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Sustainability of Merchandise Trade Flows between Croatia and Other EU Member States - Panel Cointegration Approach

Summary: This research examined the sustainability of merchandise trade flows between Croatia and other European Union (EU) member states. Merchandise exports and imports were disaggregated into bilateral merchandise trade flows between Croatia and nineteen EU trading partners for the period 1999-2014. Following Granger-causality and cointegration tests for panel data, we specified the model to be estimated. Using a pooled mean group (PMG) estimator for dynamic heterogeneous panel data, the relationship between Croatian merchandise export and import was assessed empirically. Research results revealed unsustainable Croatian merchandise exports and imports *vis-à-vis* nineteen EU partners.

Key words: Merchandise trade, Panel cointegration, Croatia, EU.

JEL: C33, F14, F43.

The dynamics of the relationship between exports and imports hold significant importance for any economy (see, for example, Bernardina Algieri 2013), since unsustainable trade deficit indicates a violation of international budget constraints over time and, in case the trade deficits persist, the domestic interest rates can be very high. Such an economy can transform into a heavily indebted country, which may affect the welfare of its citizens. The occurrence of a cointegration relationship between imports and exports indicates that the trade deficits of a country are short-term and sustainable in the long-run and confirms the existence of an effective macroeconomic policy as well. Croatia is a new European Union (EU) member state, so its position among other countries in regards to merchandise trade sustainability might be of special importance. Hence, there is a need to investigate whether trade deficits are only a short-run phenomenon in Croatia. In this paper we want to examine the sustainability of merchandise bilateral trade flows between Croatia and other EU member states and bring a missing clarification to discussions on the EU as a framework for the development of Croatia as well as other post-transition economies. The research hypothesis states: merchandise trade flows between Croatia and other EU member countries are not sustainable.

The rest of the paper is organised as follows: Section 1 provides insights into some facts on the Croatian economy related to the research topic. Section 2 briefly summarises the existing empirical literature on the exports and imports sustainability. Section 3 presents methodology and research data, while Section 4 presents an empirical analysis. In Section 5, estimation results are given. The final section provides an overview of the main findings of the research.

1. Some of the Stylised Facts on Croatian Economy Related to the Research Topic

Croatia experienced trade and financial liberalization in the last two decades as well as deep trade and financial integration with other EU member states. Furthermore, Croatia is a highly indebted country with regard to public debt (Petar Sopek 2011), foreign debt (Jesmin Rahman 2011) and household debt (Vlatka Bilas and Mile Bošnjak 2015a). Sopek (2011) points out sustainability of the Croatian public debt. According to Rahman (2011), with large external and foreign currency indebtedness and limited reserves, Croatia's economy is highly vulnerable to macroeconomic and financial shocks. While most of these vulnerabilities were built up during the pre-crisis boom years, according to Rahman (2011), the current economic crisis has further worsened the situation, exposing the Croatian economy's weak fundamentals and a lack of adequate policies. Bilas and Bošnjak (2015a) provided empirical evidence for statistically significant long-term and short-term effects of banking loans to private individuals' growth rate on the personal consumption growth rate in Croatia. Using a cointegration approach, Bilas and Bošnjak (2015a) found empirical evidence for debt-financed consumption in Croatia that lasted fifteen years. Bošnjak, Ivan Novak, and Ivan Šverko (2013) empirically confirmed the personal consumption effects on import demand in Croatia. Bilas and Bošnjak (2015b) found Croatia to be a labour-abundant country with regard to the majority of other EU member states, and empirically confirmed that the merchandise trade flows between Croatia and other EU members is in accordance with that assumed by the Heckscher-Ohlin comparative advantages theory. Thus, taking into account high overall indebtedness in Croatia, findings on sustainability of Croatian merchandise trade flows with other EU member states may be of special importance for Croatian as well as EU-wide further economic policies.

2. Brief Exports and Imports Sustainability Literature Overview

Steven Husted (1992) laid down the foundations for examining cointegration between imports and exports. With regard to quarterly data for the U.S. economy, Husted examined and confirmed a long-term relationship between exports and imports and found there was a tendency in U.S. exports and imports to converge in the long-run. In his econometric model Husted used exports as the dependent variable.

Mohsen Bahmani-Oskooee (1994), using Robert F. Engle and Clive W. J. Granger's (1987) cointegration approach on a data sample for the period 1960-1992, confirmed the long-term convergence between Australian imports and exports. Bahmani-Oskooee found the cointegrating coefficient to be very close to unity and indicated that Australia's macroeconomic policies have been very effective. On a quarterly

data sample using Søren Johansen and Katarina Juselius's (1990) cointegration approach, Bahmani-Oskooee and Hyun-Jae Rhee (1997) confirmed that South Korea's exports and imports are cointegrated and that the coefficient on exports is positive. The results suggested that South Korea does not violate its international budget constraint.

