

THE ANALYSIS OF THE IMPACT OF DEPRECIATION ON EXTERNAL DEBT IN LONG-RUN: EVIDENCE FROM CROATIA

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ABSTRACT

The impact of exchange rate changes in small open economies has been a widely researched topic for decades. According to economic theory and relevant research, depreciation can have a positive impact on the economy through an increase in exports, and a negative effect through decrease in an individual consumption. The aim of this article is to assess the impact of exchange rate depreciation on external debt in Croatia in the long-run. The long-run impact of depreciation on external debt in Croatia is assessed using Johansen cointegration approach. The results point to the existence of one cointegration relation. The long-run impact of exchange rate depreciation on external debt in Croatia is statistically significant and positive, what is in line with previous research and economic theory. The conducted analysis outlines the possible negative impact of depreciation on Croatian economy through the increase of external indebtedness, what could consequently decrease the wealth of all sectors indebted in foreign currency. Since Croatia is a highly euroised small open economy with high external indebtedness in foreign currency, this research provides captivating results for monetary and fiscal policy-making in Croatia. Therefore, as a result of the conducted empirical analysis, the exchange rate depreciation in Croatia is not recommended as the instrument of increasing export competitiveness due to current high external indebtedness in foreign currency.

KEYWORDS

exchange rate depreciation, external debt, cointegration analysis, error correction model, long-run equation

CLASSIFICATION

JEL: C32, C51, E63, H63

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INTRODUCTION

The question of the impact of exchange rate fluctuations on overall economy has been the subject of much debate among academic researchers and economic policy makers for decades. On the one hand, Marshall-Lerner condition implies that exchange rate depreciation should foster economic growth through an increase in net exports [1]. However, on the other hand, the exchange rate depreciation leads to an increase of liabilities denominated in foreign currency. In case of accumulated foreign currency debt, currency depreciation might have overall negative effect on the economy. In many Eastern European economies, including Croatia, high external indebtedness in foreign currency is present. External debt represents a problem which is in focus of economic policy making for all European Union candidate countries, as well as for European Union member countries which are on its way of accession to Euro area, such as Croatia.

Since the implementation of Stabilization Program in October 1993 by the Croatian government, there has been comprehensive discussion about managing the exchange rate level, taking into account high level of import dependency, high degree of openness, high level of external debt and extremely euroised financial system [2]. Nevertheless, the Croatian National Bank achieves its primary goal, namely price stability, by maintaining the stability of Croatian kuna to euro. The current exchange rate policy serves as a nominal anchor of monetary policy. The research of impact of depreciation on external indebtedness is important for many reasons. Croatia is small economy with high import dependency.

The criteria for accession to Euro area is referred to as convergence criteria, the so-called "Maastricht criteria". These criteria relate to the government budget deficit, public debt, inflation, interest rate and exchange rate. Inflation rate, which implies that the average rate should not be higher than 1,5 percent in relation to the three the most stable EU member states in one-year period being taken for evaluation [3]. Considering Croatia, the annual inflation rate measured using consumer price index was 0,2 % in 2016 with respect to 2015 [4]. Furthermore, the exchange rate by which a member country must participate in the Exchange Rate Mechanism (ERM II) of the European Monetary System continuously over two years prior to the year in which the exchange rate is reviewed. Croatia is accomplishing mentioned two monetary conditions, while fiscal criteria are not achieved yet. Two fiscal criteria that concern the public balance of the general government sector and the general public debt expressed as GDP ratio, what represents the sustainability of public finance policy. Regarding the first criteria, public balance of the general government sector must not exceed 3 % at the end of the previous financial year. In Croatia, according to [5], the current account deficit in 2016 was 3.8 % of GDP. Second fiscal criteria explain that public debt must not exceed 60 % of GDP at the end of the previous financial year. In Croatia, public debt was 83,7 % of GDP [6] in 2016.

Since the external indebtedness is the ongoing problem of small open Eastern European economies including Croatia, the research of depreciation effects should include external debt in order to provide broader insight into effects of depreciation. Considering Croatia, the competitiveness and wealth effect as consequence of real exchange rate on Croatian economy is estimated in [7] using linear regression modelling. Mentioned research firstly empirically analysed the competitiveness effect, namely the impact of changes of the real exchange rate on net exports and additionally the wealth effect, namely the impact of changes in wealth on consumption as a result of depreciation, was analysed. The analysis pointed to the conclusion that in spite of the fact that the increase in the real exchange rate leads to a relatively greater increase in net exports than the reduction of wealth causes a relative reduction in consumption, the depreciation of Croatian kuna is not economically reasonable due to the potential risks of extremely high external debt denominated in foreign currency. The impact

