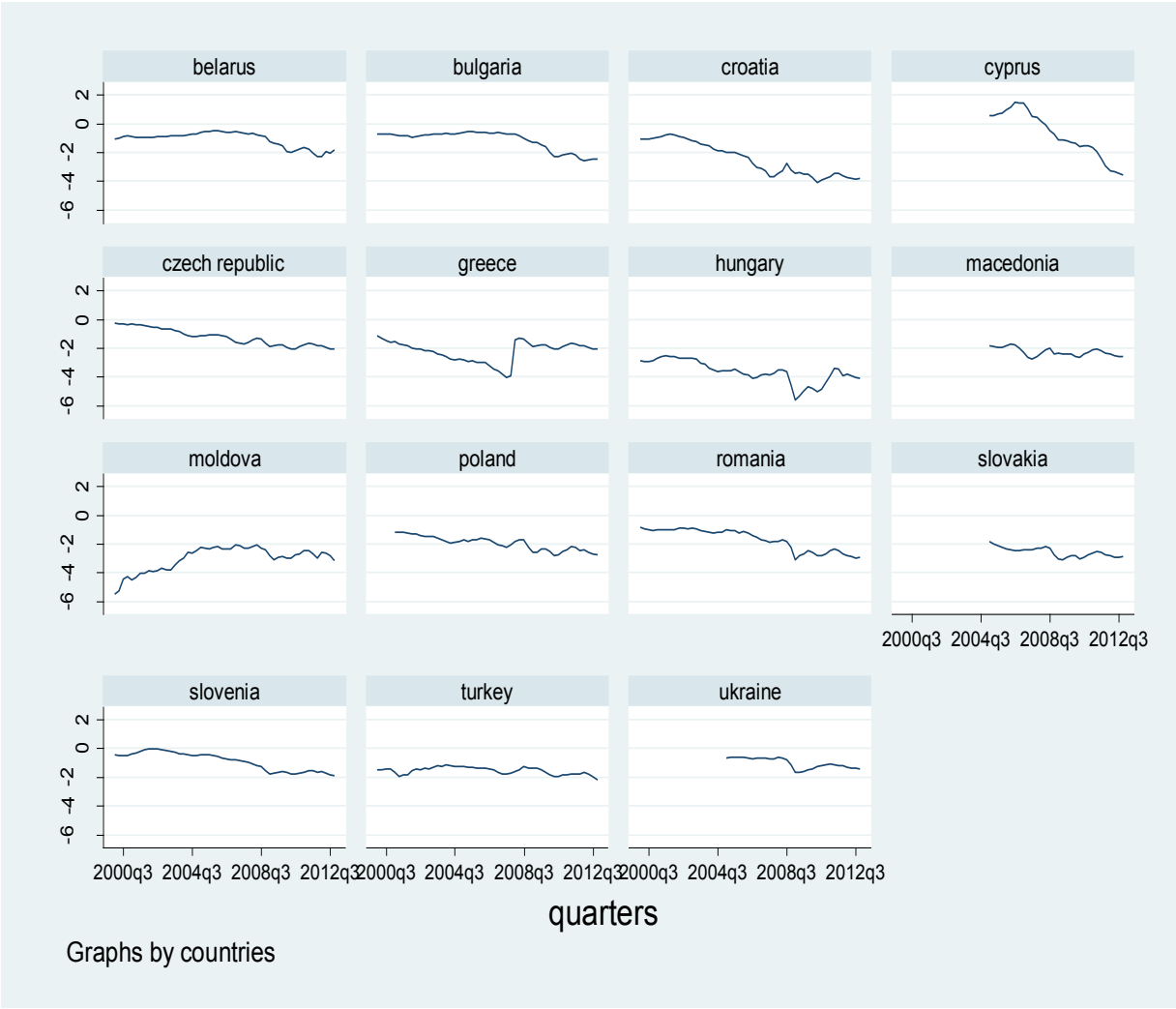


Figure A.2. Net Exports/GDP (2000q1-2012q4 period)

Figure A.3. Net Foreign Assets/GDP (2000q1-2012q4 period)



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