Augustine C. Arize (2002), using the Johansen cointegration approach on a quarterly data sample for the period 1973-1998, with imports as the dependent variable, confirmed the existence of cointegration between imports and exports for 35 out of 50 countries in the sample. Arize drew the conclusion that macroeconomic policies have been effective in the long-run and indicated that these countries are largely not in violation of their international budget constraints. Ahmad Z. Baharumshah, Evan Lau, and Stilianos Fountas (2003) found empirical evidence for a cointegration relationship between imports and exports for Indonesia, Philippines and Thailand, but not for Malaysia. Tuck Cheong Tang and Haji Alias Mohammad (2005) found a long-term relationship between the volume of imports and exports in only four out of 27 examined countries. They pointed out that exchange rates and monetary or fiscal policies are potentially effective mechanisms to improve a country's trade balance in the long-term. Sharafat Ali (2013) examined and confirmed the long-term association between Pakistan's exports and imports, indicating the effectiveness of macroeconomic policies in stabilising the international trade balance in that country. Sagaren Pillay (2014) confirmed the long-run equilibrium relationship between South Africa's exports and imports on data samples for the period 1985-2012, using imports as the dependent variable. Ramona Dumitriu, Razvan Stefanescu, and Costel Nistor (2009) examined the dynamic relations between Romanian exports and imports using monthly data from January 2005 to March 2009. The cointegration and causality between the two variables were tested using the Engle-Granger and Johansen cointegration approach. The results were ambiguous and pointed out that Romanian current account deficit cannot be considered as sustainable. Quazi M. A. Hye and Masood M. Siddiqui (2010), using imports as a dependent variable on a data sample for the period 1985-2008, concluded that the international budget constraint of Pakistan is unsustainable and that imports and exports are not cointegrated. Komain Jiranyakul (2012) examined the relationship between manufacturing exports and imports of capital goods in Thailand using monthly data between January 2000 and July 2011 and confirmed the cointegration between the variables of interests. Meriem B. H. Mohamed, Sami Saafi, and Abdeljelil Farhat (2014) examined the causality direction between imports and exports in Tunisia using monthly data from January 2005 to August 2013. They confirmed bidirectional causality between imports and exports and concluded that Tunisia relies on imports to promote its exports sector development. The recommendations stemming from the research are to enhance the Tunisian international trade competitiveness in order to reduce its current account deficit.

Although the literature has examined the relationship between exports and imports extensively in the last decades, it is inconclusive with respect to their cointegration relationship. While some research papers confirm the long-term relationship between exports and imports, others have found weak evidence or no cointegration at all. This might be the case due to methodological issues, selection bias or model misspecification. Cosmos Antwi-Boateng (2015) provides an extensive literature overview that

uses different estimation methods and points out that empirical literature does not reach the conclusion that exports and imports have long-term relationships in both developed or developing economies. Mixed findings call for further empirical evidence to add to the debate. As already stated in the introduction, cointegration between merchandise exports and imports in Croatia has not been empirically confirmed. Here we propose a disaggregated data sample and pooled mean group (PMG) estimator for dynamic heterogeneous panel data to capture the long-run adjustment of the merchandise trade balance.

3. Methodology and Empirical Data

Following the works of Husted (1992), Arize (2002), Abdulla S. Al-Khulaifi (2013), and Pillay (2014), we present a simple framework that implies a long-run equilibrium relationship between exports and imports. The baseline is the assumption that the representative agent of a small open economy produces and exports a single composite set of goods with no government involvement. The representative agent can borrow and lend in international markets at the world interest rate using one-period financial instruments, with the objective of maximising lifetime utility subject to budget constraints. The representative agent current-period budget constraint in the period is given by:

$$C_t = Y_t + B_t - I_t - (1 + r_t), \tag{1}$$

where C_t, Y_t, B_t, I_t represent current consumption, output, international borrowing, and investment, respectively. The symbol r_t represents the one-period world interest rate and $(1 + r_t) \cdot B_{t-1}$ is the debt of the agent from the previous period. Equation (1) must hold in every time period.