of real depreciation on net exports in Croatia is analysed in [8] using Johansen cointegration approach and the authors conclude that there is long-run positive impact of depreciation on trade balance. Both [7] and [8] discussed the impact of depreciation on Croatian economy, and theoretically mentioned the negative impact of exchange rate depreciation on external indebtedness. However, this research aims to analyse the long-run impact of exchange rate fluctuations on external debt in Croatia. The mentioned impact has not been empirically analysed in Croatian literature prior to this research. Obtained results will offer a basis for the comprehensive analysis of the impact of depreciation on Croatian economy.

The conclusion of [7] is that there is positive impact of depreciation through competitiveness effect on net export and the negative impact through wealth effect on consumption. However, this research contributes to the existing literature by employing Johansen cointegration approach to estimate the impact of depreciation on external debt in long-run, what has not been previously assessed in Croatian literature. The results of this research are interesting both for monetary and fiscal authorities in Croatia, since exchange rate policy is conducted by monetary authorities, while the public part of total external debt is managed by fiscal authorities.

In line with previous research and economic theory, the following research hypothesis is stated: The nominal exchange rate depreciation increases the external debt in Croatia. The nominal exchange rate is used in empirical analysis since monetary authorities can affect nominal exchange rate, while real exchange rate depends additionally on domestic and foreign price level. In this article, the emphasis is on the analysis of the impact of often recommended nominal depreciation on Croatian external indebtedness. Thus, nominal exchange rate is more appropriate than real exchange rate in order to empirically assess the adequacy of conducting exchange rate policy in Croatia.

LITERATURE REVIEW

According to Marshall Lerner Condition, real depreciation makes domestic goods and services relatively cheaper related to foreign goods and services which causes increase of foreign demand and therefore increase of domestic export [1]. In addition, real depreciation makes foreign goods and services more expensive what boosts domestic demand for domestic goods and decreases imports. Small open economies worldwide are dealing with the problem of high import dependency. However, the depreciation as potential instrument of stimulating export competitiveness can initially cause short-run negative impact on economy which can be explained with J-Curve effect [1, 9]. According to economic theory, wealth effect is explained as an increase in exchange rate which increases the wealth of private sector and thus consumption. But if the private sector has debt explosion, the exchange rate depreciation might lead to an increase in foreign debt denominated in the domestic currency [9]. Consequently, depreciation might affect the reduction of consumption, which is the most substantial component of Croatia GDP. Therefore, the exchange rate depreciation can have twofold impact on the overall economy.

Various empirical studies have analysed the impact of exchange rate on net exports and gross domestic product and they estimate the positive impact of depreciation on competitiveness through increasing net exports. In their analysis of New Zealand external debt, [10] recommended exchange rate depreciation. The mentioned research suggested exchange rate depreciation in New Zealand since external debt is denominated primarily in New Zealand dollars. Hence, depreciation could have a significant and positive effect on GDP through increased export competitiveness. The empirical examination of sustainability of exchange rate and external debt policies in 5 MENA countries (Tunisia, Morocco, Egypt, Jordan and Turkey) is conducted in [11] using unit root and cointegration test. The conclusion of [11] is that although Egypt accumulated enormous external debt, profitable decision was to shift to a

flexible exchange rate regime in 2001. Indeed, devaluation of Pound in Egypt has stimulated export competitiveness and therefore decrease current deficit. Similarly, devaluation of Lira in Turkey and exchange rate floating have increased the export competitiveness and reduce pressure for servicing enormous external debt. On the contrary, Jordan continued to follow a fixed exchange rate policy to US dollar because any exchange rate depreciation would increase external debt. Moreover, the fiscal policy in Jordan should foster reduction of external debt. Morocco and Tunisia run a harmonized fiscal and monetary policy and consequently successfully manage the external debt, but also the exchange rate through which they benefit through export.

The research of [12] estimates panel ordinary least square regressions with fixed and random effects and conclude that external debt is undoubtedly related to budget deficit, current account deficit and exchange rate depreciation, but the connection between external debt and these three components is more significant in debt trap countries (India, Indonesia, Nepal, Pakistan, Sri Lanka and Thailand) than in non-debt trap countries (Bangladesh, Fiji, Korea, Malaysia, Myanmar, Papua New Guinea, Philippines and Singapore). Moreover, [13] use a standard two-sector dynamic stochastic general equilibrium (DSGE) model for an emerging economy markets came up with conclusion that exchange rate depreciation increases foreign borrowing through nominal and real interest rate. The cointegration approach is used in [14] and authors outline that there is a long-run cointegrating relation between the exchange rate and external debt in Pakistan. Research mentioned points to the result that the increase in external debt depreciates the real exchange rate. The effect external debt on exchange rate is analysed in [15] analysed using linear regression model. Pearson correlation coefficients for various components of external debt are specified, but the most prominent subject is public external debt which has considerable impact on fluctuation of exchange rate. It is also shown that the depreciation of the domestic currency leads to an increase in external indebtedness.

