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Inflation in a Fully-Euroised Economy: Could Inflation Differentials Threaten Competitiveness?

Abstract: This paper analyses inflation in Montenegro, a country which uses euro outside the euro area, and investigates the factors which contribute to price differentials in Montenegro relative to the euro area. Furthermore, the paper examines whether changes in the real effective exchange rates, which in Montenegro's case follow the path of price differentials, may have any influence on country's competitiveness.

Key words: euroisation, inflation differentials, real effective exchange rate, competitiveness

JEL classification: E31, E52, F40

1. Introduction

Montenegro is a fully euroised economy with a commitment to pro-market reforms, encouragement of foreign investments, high openness, privatization, competitiveness and EU membership as the drivers of economic growth. Montenegro authorities adopted a unilateral and official euroisation in 2002, but the first step was imposing currency substitution and using the Deutsche Mark. Thereby, Montenegro gave up an independent monetary policy and exposed its economy to the loss of an adjustment mechanism in face of possible asymmetric shocks and different fluctuations in the business cycle with respect to the euro area (Sok-

ic and Fabris, 2013). In these circumstances, central bank policy is oriented more towards a safe and sound banking sector, i.e. safe prudential policy.

The adoption of the euro as the legal tender should have implied that in the medium and long run, inflation in Montenegro would approximate inflation in the euro area, particularly given that Montenegro is a relatively open economy (around 40% of GDP is exports and the other 60% is imports) and the fact that the EU is an important trade partner (42% of exports and 40.9% of imports). The inflation rate in Montenegro did not track closely the EMU inflation in the last 14 years. Notwithstanding the cyclical similarities, inflation trend in Montenegro seems to be higher than in the euro area. That systematic higher inflation in Montenegro suggests that its real exchange rate is appreciating in the long run. Namely, a country that registers persistently higher inflation than its main trading partners will eventually deteriorate its external competitiveness. In a country which has adopted unilaterally euroisation, asymmetric shocks cannot be corrected by changes in monetary or exchange rate policy, particularly if the fiscal policy does not play a countercyclical role in shaping this adjustment. Instead, adjustment must be made through structural reforms, which increase flexibility of the economy and relative price and wage adjustments. De Haan (2010), while analysing inflation differentials in the euro area, suggests that governments should prevent discretionary policy measures from acting pro-cyclically over the business cycle. In Montenegro's case, substantial price differentials that appear with the euro area might be a signal for policy intervention since they imply that there is an ongoing shock adjustment in real terms. Indeed, Montenegro experienced notable price differentials in certain periods, particularly in the pre-crisis period when there was an overheating of both domestic and international demand, in line with all over excess liquidity.

The paper is organized as follows: In section 2 we will present the literature review on inflation differentials and their potential consequences on the competitiveness level of the economy. In sections 3, the focus will be on stylistic facts and underlying reasons for inflation differentials and some indicators are given regarding the relative size and persistence of inflation differentials in Montenegro compared to the euro area countries. Within the following section, we will examine the determinants of inflation in Montenegro. After that we analyse whether the Montenegrin export of goods and services is sensitive to changes in the real effective exchange rate and economic activity of its main trade partners. The conclusion remarks are presented in the last section.

2. Theoretical review of inflation differentials

The issue of analysing inflation differentials within a monetary union has attracted attention of a large number of researchers over the past years. Overall, theoretical review suggests that price convergence, cross-country differences in the business cycles, and structural features of the economy generate lasting inflation differentials. Honohan and Lane (2003) conclude that a considerable part of the inflation differentials in the euro area in the early years of EMU can be explained by price level convergence. In addition, the ECB's (2003) analysis stresses that inflation differentials present a reflection of cross-country differences in real variables such as productivity growth differentials and catching-up processes. As documented in Égert (2010), countries with lower initial price levels and the ongoing catching-up process lead to higher inflation rates in the longer run by increasing inflation dispersion within the euro area. Thus, in this case, higher inflation cannot be interpreted as “bad” thing, but rather an equilibrium process.

In many studies, Balassa-Samuelson (BS) effect is a starting point for explaining the cross-country differences in price levels. Balassa and Samuelson (1964) suggest that the difference in labour productivity between the tradable and non-tradable sectors, which varies across the countries, is the main factor which drives relative prices across these countries. In particular, developing countries are expected to catch up with productivity levels of developed countries in tradable goods, and their general price level tend to rise and their real exchange rate to appreciate, provided that the catch-up in non-tradable goods is slower (Goldfajn and Olivares, 2001). However, in the case of Montenegro, a country with high concentration of GDP in services, the prices of non-tradable goods, particularly the real estate prices and services, may rise faster than total average prices. Furthermore, Hammerman and Flanagan (2009) find that the BS effect turned to be insignificant in explaining the divergent paths of inflation in CEE and CIS countries. Similarly, Égert and Podpiera (2008) provide evidence for the Czech Republic, Hungary, Poland, and Slovakia that the observed inflation and real exchange appreciation cannot be explained by the BS but rather by structural changes in the production of tradable goods.