In addition, the period-by-period budget constraints can be combined to form the country's intertemporal budget constraint, which states that the amount a country borrows (lends) in international markets equals the present value of future trade surpluses or deficits. Iterating forward from some initial period, and holding assumptions that the world interest rate is stationary while exports (X_t) and imports (M_t) are non-stationary at levels, Husted (1992) derived and tested the following model:

$$X_t = \alpha + \beta \cdot M_t + \varepsilon_t. \tag{2}$$

On the other hand, Arize (2002) tested the other model in the following form:

$$M_t = \alpha + \beta \cdot X_t + \varepsilon_t, \tag{3}$$

where M_t represents imports and X_t represents exports. The intertemporal international budget constraint is stable when there is a long-term relationship between imports and exports. The satisfaction of the intertemporal international budget constraint requires that β in Equation (2) or in Equation (3) should be equal to one; otherwise, the economy would not be able to fulfill its foreign liabilities.

The dataset used in this research consists of annual data on Croatian merchandise exports and imports, according to economic classification of countries, capturing the time span from year 1999 to year 2014 (taken from the Croatian Bureau of Statistics

2014)[1]. The data sample thus consists of annual data on Croatian merchandise exports and imports *vis-à-vis* nineteen EU trading partners: Austria, Belgium, Cyprus, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden and United Kingdom. The value of merchandise exports and imports is in thousands of local currency (HRK). Croatian merchandise trade flows with other EU member states is negligible regarding its amount, and in some years not recorded at all, and are thus left out of the sample. Since we observe Croatian merchandise exports and imports *vis-à-vis* nineteen EU trading partners within the time span from year 1999 to year 2014, the sample structure implies the panel data approach.

The decision on whether to estimate the model based on Equation (2) or Equation (3) was made following panel data Granger-causality test results. In general, the bivariate regressions in a panel data context take the form:

$$M_{i,t} = \alpha_{0,i} + \alpha_{1,i} \cdot M_{i,t-1} + \alpha_{2,i} \cdot M_{i,t-2} + \beta_{1,i} \cdot X_{i,t-1} + \beta_{2,i} \cdot X_{i,t-2} + \varepsilon_{i,t}, \quad (4)$$

$$X_{i,t} = \alpha_{0,i} + \alpha_{1,i} \cdot X_{i,t-1} + \alpha_{2,i} \cdot X_{i,t-2} + \beta_{1,i} \cdot M_{i,t-1} + \beta_{2,i} \cdot M_{i,t-2} + \varepsilon_{i,t}, \quad (5)$$

where t denotes the time period dimension of the panel, and i denotes the cross-sectional dimension. We treat the panel data as one large stacked set of data, and then perform the Granger-causality test in the standard way, with the exception of not letting data from one cross-section enter the lagged values of data from the next cross-section.

The literature dealing with dynamic and cointegrated panels rapidly evolved over the past decade, proposing a number of estimators that solve different econometrics issues (see, for example, Christoph Birkel 2014). To address the issue of short-run heterogeneity as well as long-run homogeneity of the estimated coefficients in a panel framework, the likelihood-based PMG estimator (M. Hashem Pesaran, Yongcheol Shin, and Ron P. Smith 1999) upon which we rely has gained popularity. Pesaran, Shin, and Smith argue that general method of moments (GMM) estimation procedure for the dynamic panel model can produce inconsistent and misleading coefficients of the long-run coefficients unless they are truly identical. This problem is bigger when the time dimension of the panel is large. Furthermore, there are some other advantages of the PMG estimator. It is an estimator which allows the intercepts, short-run coefficients and error variances to be different across groups, but the long-run coefficients are constrained to be homogeneous. Additionally, the likelihood-based PMG estimator on which we rely in this paper is less sensitive to outliers and can simultaneously correct the serial autocorrelation problem as well as the problem of endogenous regressors by choosing appropriate lag structure for dependent and independent variables (Pesaran, Shin, and Smith 1999).

Following the literature reviewed, there might be a tendency in exports and imports to converge in the long-run. In this case, it is assumed that the long-run equilibrium relationship amongst variables is identical across groups, while the short-run dynamics are heterogeneous. This dynamic estimator is more likely to capture the true

[1] **Croatian Bureau of Statistics.** 2014. Foreign Trade in Goods of the Republic of Croatia. http://www.dzs.hr/eng/publication/subjects.htm (accessed February 16, 2016).

nature of the data. Finally, the null hypothesis of long-run slope homogeneity in the coefficients is tested using the Hausman test:

$$M_{i,t} = \gamma_{0,i} + \gamma_{1,i} \cdot X_{i,t} + \varepsilon_{i,t}, \quad i = 1, \dots, N;\ t = 1, \dots T. \tag{6}$$

