Ekonomika Economics
Management Management
Inovace Innovation

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
www.emijournal.cz

RECENT DEVELOPMENTS IN EXCHANGE RATES OF CENTRAL EUROPEAN COUNTRIES

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Abstract

The Czech koruna, the Polish zloty and the Hungarian forint are the Central European currencies that used to be pegged to a basket of foreign currencies after their establishment. At the moment they all are in the group of currencies with a floating exchange rate regime. In year 2020 the pandemic of covid-19 was an impuls of economic decline and enhanced volatility of stock markets and decrease of the national stock exchanges of the analyzed countries to 60 – 65 % of their value at the beginning of 2020. However, the mutual exchange rate of the analyzed currencies did not show any significant increase of volatility in terms of the period 2007 - 2020, except for the PLN/CZK currency pair. In the period March – May 2020 the forint appreciated against the koruna and the zloty followed by the opposite trend in June – September 2020.

Key words:

exchange rates, Czech koruna, Polish zloty, Hungarian forint, foreign exchange markets

***JEL* Classification:** F31

1 Introduction

The covid-19 pandemic had a significant impact on the economies all over the globe. Countries all over the world have been experiencing economic declines caused by the restrictive measures introduced in order to handle the strike of the virus. Together with the consequences in relation to the economic growth different impacts on the exchange rates have occured. Apart from exchange rates the pandemic situation and expectations of the following decline of national GDPs enhanced movements in the stock markets.

This paper analyzes movements of Exchange rates of selected Central European countries – the Czech Republic, Poland and Hungary. These countries are all members of the Visegrad Group (V4) and have not adopted euro currency yet. The paper focuses on the mutual exchange rate movements and movements of inflation and interest rate differential among the countries as well as the movements of the indexes of the national exchanges in the first 3 quarters of 2020. The goal of the paper is to evaluate the mutual exchange rate fluctuations in the time of economic slowdown of 2020 of the selected countries.

2 Theoretical Background

Exchange rate implications are derived from the exchange rate regime of the country (currency). Fixed exchange rates should help companies involved in international trade to mitigate their currency risk. In this sense it simplifies plannings and predictability towards the future. Fixing a currency to a low inflationary one can represent one of the tools to fight high inflation in the economy. However high level of credibility of institutions is required. On the other hand it is connected with a loss of freedom in

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
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monetary policy of the central bank and it increases risk of speculative attacks on the currency. Floating exchange rate is derived from the economy and financial market performance. In times of economy shocks it decreases impact on the national economy through depreciation of the currency and supporting local exporting companies. Nevertheless its volatility can be transformed into the real economy. (Beker, 2006)

Exchange rate regimes can be defined by the International Monetary Fund and are in detail analyzed and described in the Annual Report on Exchange Arrangements and Exchange Restrictions as follows:

- Currency board – binding legislative commitment to maintain a fixed exchange rate against a specific foreign currency. This practically results into a loss of an autonomous monetary policy of the central bank according to the strictness of the arrangement.
- Conventional peg – currency exchange rate is pegged to another currency on a fixed level with a possible potential fluctuation within a band of ±1 % around the central parity or the minimum and maximum value of the spot exchange rate that has to move within a narrow 2 % margin within a period of at least 6 months. In order to maintain the parity a national central bank intervenes directly or indirectly.
- Stabilized arrangement – spot exchange rate is not floating and remains within a 2 % margin for 6 months or more. The stability is benchmarked to a single currency or to a basket of currencies.
- Floating - exchange rate is mostly market based with a possibility of direct or indirect interventions in case of undesired or extreme movements of the spot rate or shock in the economy
- Free floating – interventions to the exchange rate are rather exceptional and target a specific event in the market. These interventions can take up to three business days and can occure maximum three times within the period of 6 months

Floating exchange rates theory based on interest rate differentials is derived from two fundamentals:

$$1. \quad d = \log r - \log r^* \tag{1}$$

where d is defined as a difference between log domestic interest rate and log of the foreign interest rate. Hence d represents the forward discount.