According to the theory, cyclical conditions presented by output gap –the difference between the actual and the potential output- are an important determinant of inflation in one country. Égert (2007), while analysing the factors that can cause price levels to diverge in 27 EU countries, provides evidence that besides the catching up process, the cyclical conditions and regulated prices are important drivers of inflation rates in an enlarged Europe. De Haan (2010) suggests that countries with output above trend are likely to have upward pressure on inflation,

while countries with output below trend are expected to experience downward pressure on inflation. De Haan's findings are in line with Honohan and Lane (2003) and Horvath and Koprnicka (2008) who also find positive effect of output gap on inflation differentials in the euro area. Output gap can be explained by demand pressures, in particular by the wage growth and real credit growth (ECB, 2003). The ECB (2003) noted that inflation differentials may reflect inappropriate domestic policies or other unsupportable domestic developments such as wage increases out of line with productivity and employment growth; excessive increases in house prices, unsustainable expansion of profit margins, financial asset price bubbles or an inappropriate fiscal policy stance, etc. De Haan (2010) suggests that inflation differentials possibly exist due to the asymmetric supply and demand shocks and policy reaction to these shocks. Namely, relative prices may fluctuate across countries in response to asymmetric productivity shocks, booming property prices, etc. Furthermore, Duarte and Wolman (2008) provide evidence that productivity shocks alone generate significant variation in inflation across countries. Moreover, they find that government can suppress incipient inflation differentials associated with shocks to productivity growth by letting the income rate to respond to inflation differentials. Asymmetric structural reforms across countries, such as lowering income taxes in one country, may have a positive short-term effect on domestic demand, so that inflation differentials may temporarily increase – although such reforms would lower the scope for lasting inflation differentials over the medium and longer run (ECB, 2003).

The ECB (2012) shows that until 2008, cyclical and structural factors contributed together to the incidence and persistence of inflation differentials. Furthermore, they stated that in particular: mispricing of risk, overly optimistic expectations concerning future income prospects, and inappropriate national policies played a role before the crisis. However, since 2008, developments in inflation differentials are found to be mainly related to changes in national policies aimed at reducing imbalances. Recently, Mohl and Walsh (2015) analysed how the euro area countries respond to asymmetric shocks via internal adjustment processes or relative price mechanism. They find that in the post-2009 period, relative price mechanism occurred with a delay and it was hampered by structural rigidities, in particular in the national labour, product and financial markets.

Lastly, exchange rate shocks may affect differently inflation rates in one currency union. The exchange rate pass-through (ERPT) literature, which examines the appearance of inflationary pressure due to pass-through, suggests that the exchange rate pass-through is generally higher in developing economies than in more developed economies, mainly due to the fact that import is higher in developing countries. Dollarized countries should have a very low pass-through as

their currencies are anchored to that of their principal trade partner (Del Cristo and Gómez-Puig, 2012). Yamada and Bell (2012) while analysing inflation performance of South East European countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, and Serbia) reveal that the exchange regime, or the exchange rate pass-through, plays a role. However, all of SEE countries, except Serbia, that have either a fixed or “de facto”-fixed regime, yield a lower inflation rate than intermediate or flexible regimes. In the case of Montenegro, the prices of imported goods are set in the local currency (euro), thus it is expected that the exchange rate will not have an impact on prices, and in other words, we will have a zero pass-through.