The first necessary step of the empirical analysis was to choose the lag order of the autoregressive distributive lag (ARDL) model by applying the Schwarz information criterion (SBC). Even though there was no clear evidence for a most common representation, after choosing a trading partner specific lag order of the ARDL model by applying the SBC, the preferred specification for the whole sample of analysed trading partners was an ARDL (1,1) model:

$$M_{i,t} = \delta_i + \gamma_i \cdot M_{i,t-1} + \beta_{1,0,i} \cdot X_{i,t} + \beta_{1,1,i} \cdot X_{i,t-1} + \varepsilon_{i,t}. \tag{7}$$

According to Engle and Granger (1987), if the variables are I(1) and cointegrated, the error term is an I(0) process for all trading partners (i). Furthermore, cointegrated variables show great responsiveness to any deviation from long-run equilibrium, so this feature implies an error-correction parameterisation of Equation (6) such as:

$$\Delta M_{i,t} = \varphi_i\left(M_{i,t-1} - \alpha_{0,i} - \alpha_{1,i} \cdot X_{i,t}\right) + \beta_{1,1,i} \cdot \Delta X_{i,t} + \varepsilon_{i,t}, \tag{8}$$

where:

$$\varphi_i = -(1 - \gamma_i),\ \alpha_{0,i} = \frac{\delta_i}{1-\gamma_i},\ \alpha_{0,i} = \frac{\beta_{1,0,i}+\beta_{1,1,i}}{1-\gamma_i}.$$

Equation (8) represents the preferred specification to be estimated using the PMG estimator. Parameter φ_i represents the error-correcting speed of adjustment, and we expect it to be negative and significant under the assumption that the variables of interest show a return to long-run equilibrium.

4. Empirical Analysis

Following the PMG procedure, we first tested statistical properties for the observed variables. The first step of our empirical analysis was to perform panel unit root tests. Testing for unit roots in time series studies has recently become a common practice within applied research. This notwithstanding, in the case of cointegration testing, unit root tests might not be necessary since unit root tests cannot easily distinguish between unit root and close alternatives, as originally noted by Graham Elliott (1998). Many panel unit root tests are developed for time series studies: Levin-Lin-Chu (LLC) test, Im-Pesaran-Shin (IPS) test, Breitung test, Residual-Based Lagrange Multiplier (LM) test, Augmented Dickey-Fuller (ADF) test and Maddala-Wu (MW) test. According to the literature (Hyungsik Roger Moon and Benoit Perron 2004; Jörg Breitung and Pesaran 2005), panel-based unit root tests have higher power than the unit root test based on an individual time series. We applied the most popular and commonly used LLC (Andrew Levin, Lin Chien-Fu, and James C. Chia-Shang 2002) and IPS (Kyung So Im, Pesaran, and Shin 2003) tests. Table 1 summarises panel unit root test results.

Table 1 Panel Unit Root Test Results

Variable	Panel specifications	Unit root tests	*p*-values Levels
X	Individual intercept and trend	LLC	0.9296
		IPS	0.6870
	Individual intercept	LLC	0.9997
		IPS	0.9996
	None	LLC	0.9999
M	Individual intercept and trend	LLC	0.9950
		IPS	0.7288
	Individual intercept	LLC	0.9867
		IPS	0.8262
	None	LLC	0.9847

Source: Authors' calculations.

Following panel unit root tests results for all series of interest, the null hypothesis of a unit root cannot be rejected. Since the null hypothesis of a unit root holds for both series of interest in the next step, we proceeded with panel cointegration tests.

There are a number of ways of testing the null hypothesis of no cointegration, and those tests can be divided into two groups: residual-based tests (Chihwa Kao 1999; Peter Pedroni 1999, 2004), constructed on the basis of the Engle and Granger (1987) test, and likelihood-based tests (Gangadharrao Soundalyarao Maddala and Shaowen Wu 1999) that represent the generalisation of Johansen's (1991, 1996) test for vector auto-regressive models to panel data. Table 2 summarises the panel cointegration test results.

Table 2 Panel Cointegration Test Results: Merchandise Exports and Imports

Test	Null hypothesis	Alternative hypothesis	Name of the statistics	*p*-values
Pedroni	No cointegration	Homogenous cointegration	Panel ADF	0.0000
		Heterogeneous cointegration	Group ADF	0.0000
Kao	No cointegration	One cointegration relationship	Panel ADF	0.0000
Johansen-Fisher	No cointegration	At most one cointegration relationship	Fisher trace	0.0000
			Fisher max	0.0001

Notes: All tests include constant and trend.