Secondly the expected depreciation is defined by a gap between the present spot rate and the long term equilibrium, and expected long term inflation differential between countries.

$$2. \quad d = -\theta (e - e^*) + \pi - \pi^* \tag{2}$$

where e is the spot exchange rate and π is the level of expected long term domestic and foreign inflation. (Frankel, 1979)

Real exchange rate can be then defined as:

Real exchange rate = nominal exchange rate * PPP

Where PPP represents parity purchasing power as a fraction of domestic and foreign price index. Based on the single price rule same goods and products shall in long run have identical price in different countries. Otherwise there would exist arbitrage opportunity to buy a product cheaper in one country and sell more expansive in another one. These arbitrage operations would finally balance the price difference and bring the value back to the single price principle. However this theory is limited due to

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
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other costs reflected in the goods price (transport costs and other specific costs related to the market). (Boykorayev, 2008)

In short run the movements in nominal exchange rates are equally transformed into the real exchange rate movements according to the Mundell-Fleming-Dornbusch model. Accordingly, the exchange rates can be more volatile than the underlying fundamentals due to sticky goods prices and flexible capital mobility. After some time goods prices adjust and real exchange rates return back to the stable level. (Devereux, 1997)

Generally exchange rates are detrmined by macroeconomic fundamentals. These fundamentals are money supply, economy output and inflation rates. (Engel & West, 2005)

Twarowska and Kakol (2014) investigated impact of different factors on fluctuations of the exchange rate of the Polish zloty against Euro. Most significant factors proved to be increase of financial account surplus resulting in appreciation of the currency, increase of inflation leading to depreciation of zloty, increase of market interest rate contributing to appreciation and government deficit.

Ehrmann and Fratzscher (2005) analyzed impact of the news connected to the macroeconomic fundamentals on the exchange rates. They found out three key aspects:

- Announcements connected to the macroeconomic fundamentals can explain direction of the exchange rate movement
- Impact of these announcements or news is rather smaller in the Euro area and Germany compared to the USA
- The extent of this impact is given by the real macroeconomic situation – impact increases in the times of higher market ucertainty and increased volatility of the market

Negative information has more significant impact on the exchange rate than the positive ones.

With the uncertainty of the market work Bacchetta and van Wincoop (2013) in their study. Based on their findings the relationship between exchange rate and the macroeconomic fundamentals is highly unstable and the exchange rate is determined rather by perception and expectation of these fundamentals.

2.1 Czech koruna

The Czech koruna after its establishment in 1993 was pegged to a basket of currencies. As the transformation processes in the economy were more successful than in comaparable countries high volumes of foreign capital started to flow into the country. In 1996 the fluctuation band of the exchange rate was increased to ± 7,5 % aiming to decrease volumes of capital inflow that lead to immediate outflows of foreign money. This untied hands of the central bank in terms of the monetary policy flexibility on the other hand financial account of the balance of payments was not able to finance current account deficit. This finally lead to depreciation of the currency in 1997 forcing the central bank to intervene in the foreign exchange market in order to keep the exchange rate within the fluctuation band which proved to be not possible anymore. As a result pegged exchange rate regime was switched for managed floating. (Koderova, 2013)

The primary objective afterwards was the inflation targeting monetary system (not the exchange rate) and the monetry policy of the central bank proved to be successful that improved credibility and independency of the Czech National Bank. (Kemme & Lyakir, 2011)

In 2007 Melecky and Komarek (2007) analyzed equilibrium exchange rate of the Czech koruna to euro (German mark) based on fundamentals of the economy. According to the results in the period of 1994 – 2004 the Czech koruna was undervalued on average by 7 %.

Inflation rate in the Czech Republic decreased below the 2 % target of CNB in 2012 with a forcasted further drop below 1 %. Therefore the CNB decided (as the interest rates would have to be decreased below 0 % level) to intervene in the FX market in 2013. The objective was to keep the

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ISSN: 1804-1299 (Print), 1805-353X (Online
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EUR/CZK exchange rate above 1 EUR = 27 CZK. (Skorepa & Hampl, 2014) This objective prevailed until 2017. (Lizal & Schwarz, 2017)

Helisek and Mentlik (2018) provided the analysis of a suitable exchange rate regime for the Czech koruna with prospect to potential euro adpotion (ERM II participation). As a suitable possibility they would see peg with a standard fluctuation band as the favorable choice in order to mitigate risk of currency crisis. In the future they expect long term trend of appreciation of the Czech koruna against euro.