For developing countries, the literature supports the hypothesis that exchange rate volatility has a negative effect on exports flows (see McKenzie, 1999). Real overvaluation may hamper exports and consequently, leads to a fall in economic growth (Easterly 2005; Johnson, et al. 2007). As stressed by Angeloni and Ehrmann (2007) with no possibility of adjusting the nominal exchange rate in the unified currency zone, movements in the real exchange rate will directly follow the path of inflation differentials. Namely, if not counteracted by domestic economic policy, significant inflation differentials could eventually lead to losses in country competitiveness. Regarding the real exchange rate changes induced by a change in inflation differentials, ECB (2003) provides evidence that the euro area countries have experienced significant differences in the evolution of indicators of national competitiveness. Measuring the price competitiveness for EMU countries, Fischer (2007) analyses whether these indicators have displayed distinctive trends since the start of EMU and whether they converge with or diverge from their respective fundamental value. He found that all three indicators suggest a gain in competitiveness for the German economy and a corresponding loss for Italy, Portugal and Spain. Chen et al. (2012) present econometric evidence that appreciation adversely affected the export performance of the debtor countries (Greece, Ireland, Italy, Portugal, and Spain), over and above the average impact on euro area exports. Coudert et al. (2013) while assessing real exchange rate misalignments for euro area countries from 1980 to 2010, find that the peripheral member countries have been suffering from increasingly overvalued exchange rates since the mid-2000s, as their real appreciation has not stemmed from improving fundamentals in terms of productivity or external position. Égert and Morales-Zumaquero (2005) analyse the direct impact of exchange rate volatility on the export performance of ten Central and Eastern European transition economies as well as its indirect impact via changes in exchange rate regimes. On the basis of standard export equations, augmented with FDI, they find that a rise in forex volatility, measured either directly or via changes in the exchange rate

regime, hinders exports, and that this negative impact is transmitted with some delay rather than being instantaneous.

3. Descriptive and Explanatory Analysis

In this section we are interested in comparing the inflation performance of Montenegro relative to the euro area and to further investigate the determinants of their inflation differentials. Figure below shows that the inflation rate in Montenegro did not track closely the EMU inflation in the last 14 years. Notwithstanding the cyclical similarities, inflation trend in Montenegro seems to be higher than in the euro area. Since 2002, average inflation rate in Montenegro amounted to 4 percent. In comparison with euro area, on average, inflation in Montenegro has been 2.3 percentage points higher than registered in euro area. If we analyse the spread of the inflation differentials of Montenegro relative to euro area, the extreme values lie within the minimum of -2.3 percentage points and the maximum of 17.3 percentage points.

Inflation performance significantly improved through the adoption of the euro as sole legal tender. The introduction of the euro as the legal tender in 2002 instigated a one-off inflationary shock in April that year (see Figure 1), when DEM was officially replaced by EUR. Namely, retailers took advantage of the conversion to

Figure 1: Inflation rates in Montenegro and euro area (annual growth rates, differentials in percentage points)

Source: Monstat and Eurostat. Note: From 2002 to 2008 inflation rate in Montenegro is presented by Cost of living index, and from 2008 by Consumer price index (CPI).

increase their prices, and not just to translate them from DEM to EUR (Central Bank of Montenegro (CBCG), 2005)). Furthermore, structural reforms in the Montenegrin economy continued in 2003, which was characterized by the introduction of VAT and a new inflationary shock. Namely, in these two years, inflation development was mainly influenced by the structural and administrative reforms and, to a lesser extent, by monetary adjustments. After these

shocks, the annual inflation started to record one-digit rates, which was the first time in the recorded history of Montenegro (CBCG, 2005). In mid-2004, inflation in Montenegro reached the level of inflation in the euro area. Besides lower inflation and anchored expectation, unilateral euroisation has brought massive FDI inflows, reduction in transaction costs and the elimination of the currency risk premium.

However, from mid-2005 inflationary pressures have increased despite euroisation. Namely, over the three-year pre-crisis period, the inflation rate averaged almost 6 percent, in part reflecting remarkably accelerated rates of economic growth and significant capital inflow. The main factors that contributed to this rapid economic growth were: privatization, trade liberalization and tax reform, the large inflows of foreign direct investment and entry of foreign banks. In such macroeconomic environment, banks were lending aggressively and, consequently, ballooning the asset prices. Inflation in the pre-crisis period was also instigated by international access liquidity and the synchronization of financial cycles with the EU. In addition, price movements in the world markets, primarily oil and food product prices, contributed to this increase. Moreover, an upsurge in domestic aggregate demand had a significant impact on the inflation increase. Namely, the increase in aggregate demand is a result of an increase in salaries (see Figure 2a), a high loan growth rate, and the sale of real estate (see Figure 2b), foreign direct investments inflow, foreign transfers, etc. Price differentials with the euro area in the pre-crisis period reached almost 8 percent (see Figure 1).

Figure 2a: Wages and inflation rate in Montenegro

Figure 2b: Credit and house developments in Montenegro

Source: Central bank of Montenegro

The global financial crisis induced a decrease in aggregate demand, both national and international, resulting in low rates of inflation worldwide. Furthermore, the 2009 credit crunch contributed to a decrease in aggregate demand and credit recovery was slow ever since (see Figure 2.b). Moreover, wages adjusted to the crises and have been broadly flat since 2011 (see Figure 2.a). The crisis adjustment became apparent in the behaviour of inflation in Montenegro, which reached its low 0.7 per cent in 2010. However, if we look at Figure 1, this price adjustment was done with a certain time delay. Substantial monetary and fiscal stimuli used globally to combat recession inevitably affected Montenegro, so in the post-crisis period, inflation in Montenegro was primarily a result of price rise in energy and food products which Montenegro mainly imported, and weak inflation pressures in the euro area and the region. Also, the situation with price adjustment with delay repeated in 2015.