Source: Authors' calculations.

Following the results presented in Table 2, the null hypothesis of no cointegration is rejected for the variables of interest. In order to determine whether the model represented based on Equation (2) or Equation (3) is more appropriate, Granger-causality is tested. With regard to the number of selected lags in Granger-causality, we first follow the Schwarz information criterion estimate of one and two lags for each variable. Furthermore, as noted by Kenneth J. Meier and Alisa Hicklin (2008), in

theory, one uses an infinite number of lags in Granger-causality, but in practice one or two lags are usually sufficient. Granger-causality test results are summarised in Table 3.

Table 3 Panel Granger-Causality Test Results for the Variables of Interest

Number of lags	Null hypothesis	Number of observations	*F*-statistic	*p*-values
1	*X* does not Granger cause *M*	285	18.8291	2.E-05
	M does not Granger cause *X*		0.70740	0.4010
2	*X* does not Granger cause *M*	266	8.81780	0.0002
	M does not Granger cause *X*		0.18727	0.8293

Source: Authors' calculations.

The results in Table 3 indicate unidirectional Granger-causality from merchandise exports to merchandise imports. Following the results presented in Table 2 and Table 3, we can estimate the model as presented in Equation (8). Estimated results can provide reliable inferences about the long-term and short-term influence of merchandise exports on merchandise imports, and therefore on sustainability on trade flows, between Croatia and other EU member states.

5. Results and Discussion

Table 4 presents the results of the baseline model specified by Equation (8). If the slope coefficients are homogeneous, then the PMG estimator is consistent and efficient. However, homogeneity restriction is not rejected by the data. According to Table 4, the adjustment coefficient for the analysed panel has the correct negative sign and is statistically significant at the 1% significance level, which implies that an error-correction mechanism is in place. The average value of the error-correction coefficient is -0.4, implying that equilibrium is reached in about two years. Furthermore, the estimates suggest the presence of the long-run merchandise export effect that is properly signed and significant at the 1% significance level. The long-run coefficient amounts to 1.99 and it can be concluded that the long-run merchandise import from other EU member states is responsive to changes in merchandise exports from Croatia to other EU member states. The short-run coefficient and constant do not achieve significance at the 1% or at the 5% significance level.

Since the PMG procedure allows for short-run heterogeneity, it is possible to estimate separate short-run coefficients for each trading partner in the panel (see Table 5). The estimates of the short-run trading partner, specific error-correction models, also provide evidence for merchandise export effect on merchandise import with statistically significant coefficients for Germany, Cyprus, Poland, Malta and Luxembourg, whereas that effect is not with the expected sign for Belgium, Italy, Spain, or Sweden. For other countries in the sample, there is a lack of short-run Croatian merchandise import reaction to changes in merchandise exports to the same country. The error-correction term is statistically significant and correctly signed in almost all the analyzed counties, with Luxemburg and United Kingdom being exceptions. The error-correction

term is not negative as expected for Luxemburg, while for the United Kingdom it does not achieve desired statistical significance.

Table 4 Pooled Mean Group Estimates for Panel of 19 European Countries

Speed of adjustment (φ_1)	-0.373164*** (0.081072)
Long-run coefficient ($\alpha_{1,1}$)	1.989730*** (0.164238)
Short-run coefficient ($\beta_{1,1,1}$)	0.010544 (0.205097)
Constant	-0.6002794 (242505.9)
Number of observations	285
Number of countries	19
Hausman test for poolability of countries	0.1826

Notes: Estimations are performed using the PMG estimator; all equations include a constant term; standard errors are in brackets; ***, **, * denote significance at the 1%, 5% and 10% significance level, respectively.

Source: Authors' calculations.

Following the estimates in Table 4, one can see that the estimated long-run coefficient is far from being equal to one. The estimated long-run coefficient amounts to almost two, meaning that in the long-run Croatian merchandise imports from nineteen EU trading partners doubles Croatian merchandise exports to the same trading partner. In line with the presented research framework, Croatia could possibly not be able to fulfill its foreign liabilities; therefore, trade flows with other EU trading partners are not sustainable. Taking into account high indebtedness as stated in the introduction and high imports to exports level in the long-run, the following question might arise: is there a phenomenon of buying foreign goods using foreign money? This phenomenon might be pricey, since long-run or persistent merchandise trade deficits can have serious effects, such as high domestic interest rates relative to foreign counterparts, while simultaneously imposing an excessive burden on future generations and thus lowering their standard of living.