2.2 Polish zloty

During the period of transition of the Polish economy the Polish zloty was pegged to the US dollar from 1990. This helped Poland to fight hyperinflation however due to enduring high level of inflation rate it was decided to devaluate the zloty and peg it to the basket of selected currencies in 1991. The basket contained US dollar (45 %), German mark (35 %), British pound (10%), French franc (5 %) and Swiss franc (5 %) base on the approximate levels of trade payments. In 1999 the basket was adjusted to 55 % of the euro and 45 % of US dollar. The free floating exchage rate regime was introduced in 2000. (Trenkler, 2003)

Czaja (2020) analyzed volatility of the Polish zloty against major world currencies and other Central European currencies. According to the study in the time period of 2004 – 2010 the currency was a target of many speculators. Undervaluation and overvaluation of the zloty lead towards significant capital flows. This volatility forced local businesses to seek opportunities to hedge against currency risk.

Rubaszek (2005) investigated equilibrium exchange rate for the Polish zloty. His model works with the expectation of the future adoption of euro. As benefits of the euro adoption the author sees decrease of risk premium, lower transaction cost and mitigation of currency risk. However according to the paper it is crucial to set the conversion rate correctly at the equilibrium level.

Floating exchange rate regime should by theory work as an absorber of economic shocks and help to mitigate impacts of the shock on the country. With this approach does not agree the study of Pronobis (2017). Based on the results the study questions ability of the floating exchange rate to mitigate impacts of economic cycles and proves only moderate relationship between the rate and the economy

Relationship of the exchange rate of the zloty and the national bank interest rate was analyzed by Pronobis and Sokolowska (2018). The study did not prove impact of the interest rate on the exchange rate. This limits possibilities of monetary policy to influence the currency market.

There has been a proved correlation of the zloty with the Hungarian forint in the paper of Kliber and Kliber (2010). However based on evidence from the year 2008 both currencies reacted differently to the identical shocks. Hence the volatility of each currency should be threated itself and it is derived from the macroeconomical situation.

2.3 Hungarian forint

During the economic transition of the country after the era of comunism the stabilisation policy of Hungary was less aggressive than in the Czech Republic and in Poland. The inflation rate in Hungary reached 35 % that represented half of the value of inflation in Poland. Challenging was a high volume of external debt of the country. This fact together with less intensive stabilisation measures lead towards government budget and current account deficits. (Barlow, 2005)

The Hungarian forint, similarly as the zloty, was pegged to a basket of currencies in order to fight expected inflation in 90s. The currency was pegged to US dollar with 50 % weight and to the European Currency Unit and German mark. In spite of the increasing confidence in the forint of the authorities a more flexible crawling band regime was introduced in 1995. The exchange rate was allowed to move within the band of ± 2,25 % with decreasing weight of US dollar in favor of ECU. The band was revised and extended to ± 15 % in spring 2001. In september the regime was adjusted allowing the exchange

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ISSN: 1804-1299 (Print), 1805-353X (Online
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rate to move in the area of ± 15 % around the central parity 1 EUR = 276,1 HUF. The parity was devalued to 1 EUR = 282,36 HUF in 2003. Finally in 2008 free floating regime was adopted. (Zoican, 2009)

In 2003 the Hungarian forint faced a speculative attack with a purpose to create a pressure on appreciation of the currency and forcing the central bank to adjust the central parity to euro. The National Bank of Hungary responded resolutely with an intervention in the foreign exchange market and increasing its FX reserves by 50 %. At the same time deposit interest rate was decreased by 2 % and deposit facility volume was limited. These measures lead to depreciation of the forint by more than 4 %. (Losoncz, 2003)

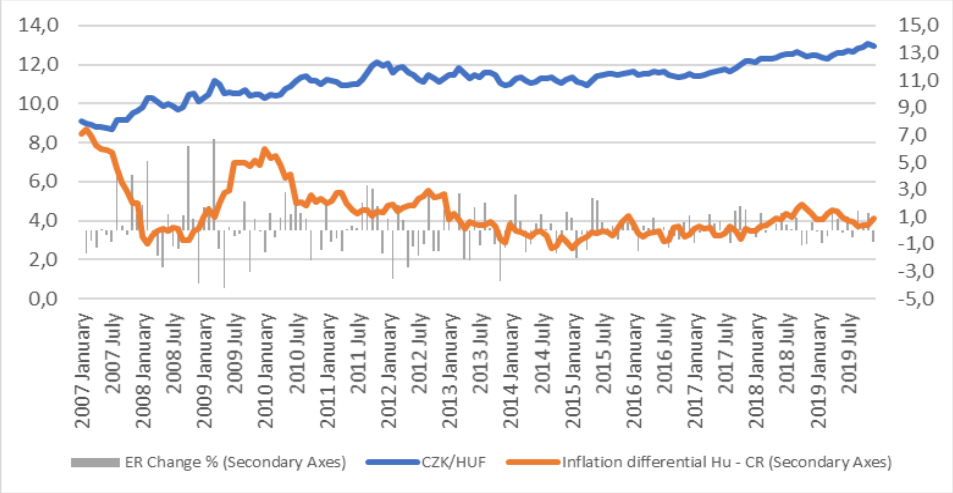
Hung (2007) presented a study of the volatility of the euro - Hungarian forint exchange rate. The daily volatility of the rate reached 0,49 % in the time frame 2010 – 2017.