As described in the previous section, cyclical conditions can be the main determinant of inflation. Figure 3 gives evidence that cyclical conditions, measured by

Figure 3: Output gap in Montenegro

Source: Authors' calculation

output gap, have been an important determinant of inflation in the pre-crisis period. Namely, the output above the trend (from the beginning of 2007 to the end-2008) suggests the excess in demand which has an upward pressure on inflation. However, in the post-crisis period, inflation has not followed closely the output gap line. Namely, in 2012, the output gap was below the trend line, while the inflation rate was positive (4.2 percent, on average).

However, as argued by Ayuso et al. (2004) the inflation rate of a country depends in the short run on the cyclical position, represented by the output gap, while in the medium and long term, it depends on a number of structural factors which determine inflation persistence and inflation expectations. According to Canzoneri et al. (2002), three main structural factors which affect inflation refer to wage setting, productivity growth and mark-up behaviour. A notable feature of

Montenegrin economy in pre-crisis period has been the continuous growth in unit labour costs and wages. Unit labour cost growth slowed down after the crisis, which mainly reflected the rapidly declining growth of compensations per employee. Furthermore, persistent inflation differential should be closely associated with the functioning of the labour market and its productivity performance. Labour productivity increased rapidly in a period when country became more open, with huge capital investments and high GDP growth rates. However, labour productivity in a period after the crisis has remained weak, even though the economy has recovered and has been recording growth. The main argument for that lies in small growth rates of employment. Furthermore, it is worth mentioning that there is still a significant level of undeclared work present in Montenegro, as some persons are employed in the informal sector or hold informal employment in formal sector companies (informal employees).

Figure 4: Unit labour costs (annual average growth rates)

Source: Authors' calculation

According to Micallef and Cyrus (2013), one of the sources of inflation differentials can be households' different consumption expenditure patterns. Analysing the components of price index from 2009¹ and 2016 (see Figure 5), we can note that inflation differentials differs across categories. Categories of: Alcoholic beverages and tobacco, Health and communications, Restaurants and hotels have been the main contributors of increase in inflation differentials, while Furnishings, household equipment and routine household maintenance, Education and recreation and culture, and Miscellaneous goods and services have contributed

¹ From January 2009, MONSTAT has begun publishing the CPI by categories of products and services used by households for consumption.

in the opposite direction. Thus, we may conclude that, on one hand, price dispersion is higher in case of goods whose prices are subject to substantial government regulation

Figure 5: Inflation differentials by categories of consumer price index

Source: Monstat and Eurostat

Figure 6: Decomposition of HICP index in Montenegro and euro area

Source: Monstat and Eurostat

(Alcoholic beverages and tobacco, and communications) and goods whose tradability is limited (Health, Education and recreation and culture). On the other hand, lower price dispersion (less than 1 p.p.) is recorded in categories which are internationally tradable (Food and non-alcoholic beverages and Clothes and footwear). These findings hold also due to the fact that Montenegro is a great importer of food.

Lastly, differences in the HICP structure or, in other words, the weight of sub-categories in the HICP can exacerbate inflation differentials. Namely, the category of Food, alcohol and tobacco has a higher weight in the HICP basket in Montenegro than in the euro area; on the other hand, the weight of services and energy in Montenegro's consumption basket are lower than in the euro area.

To sum up, the prices levels in Montenegro from 2002 – 2016 were higher than in countries of the

euro area, with the exception of those recorded in 2004, 2010, and 2014. Namely, in 2004, the price differentials in Montenegro relative to the euro area were negative mainly due to the base effect, while in 2010 and 2014, they reflected delays in price adjustment from the euro area. Increase in price differentials can be attributed to the catching up process, structural economic reforms, capital inflows and, to a larger extent, to policy actions. Furthermore, we may conclude that higher inflation in Montenegro is not limited only to the headline price index but is also present in other sub-indices, mainly in categories with limited tradability and in administered prices. Lastly, this illustrative statistics on inflation differentials in Montenegro relative to the euro area suggest that there is a need for deeper understanding of the structural forces behind Montenegro inflation dynamics and the price setting behaviour of domestic firms.