The literature points to the role of foreign capital inflows in current account deficits of the European post-communist countries. The inflow of foreign loans boosted the consumption. Consequently, there was an increase in consumption stimulated import demand and the current account deficit (Bas B. Bakker and Anne-Marie Gulde 2010; Alka Obadić, Tomislav Globan, and Ozana Nadoveza 2014). The paper refers to this phenomenon as the phenomenon of buying foreign goods using foreign money. Robert Unger (2017) employed panel error-correction specification and showed that flows of bank loans to the non-financial private sector are a significant determinant of the current account and that they – together with changes in competitiveness – constituted the most important factor driving the build-up of current account imbalances in the deficit countries. J. Scott Davis et al. (2016) examined the cause of a crisis and found that the combination of credit growth and external deficits increases the probability of a banking crisis. M. Fatih Ekinci, F. Pinar Erdem, and Zubeyir Kilinc (2015) pointed that, at the early stages of financial development, acceleration in credit growth might cause a larger deterioration in the current account balance. Karlo Kauko

(2014) provided an extensive empirical literature overview and pointed out that most findings corroborate the view that, during a typical build-up phase, banks borrow internationally to finance domestic lending, boosting the current account deficit and causing a real estate bubble. Bakker and Christoph Klingen (2012) noted that bank lending, often funded by foreign parent banks and directed to finance real estate and non-tradable sectors, has been found to be unsustainable. Radmila Jovančević (2007) and Ines Kersan-Škabić (2013) noted that the large portion of the foreign capital was directed toward financial institutions; Table 6 in the Appendix confirms these points.

Figure 1 and Figure 2 in the Appendix illustrates development of the Croatian external debt. Hrvoje Jošić and Mislav Jošić (2012) reported investments being slightly above savings in Croatia. Therefore, the investments are partially financed by foreign debt. However, ample public debt, as illustrated by Ana Andabaka, Ivo Družić, and Nora Mustać (2017), is also financed externally. Table 7 in the Appendix shows that a large portion of Croatian external debt is used to finance public spending. Conclusively, as public and external debt levels are high, the growing Croatian economy remains vulnerable. In addition, structural impediments continue to weigh on growth prospects. Unsustainable Croatian merchandise trade flows, in combination with a high level of public and external debt, present a serious issue for the Croatian economy.

Enzo Weber (2011) suggested an export-strengthening strategy as the one that would have merit in reducing international macroeconomic imbalances and growth of Eastern Europe countries. The recommendations out of this research point out a need to enhance Croatian international trade competitiveness. Results from Romania provided by Dumitriu, Stefanescu, and Nistor (2009) pointed out the same for the case of Bulgaria. The depreciation of the Croatian currency would make exports more competitive. However, the Croatian financial system is characterised by very high and persistent levels of financial Euroisation (Marina Tkalec 2013) and, within the limits of the exchange rate anchor (Bošnjak, Bilas, and Novak 2016), there is not much opportunity for independent monetary policy. Therefore, more attention needs to be directed towards fiscal policy and public debt management. Policies need to affect the structure of revenue and expenditure. Reforms increasing the efficiency of public services are desirable and may help to reduce these impediments. Structural measures are essential for advancement of the Croatian economy.

6. Concluding Remarks

There are several conclusions that can be drawn out of the research presented in this paper. Firstly, as suggested by the results of the cointegration tests and the PMG procedure, it is evident that Croatian merchandise exports and imports *vis-à-vis* its nineteen EU trading partners, form a long-run equilibrium relationship.

Secondly, the error-correction model estimates for the analysed trading partners indicate that when the equilibrium relationship is disturbed, the resulting discrepancy is corrected by Croatian merchandise imports. Thirdly, the persistent Croatian merchandise trade deficit inside the EU raises concerns about its ability to service its debt. Additionally, PMG procedure and cointegration techniques seem to be well suited to capture the long-run adjustment of the trade balance. Eventually, merchandise trade flows between Croatia and other EU member states are not sustainable in the way they

have existed for the last fifteen years. Unsustainable trade flows accompanied by high public and external debt levels may present a serious threat for the Croatian economy. Consequently, structural measures are essential for advancement of the Croatian economy. Policymakers should put more attention on fiscal policy and public debt management in the first place.