THE EMPIRICAL ANALYSIS OF THE IMPACT OF REAL EXCHANGE RATE ON EXTERNAL DEBT CROATIA

DATA AND METHODS

Monthly data on both gross external debt and nominal effective exchange rate indices are used in empirical analysis. Data on gross external debt are available at [16] and refer to the sum of public sector external debt, publicly guaranteed private sector external debt and non-publicly guaranteed private sector external debt. Data on indices of nominal effective exchange rate of the kuna, 2010 = 100 are available at [17]. Index is calculated a weighted geometric average of the index of bilateral nominal exchange rates of the kuna against the selected currencies of the main trading partners [17]. The seasonal component is present in both analyses time series and seasonal adjustment is conducted using X-13 ARIMA SEATS adjustment method provided by [18]. Thus, seasonally adjusted logarithmic values of nominal effective exchange rate (denoted by *LE_SA*) and seasonally adjusted logarithmic values of external debt (denoted by *LD_SA*) are used in empirical analysis.

Table 1: ADF unit root test *t*-test statistics for selected variables in levels and first differences. Source: Author's calculation using EViews 9.

Variable	Constant	Constant and trend	No deterministic components
LE_SA	-1,8872	-1,7860	-0,6637
LD_SA	-3,2818	1,1720	2,4186
Δ LE_SA	-11,9903*	-12,1293*	-11,9673*
Δ LD_SA	-4,8887*	-13,9347*	-3,2091

*denotes the stationarity of time series at 1 % significance

The null hypothesis of a unit root cannot be rejected for both selected variables in levels. However, it is not rejected for variables in the first differences and it is concluded that time series are stationary in first differences. Thus, both time series are not stationary in levels and stationary in first differences at 1 %. If a linear combination of non-stationary variables is stationary, the variables are cointegrated [19]. The existence of cointegration between *LE_SA* and *LD_SA* is examined in the next chapter.

RESULTS OF COINTEGRATION ANALYSIS OF EXCHANGE RATE AND EXTERNAL DEBT IN CROATIA

Johansen's cointegration approach is used to assess the existence of cointegration among selected variables. Cointegrated variables are related in a long-run, thus the long-run equilibrium exists. However, expression "equilibrium" is used in a different manner by econometricians and economic theorists. Economic theorists refer to the equality between actual and desired state of economic variables. In econometric sense, "equilibrium" refers to the long-run relationship of non-stationary variables. Therefore, for cointegration existence among variables, it is not necessary that long-run equilibrium is the result of a market mechanism or behavior of individuals [20].

Trace and maximum eigenvalue test are used to determine number of cointegration vectors. When the null hypothesis is rejected for first time, the conclusion about the number of cointegrating vectors is brought. For further information about trace test and maximum eigenvalue test see [19]. Results of both tests are presented in Table 2.

Table 2: The results of the trace test and the maximum eigenvalue test. Source: Authors' calculation.

Hypothesized number of cointegrating equations	Eigenvalue	Trace statistic	0,05 Critical value (trace statistic)	Max eigenvalue statistic	0,05 Critical value (max eigenvalue statistic)
0*	0,2554	34,9714	20,2618	27,4210	15,8921
1	0,0780	7,5504	9,1645	7,5504	9,1645

*denotes rejection of the hypothesis at the 0,05 level

Both conducted tests indicate that cointegration between exchange rate (*LE_SA*) and external debt (*LD_SA*) is present at 5 % significance. Based on estimated cointegrating vector, the long-run equation with associated *t*-values in parentheses is given by (1):

$$LD_SA = 7,827 + 0,624LE_SA \quad (1)$$

(6,611) (2,445)

In long-run nominal exchange rate has positive statistically significant impact on external debt in Croatia. In other words, the estimated model points to conclusion that increase in nominal exchange rate, namely nominal depreciation, causes an increase in external debt.