4. Inflation rate model in Montenegro

Based on the findings from the previous section, in this section we will model the inflation rate in Montenegro. Namely, we would like to confirm that inflation rate in Montenegro depends on cyclical and structural factors. Bearing in mind data limitations in Montenegro², our analysis will focus on the country's openness, broad money, and housing prices.

Focusing on the demand side of the economy, the output gap can be explained by the growth of demand in excess of GDP growth. As proxy for the demand pressure and output gap we have used the house prices. Namely, excessive increases in housing prices which created the asset price bubble in the pre-crisis period have been one of the important signals of the economy overheating. Large FDI inflows primarily went to the tourism sector and associated house sales, and banking. House sales to foreign investors have generated strong wealth effects and boosted domestic demand. These large FDIs contributed to a sharp increase in bank deposits and also fuelled domestic demand. Namely, money supply in Montenegro is exogenous variable and is exclusively formed under the influence of exchange though the current and capital account. In our model we will use demand deposits and deposits to private sector as a measure of broad money, as defined by the IMF Monetary and Financial Statistics Manual (2010). Namely, the CBCG does not calculate monetary aggregates due to the euroisation and impossibility to measure money in circulation nor conducts monetary policy based on this indicator. The

² In general, the labour market data are not reliable. There is no data on unit labour costs and nominal effective exchange rate, and data on the consumption basket are available only from 2010 onwards.

external dimension of the country and the degree of openness can play an important role in affecting prices. We measure openness of the country as the share of imports to GDP. The hypothesis for including this variable is that openness increases the exposure to external shocks and exerts upward pressure on inflation.

The econometric technique of this analysis is the Ordinary Least Square (OLS) applied to a multiple regression model. According to the econometric standard procedure, primarily, we should check for the possible non-stationarity. To test the stationarity we have used Augmented Dickey Fuller (ADF) and Phillips Perron (PP). The tests on stationarity suggest that the series import to GDP are stationary in levels, while series of inflation and house are stationary on first difference, and series of broad money are stationary on the second difference. Based on the previous analysis we specified the model which is presented in the following equation:

$$D(\text{LOGCPI})_t = \alpha + \beta_1 D(\text{LOGREALEST})_t + \beta_2 (\text{IMPORT_TO_GDP})_t + \beta_3 D(\text{LOG_B_MONEY})_t + \beta_4 \text{DUMMY1} + \beta_5 \text{DUMMY2} + \beta_6 \text{DUMMY3} + \varepsilon_t$$

Where:

Dummy 1 - time dummy which represents the beginning of the global financial crisis;

Dummy 2 - time dummy which captures an increase in oil prices;

Dummy 3 - time dummy which represents an administrative policy or the variable for the introduction of excise duties on raw and roasted coffee, cigarettes and fuel.

The OLS estimates of inflation regression model are present in Table 1 below.

Table 1 - Inflation regression model

Dependent Variable: D(LOGCPI)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGREAL)	0.128545***	0.035878	3.582823	0.0010
LOGIMPTOGDP	0.014158*	0.007426	1.906604	0.0648
D(LOGBM,2)	0.067807*	0.034596	1.959963	0.0580
Dummy1	0.042535**	0.009333	4.557326	0.0001
Dummy2	0.036570**	0.009185	3.981265	0.0003
Dummy3	0.027067**	0.009385	2.884222	0.0067
R-squared	0.651683	Mean dependent var		-0.000350
Adjusted R-squared	0.591971	S.D. dependent var		0.013775
S.E. of regression	0.008799	Akaike info criterion		-6.477339
Sum squared resid	0.002710	Schwarz criterion		-6.187727
Log likelihood	143.0241	Hannan-Quinn criter.		-6.371185
F-statistic	10.91385	Durbin-Watson stat		1.951139
Prob(F-statistic)	0.000001			

Breusch-Godfrey LM Test: p- value=0.697, Heteroskedasticity Test: p-value=0.368

Jarque Bera test: p-value=0.997

Note: *** significant at 1%; ** significant at 5%; * significant at 10%

Looking at the estimation results, there is evidence of effects of house prices, broad money and country's openness, expressed by the ratio of import to GDP, on inflation rate in Montenegro. Namely, an increase in broad money by one percentage point leads to increase in inflation rate by 0.07 percentage points. According to these results, an increase of one percentage point in house price during the first quarter, leads to an increase of 0.13 percentage points in CPI index during the second quarter. Furthermore, an increase of one percentage point in ratio of import to GDP during the first quarter, leads to an increase of 0.01 percentage points in CPI index during the second quarter. Time dummies which represent external shocks such as global financial crisis and oil increases have been found to have a positive statistically significant impact on inflation rate. Moreover, time dummy which represents policy measure of increase in excise has also positive statistically significant influence on inflation rate. These findings are in line with our descriptive analysis in the previous section, where we noted that cyclical and structural factors together with policy actions determine inflation rate.