3 Methodology

This paper analyzes movements of the Czech koruna, the Polish zloty and the Hungarian forint in terms of the volatility of the financial markets enhanced by the covid-19 pandemic in 2020. The data in this study are based on the data of the International Monetary Fund, Bank for International Settlements, Eurostat and the national banks and exchanges of the analyzed countries. Comparable analysis of the movements of the mutual Exchange rates is conducted in relationship to the inflation differential and interest rate differential between the analyzed currency pairs. These variables are analyzed in the long term perpective for the period 2007 – 2019 as well as for the short term movements of the markets in January – September 2020.

4 Long term exchange rates fluctuations

Figure 1: CR – Hu exchange rate and inflation differential development



Source figure: Own compilation based on IMF and Eurostat

The exchange rate CZK/HUF in the observed period 2007-2019 moved from 9,12 to 13,08 that represented appreciation of the Czech koruna by 43 %. On the other hand inflation differential between Hungary and the Czech Republic decreased from 7 % at the beginning of the period to 1 % in the end of 2019. This was driven mostly by high level of inflation in Hungary that was afterwards compensated by increase of price level in the Czech Republic. Recently the inflation rates stabilized in the range 2-3 % in both countries, Highest monthly volatility of the exchange rate was reported in 2008 and 2009 caused by strong depreciation of Hungarian forint by 7 %. From 2014 the changes of the average monthly exchange rates have been rather stable with movements up to 2,5 %.

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ISSN: 1804-1299 (Print), 1805-353X (Online
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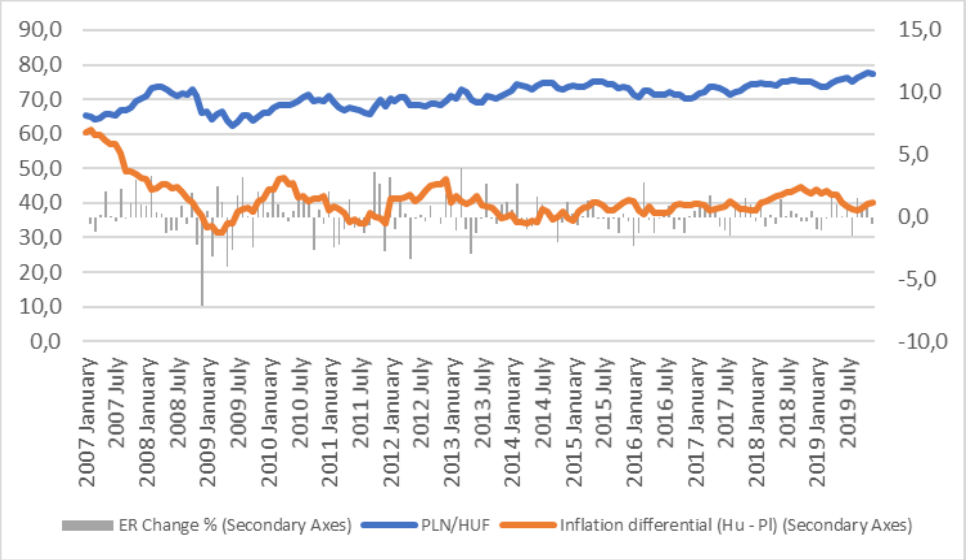
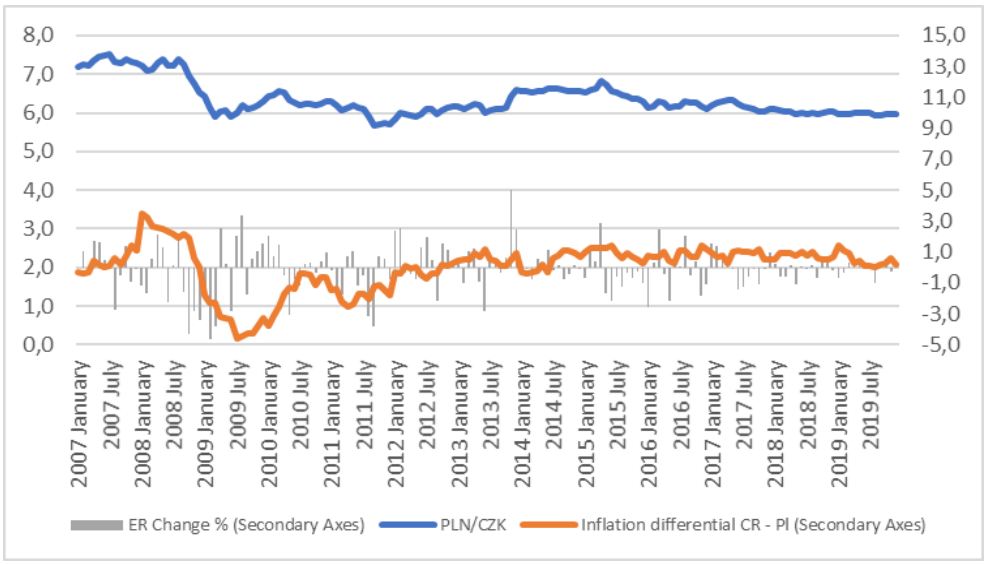
Figure 2: PI – Hu exchange rate and inflation differential development