The error correction term (ECT) is equal to $-0,1782$, with *t*-statistics equal to $-3,8384$, pointing to the significance of ECT. The negative sign of ECT indicates that variables return to long-run equilibrium. In every month, 17,82 % of disequilibrium is corrected and therefore external debt returns to the equilibrium level for 5,5 months.

Furthermore, residual diagnostics tests are conducted. White heteroskedasticity test χ^2 statistic equals 116,7435 with associated empirical level of significance equal to 0,7108. Therefore, the null hypothesis of homoscedasticity cannot be rejected at 1 % significance. The LM autocorrelation test indicates that the null hypothesis about the absence of autocorrelation cannot be rejected until lag 12 at 1 % significance, taking into consideration that empirical levels of significance or *p*-values up to lag 12 are higher than 0,01.

Finally, the stability of the error correction model was tested by calculation of inverse roots of AR characteristic polynomial using EViews 9 (Figure 1).

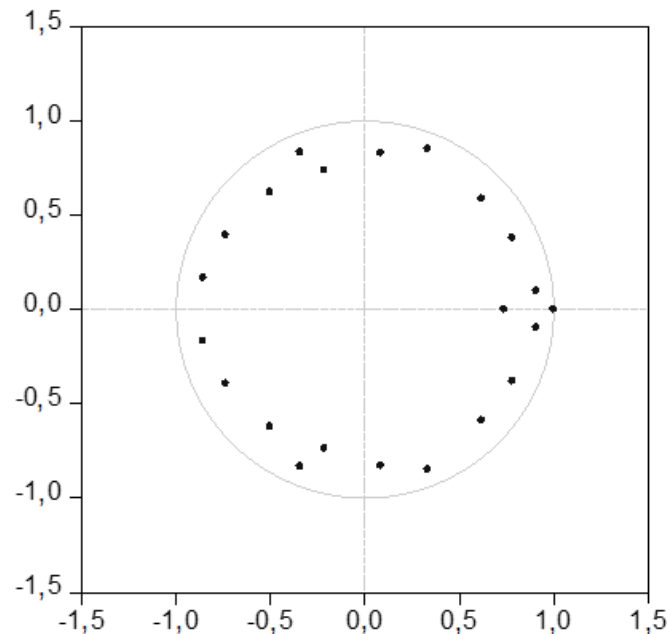


Figure 1: Inverse roots of AR characteristic polynomial (EViews 9).

The error correction model with r cointegrating relations is stable if $n-r$ roots are equal to one and the remaining roots lie inside the unit circle, where n is the number of variables and r is the number of cointegrating relations [21]. The estimated error correction model imposes 1 unit root and the remaining roots have modulus less than one. Since there are two variables, namely LD_SA and LE_SA , and one cointegrating relation, one unit root shown in Figure 1 points to the stability of estimated model. For detailed explanation of problems of heteroskedasticity, autocorrelation as well as AR roots calculation, see [19] and [21].

CONCLUSIONS

The exchange rate depreciation could have twofold effect on overall economy according to economic theory and empirical research, and thus the exchange rate management is one of the important economic policy question, especially in case of small open economies such as Croatia, which are highly dependent on foreign sector. The impact of depreciation on external debt in Croatia is examined in this article using Johansen cointegration approach. Trace test and maximum eigenvalue test indicate the existence of one cointegrating relation between nominal effective exchange rate and external debt. The estimated long-run equation points to positive statistically significant effect of nominal exchange rate increase on external debt. Therefore, possible depreciation of Croatian kuna could have overall negative effect on Croatia economy. Despite the Marshall-Lerner Condition which implies positive impact of real exchange rate increase by leading to growth in net exports through competitiveness effect, results of this research are not in favor of implementing depreciation. Moreover, depreciation of Croatian kuna is not recommended for monetary policy authorities and therefore current exchange rate policy is suitable taking into consideration empirical characteristics of Croatian economy, especially current state of public finance in Croatia and highly euroized financial system. Further increase in external indebtedness, taking into account that external debt is mostly denominated in foreign currency, is not only unfavorable from the aspect of Croatian fiscal authorities, but also for Croatian National Bank which has

primary function of maintaining price stability what is related to stability of exchange rate of Croatian kuna to euro. Speaking of managing public debt, fiscal authorities role is important in order to sustain fiscal stability for Croatian potential accession to Euro area. Finally, considering the overall situation including monetary and fiscal aspects, the impact of depreciation has positive effect on increasing of external indebtedness. Moreover, possible depreciation and consequently increase in external indebtedness could impede the fulfilment of Maastricht criteria in Croatia, which could not only prolong adopting euro as national currency, but also postpone efficient public debt management taking into account high euroisation.

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