The estimated F-statistic proves whole model to be a significant one, i.e. joint influence of the explanatory variables on the variation of inflation (65%) is highly significant. Furthermore, the Ramsey RESET test for the model specification error regarding omitted relevant variable, incorrect functional form and correlation between explanatory variable and error, suggest that the model specification is correct. Jarque Bera test suggest that the residuals are normally distributed. Namely, the hypothesis that residuals are normally distributed can be rejected both at 5% and 1% significance level. According to the results of the White Heteroscedasticity test the null hypothesis that stochastic errors are homoscedastic cannot be rejected. Hence, it can be concluded that there is no problem of heteroscedasticity in the model. Finally, the results of the Breusch-Godfrey LM Test indicate that there is no serial autocorrelation in the model. This result was expected since estimated value of DW statistic is close to 2.

5. Competitiveness model Montenegro

As already stated, due to the unilaterally adopted euroisation in Montenegro and with no possibility of adjusting the nominal exchange rate, we are particularly interested to analyse the effect of changes in real effective exchange rate, to aggregate exports, both goods and services, in Montenegro. A country that records higher inflation rates than its main trading partners could eventually deteriorate its competitiveness, with subsequent losses in output and employment.

The role of real effective exchange rate in export promotion features prominently in literature on development and globalisation (Haddad and Pancaro, 2010). Export performance in Montenegro is derived from a limited number of sectors, mostly related to tourism and to lesser extent to commodities. Bogetić et al. (2013) explain that Montenegro has a limited and highly concentrated export base but it is also in the middle of a major transformation towards a much more tourism and services based economy. The exports of services imply narrow productivity gains, as tourism, transport and construction are major drivers of total services exports, while high value added services such as insurance, financial, and property services account are minor (Hashimoto, 2016).

In the macroeconomic literature export is usually viewed as a function of foreign income and real effective exchange rate. The channel of foreign income's influence operates through an increase in foreign demand, which determines the domestic export. While the channel of real exchange rate influence, in case of real depreciation, works through cheaper domestic goods or relative price increase of foreign goods. To model exports in Montenegro we start from the basic assumption that exports depend on real exchange rate foreign demand. The function of export is presented in the equation below:

$$X = f(Y_f, \varepsilon)$$

where X represents the volume of exports, Y_f is foreign income, and ε real effective exchange rate. The analysis covers the period from 2005 to 2015, in a monthly frequency. The real effective exchange rate is based on the consumer price percent change. An increase in the real effective exchange rate reflects the appreciation. Bearing in mind that the index of monthly industrial output is only monthly economic activity index; we used that index to represent foreign income. The foreign income variable is calculated as a weighted average of the industrial production index of three major trading partners (the European Union, Serbia, and Bosnia and Hercegovina). The weights are obtained as a normalized share of these countries in the Montenegrin exports in the period 2005-2015. These countries account for around 83% of Montenegro's exports, on average. The industrial production indices were collected from Eurostat and the statistical agencies in Serbia and Bosnia and Herzegovina, while the export data and prices for Montenegro were collected from Monstat.

After applying a Vector Autoregression (VAR) model³, we present the impulse responses of Montenegrin exports to changes in the real effective exchange rates and foreign accumulation (Figure 7).

Figure 7 suggests that Montenegro's exports appear to respond to these shocks, but with different intensity. Namely, according to the impulse response figures, Montenegro's exports can be more attributed to changes in foreign demand than to changes in real effective exchange rate.

Figure 7: Impulse response of Montenegro's exports to real exchange rate, domestic and economic activity in euro area

Source: Authors' calculation

³ Before proceeding with VAR, we applied a set of unit root tests on data in an attempt to classify the series based on trend and unit root properties. All variables in the model, except the real effective exchange rate, appear to be stationary. Real effective exchange rates are integrated of order one. The VAR model diagnostics suggest that the models fulfil the condition on stability and there is no evidence of serial correlation and non-normality of the VAR residuals (see Appendix).