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Appendix

Table 5 Short-Run Trading Partner Specific Estimates

Country	Speed of adjustment (φ_i)	Short-run coefficient ($\beta_{1,1,i}$)	Constant
Austria	-0.616411*** (0.60208)	-0.603646 (0.436369)	-90022.59 (2.90E+11)
Belgium	-0.375707*** (0.013198)	-0.0652185*** (0.057503)	279896.8 (4.62E+09)
Cyprus	-0.052888*** (0.004184)	0.068142*** (0.011182)	-51207.01 (2.08+09)
Czech Republic	-0.285300*** (0.033569)	1.182742 (0.790017)	370943.1 (6.55E+10)
Denmark	-1.391980*** (0.053354)	-2.252162 (1.316992)	742668.0 (1.77E+10)
France	-0.284908*** (0.032002)	-0.033696 (0.189970)	407424.5 (9.73E+10)
Germany	-0.214625*** (0.020891)	1.379106** (0.395489)	799063.9 (3.86E+11)
Hungary	-0.455517*** (0.093658)	0.121871 (0.563089)	917250.3 (1.89E+11)
Ireland	-0.176888*** (0.004216)	0.083508 (0.112625)	46416.19 (4.83E+08)
Italy	-1.056087*** (0.045876)	-0.713232** (0.229495)	-3994107 (4.01E+12)
Luxembourg	0.001409*** (1.47E-05)	0.000508*** (6.91E-05)	6593.003 (21328067)
Malta	-0.079173*** (0.009064)	0.210061*** (0.032314)	-121425.2 (1.77E+10)
Netherlands	-0.195159** (0.062944)	-0.639323 (0.639682)	408034.0 (4.44E+10)
Poland	-0.405450*** (0.014325)	1.124009*** (0.169349)	476249.1 (1.36E+10)
Slovakia	-0.217987*** (0.042695)	1.510973 (0.995311	53423.55 (1.39E+10)
Slovenia	-0.589096*** (0.054640)	0.114792 (0.526044)	-997435.7 (4.83E+11)
Spain	-0.474762*** (0.018487)	-0.744536** (0.215201)	573783.2 (2.32E+10)
Sweden	-0.200748*** (0.016301)	-0.224755** (0.047893)	54779.67 (1.28E-5)
United Kingdom	-0.018842 (0.020327)	0.268161 (0.140966)	10618.81 (8.37E+09)

Notes: *, **, *** indicate significance at 10%, 5% and 1% significance level, respectively; numbers in the brackets are standard errors for full PMG.

Source: Authors' calculations.

Table 6 Direct Investments, Net Incurrence of Liabilities (by Activity; NACE Rev. 2) in Million EUR

Activity	Period																Industry total	Industry total % total
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Financial service activities, except insurance and pension funding	90,1	437,4	117,0	418,6	156,8	249,3	648,4	1.024,6	1.769,9	726,7	558,0	585,0	328,0	93,9	-113,7	1.923,3	9.013,3	33,54%
Wholesale trade, except of motor vehicles and motorcycles	33,0	34,2	37,3	39,5	86,3	71,1	87,1	108,8	371,1	932,7	712,7	43,7	-136,1	85,9	-7,3	-39,8	2.460,3	9,16%
Real estate activities	34,2	41,5	67,8	14,6	93,0	70,6	105,5	123,7	250,2	184,2	108,2	180,5	216,1	6,8	166,9	71,5	1.735,3	6,46%
Telecommunications	841,7	40,6	536,0	51,8	149,4	69,7	-172,6	56,7	-87,4	31,2	288,8	-76,0	37,8	-46,8	-12,8	116,9	1.824,9	6,79%
Retail trade, except of motor vehicles and motorcycles	26,5	32,8	66,2	62,6	120,7	94,8	119,4	156,1	122,9	213,6	121,5	95,4	53,2	105,7	-35,0	155,3	1.511,8	5,63%
Real estate investments	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	52,8	54,6	105,4	175,0	150,7	168,4	159,7	155,8	1.022,4	3,81%
Manufacture of coke and refined petroleum products	0,0	43,6	-77,6	0,0	440,5	27,6	46,5	38,1	20,2	892,5	106,8	-0,7	68,6	13,1	-119,6	-121,4	1.378,3	5,13%
Construction of buildings	3,3	51,0	20,5	92,6	21,6	38,7	109,7	102,7	281,6	54,7	16,8	8,8	47,8	46,6	16,0	37,4	949,9	3,54%
Manufacture of basic pharmaceutical products and pharmaceutical preparations	80,2	64,6	42,6	74,8	304,1	-32,5	-59,6	510,5	-41,6	-58,4	0,6	-279,5	45,1	-57,6	34,1	124,3	751,7	2,80%
Accommodation	15,4	59,7	24,4	85,9	36,0	47,9	111,9	34,5	53,0	139,1	7,2	30,5	-29,2	58,6	21,8	176,5	873,4	3,25%
Manufacture of other non-metallic mineral products	54,6	51,7	82,5	39,4	18,2	54,7	64,9	26,2	24,1	287,7	21,4	-52,3	51,6	-1,2	-21,2	28,8	730,9	2,72%