The figure 7 suggests that Montenegro's total exports reacts slowly to changes in the real effective exchange rate. These findings are also supported by variance decomposition. One of the explanations might refer to the fact that developing countries catch up with productivity levels of developed countries and their general price levels tend to rise and their real exchange rate to appreciate. Similar evidence is proven by Orszaghova et al. (2013). She argues that as long as any real appreciation reflects productivity growth, it does not indicate a loss of competitiveness. While analyzing the catching-up process in Bulgaria and Romania, Penkova-Pearson (2012) explains that the period of convergence with the euro area was accompanied by a trend of real exchange rate appreciation of the two countries' currencies. However, she finds that the real exchange rate appreciation did not have a significant impact on export developments of Bulgaria and Romania. Namely, she explains that the real exchange rate appreciation during this period of convergence reflected an upward movement in its equilibrium value, not a loss in competitiveness. Furthermore, Apostolov and Josevski (2016) find that the conventional approach of real depreciation to stimulate exports and raise real output does not apply to the selected Southeast Europe economies. Haddad and Pancaro (2010) note that although a stable real exchange rate is a necessary condition for developing countries to achieve sustained economic growth, only large fluctuations matter for exports. Lastly, our findings are in line with (Hashimoto, 2016) that recently analysed and explained export performance in Montenegro.

In contrast to the real exchange rate effects on exports, the figure suggests that changes in economic activity of the main Montenegrin trade partners have substantial positive effects on Montenegro's exports. Again, these findings are in line with Hashimoto's (2016) findings that foreign demand explains Montenegro's exports. Furthermore, Hashimoto's (2016) makes a difference between the export of services and goods, finding that service exports are well explained by foreign demand but less so goods exports. That foreign demand is import determinant of Montenegro's exports might be linked with business cycle synchronization. Hildebrandt and Moder (2015), while analysing the degree of business cycle synchronization between the Western Balkans (including Montenegro) and the European Union, found that the degree of synchronization had been low or even negative before 2000, however, since then, the business cycles have clearly converged. They reveal that since 2009, in particular, business cycle synchronization with the EU has been high for all Western Balkan countries. As expected, Montenegro, a small and open euroised economy is highly sensitive to the euro area developments. Furthermore, with more than 40 percent of total exports going to the EU, trends in the EU, e.g. economic slowdowns, might lead to reduced external demand affecting the real economy in Montenegro.

6 Conclusion

Empirical studies suggest that differences in inflation are not unusual for countries which use same currency. As suggested by the literature on price convergence, cross-country differences in business cycles and structural features of an economy may generate inflation differentials. In this paper, we were particularly interested in investigating the factors which contribute to price differentials in Montenegro, a country which uses the euro outside of the euro area, relative to the euro area. One would expect that country using the euro as the sole legal tender would produce much stronger convergence in price level unlike what actually happened in last 14 years. This implies that structural factors and market forces have a strong influence on prices level. Thus, our intention has been to investigate whether changes in the real effective exchange rates, which in Montenegro's case follow the path of price differentials, can have any influence on the country's competitiveness.

Our analysis provides the evidence that inflation differentials are significantly different in size and persistence before and after the global financial crisis. Namely, pre-crisis inflation differentials averaged around 4 p.p., while after the crisis they averaged below 1 p.p. The inflation differentials before the crisis can be attributed to price convergence, structural economic reforms, and overheated domestic and global demand. Even though the inflation differentials were mild after the crisis, they were mainly generated by structural forces, regulated prices, and the price setting behaviour of domestic firms. The findings from our inflation model suggest that the openness of Montenegro, overheated demand expressed in increase in house prices and broad money, accompanied with policy actions to increase excises and external shocks (such as increase in oil prices and the global financial crisis) have positive impact on inflation. As stressed by the literature, if the inflation differentials are long lasting, they can have negative implication for the country's competitiveness causing an increase in real exchange rates. However, our findings suggest that changes in the real effective exchange rate have no major effects on the aggregate exports in Montenegro, while due to the high business cycle synchronization; the changes in economic activity of Montenegro's main trading partners have substantial positive effects on Montenegro's exports. Finally, further analysis using variables to model inflation differentials in Montenegro relative to the euro area, particularly if time series for unit labour costs and nominal effective exchange rates were available, would be interesting areas for further research.

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APPENDIX

Test for stationarity

The table below presents p values of ADF test

Variable	Augmented Dickey-Fuller (ADF)	
	Levels	First differences
IND_EA	0.0020	
IND_MNE	0.0000	
LOGEXPORTS	0.0025	
RELATIVEPRICES	0.0846	0.0000

Standard errors in () & t-statistics in []			
	LOGIZVOZS	D((REER))	COM_IND
LOGIZVOZS(-1)	0.353153 (0.07803) [4.52560]	-0.584484 (0.76024) [-0.76882]	0.128769 (2.44711) [0.05262]
LOGIZVOZS(-2)	0.350800 (0.07514) [4.66881]	1.016437 (0.73201) [1.38856]	0.473773 (2.35624) [0.20107]
D((REER(-1)))	-0.004124 (0.00914) [-0.45135]	0.323016 (0.08901) [3.62918]	-0.339835 (0.28650) [-1.18617]
D((REER(-2)))	0.017699 (0.00921) [1.92188]	0.032548 (0.08972) [0.36277]	-0.264312 (0.28880) [-0.91521]
COM_IND(-1)	0.006357 (0.00273) [2.32578]	-0.039117 (0.02663) [-1.46892]	0.759925 (0.08572) [8.86546]
COM_IND(-2)	0.001200 (0.00280) [0.42807]	0.029274 (0.02731) [1.07203]	0.136969 (0.08790) [1.55825]
C	4.545831 (0.99103) [4.58697]	-6.750008 (9.65493) [-0.69913]	0.701658 (31.0781) [0.02258]
D2008M2	0.161780 (0.09502) [1.70253]	0.623027 (0.92574) [0.67300]	0.168494 (2.97986) [0.05654]
D2014M01	-0.128171 (0.09702) [-1.32106]	-0.278106 (0.94521) [-0.29423]	-11.89073 (3.04251) [-3.90819]
D2006M1	-0.347280 (0.09655) [-3.59684]	-1.395790 (0.94064) [-1.48388]	-7.029736 (3.02779) [-2.32173]
D2009M06	0.233855 (0.09747) [2.39929]	1.448353 (0.94957) [1.52528]	2.546041 (3.05654) [0.83298]
R-squared	0.801730	0.200023	0.824119
Adj. R-squared	0.784638	0.131060	0.808956
Sum sq. resids	1.024634	97.25069	1007.634
S.E. equation	0.093984	0.915624	2.947287
F-statistic	46.90607	2.900423	54.35354
Log likelihood	125.8554	-163.2574	-311.7247
Akaike AIC	-1.808746	2.744210	5.082278
Schwarz SC	-1.562399	2.990557	5.328625
Mean dependent	18.12624	-0.014303	109.5625
S.D. dependent	0.202521	0.982251	6.743047
Determinant resid covariance (dof adj.)		0.063413	
Determinant resid covariance		0.048322	
Log likelihood		-348.2186	
Akaike information criterion		6.003442	
Schwarz criterion		6.742483	

VAR Residual Portmanteau Tests for Autocorrelations

Null Hypothesis: no residual autocorrelations up to lag h

Date: 01/23/17 Time: 15:36

Sample: 2003M01 2015M12

Included observations: 127

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	3.183310	NA*	3.208575	NA*	NA*
2	8.961714	NA*	9.079433	NA*	NA*
3	13.53833	0.1397	13.76677	0.1309	9
4	17.10094	0.5162	17.44525	0.4927	18
5	25.48643	0.5472	26.17440	0.5089	27
6	27.64548	0.8396	28.44051	0.8111	36
7	42.37191	0.5839	44.02598	0.5131	45
8	48.28863	0.6934	50.34047	0.6163	54
9	57.01227	0.6884	59.72946	0.5936	63
10	62.57288	0.7783	65.76534	0.6842	72

*The test is valid only for lags larger than the VAR lag order.

df is degrees of freedom for (approximate) chi-square distribution

*df and Prob. may not be valid for models with exogenous variables

VAR Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)

Null Hypothesis: residuals are multivariate normal

Date: 01/23/17 Time: 15:37

Sample: 2003M01 2015M12

Included observations: 127

Component	Skewness	Chi-sq	df	Prob.
1	0.222616	1.048979	1	0.3057
2	-0.295136	1.843724	1	0.1745
3	-0.358411	2.719037	1	0.0992
Joint		5.611741	3	0.1321

Component	Kurtosis	Chi-sq	df	Prob.
1	2.568808	0.983860	1	0.3212
2	3.547647	1.587064	1	0.2077
3	3.804208	3.422391	1	0.0643
Joint		5.993316	3	0.1119

Component	Jarque-Bera	df	Prob.
1	2.032840	2	0.3619
2	3.430789	2	0.1799
3	6.141429	2	0.0464
Joint	11.60506	6	0.0714

Period	LOGIZVOZS	D((REER))	COM_IND
1	100.0000	0.000000	0.000000
2	96.29849	0.339137	3.362375
3	91.73809	0.872653	7.389258
4	86.56858	0.778464	12.65295
5	81.14296	0.697032	18.16001
6	75.59705	0.801143	23.60181
7	70.44092	1.007547	28.55153
8	65.73014	1.358281	32.91158
9	61.59839	1.760628	36.64098
10	58.01538	2.199114	39.78550

Cholesky Ordering: LOGIZVOZS D((REER)) COM_IND