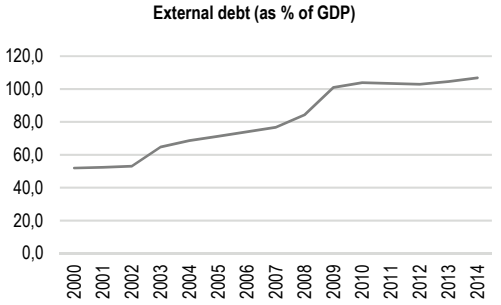
Source: Authors' calculations based on data from Croatian National Bank (2015a)[2].

[2] **Croatian National Bank.** 2015a. Foreign Direct Investments. http://www.hnb.hr/en/-/inozemna-izravna-ulaganja (accessed April 30, 2017).

Table 7 Croatian External Debt in Million EUR

Year	General government	Central bank	Financial institutions	Other sectors	Foreign direct investments	Total
1999	3.943,90	219,1	2.147,60	3.566,40	297,5	10.174,50
2000	5.171,90	216,4	2.250,80	4.045,60	578,8	12.263,50
2001	5.691,80	215,9	2.918,00	4.249,00	534,6	13.609,30
2002	5.540,90	23,2	4.180,40	4.727,40	672	15.143,90
2003	6.142,90	365,9	6.531,10	5.938,40	905,6	19.883,90
2004	6.728,60	2,4	8.047,30	7.058,80	1.096,30	22.933,40
2005	6.555,50	2,6	9.195,40	8.823,00	1.413,40	25.989,90
2006	6.345,80	2,6	10.405,80	11.187,80	1.783,00	29.725,00
2007	6.853,80	2,3	8.948,80	15.008,90	2.907,00	33.720,80
2008	7.208,50	2,3	10.307,00	19.205,80	3.866,50	40.590,10
2009	8.248,90	332,2	11.066,90	20.400,90	5.515,50	45.564,40
2010	9.126,00	357,3	11.212,40	20.076,30	6.136,50	46.908,50
2011	9.624,90	360,1	12.207,90	19.186,90	5.017,40	46.397,20
2012	10.938,90	351	9.885,80	18.735,40	5.386,20	45.297,30
2013	12.711,90	421,5	9.156,80	17.969,00	5.698,50	45.957,70
2014	13.654,40	444,9	8.160,10	18.070,00	6.380,10	46.709,50

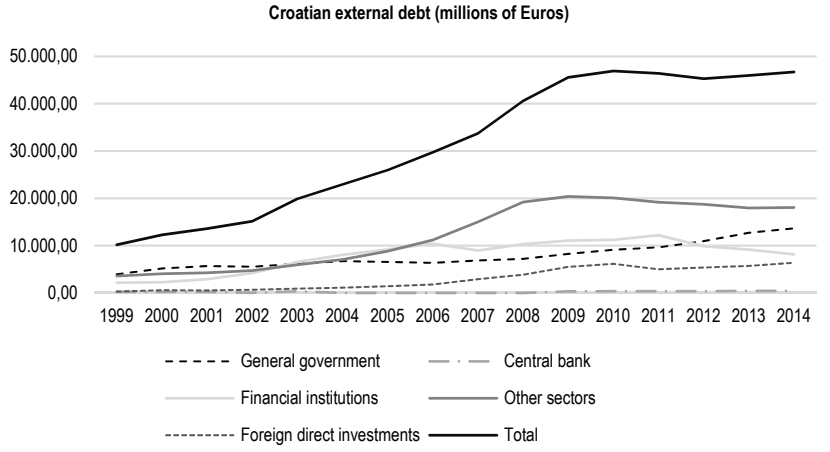
Source: Authors' calculations based on data from Croatian National Bank (2015b)[3].



Source: Authors' calculations based on data from Croatian National Bank (2015b).

Figure 1 Croatian External Debt as % GDP

[3] **Croatian National Bank.** 2015b. Croatian External Debt in Million EUR. http://www.hnb.hr/en/statistics/statistical-data/rest-of-the-world/outstanding-gross-external-debt (accessed April 30, 2017).



Source: Croatian National Bank (2015b), the authors' calculations.

Figure 2 Croatian External Debt Development (Million EUR)

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