Source figure: Own compilation based on IMF and Eurostat

The Polish zloty / Hungarian forint moved from 65 in 2007 to 77 in 2019 representing a depreciation of the forint and appreciation of the zloty and moved within the range from 62 to 77. The exchange rate PLN/HUF was the most stable of the three analyzed rates with standard deviation below 5 % of the average value. Inflation differential decreased from the initial 7 % level to 1 % in the end of 2019 due to high level of inflation in Hungary in 2007 and its decrease below 3 % and simultaneous increase of inflation in Poland up to 3 % in 2019.

Figure 3: CR – PI exchange rate and inflation differential development



Source figure: Own compilation based on IMF and Eurostat

The exchange rate the Polish zloty / the Czech koruna reported almost stable trend of the zloty deppreciation during the analyzed period and moved within the range of 6-7,5. From the initial value above 7 the rate dropped to 6 in the end of 2019. Monthly volatility of the exchange rate measured by a standard deviation reached almost 7 % of the average value of the rate. Inflation differential was volatile at the beginning of the period in years 2007 – 2012. This was determined by high levels of

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ISSN: 1804-1299 (Print), 1805-353X (Online
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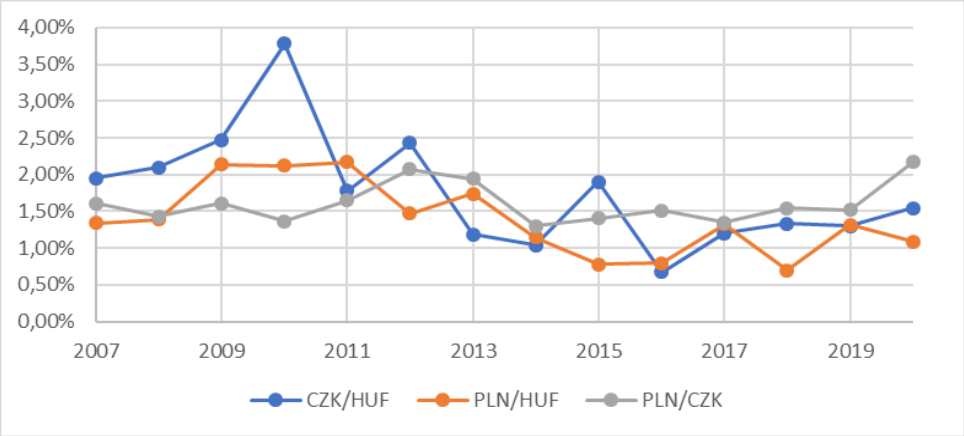
inflation in the Czech Republic in 2008 and following very low levels around 0 in 2009 and 2010. Afterwards it stabilized around 0 value as the price level changes in both countries almost equalized above 3 %.

5 Exchange rates in 2020

Figure 4: Average monthly standard deviations



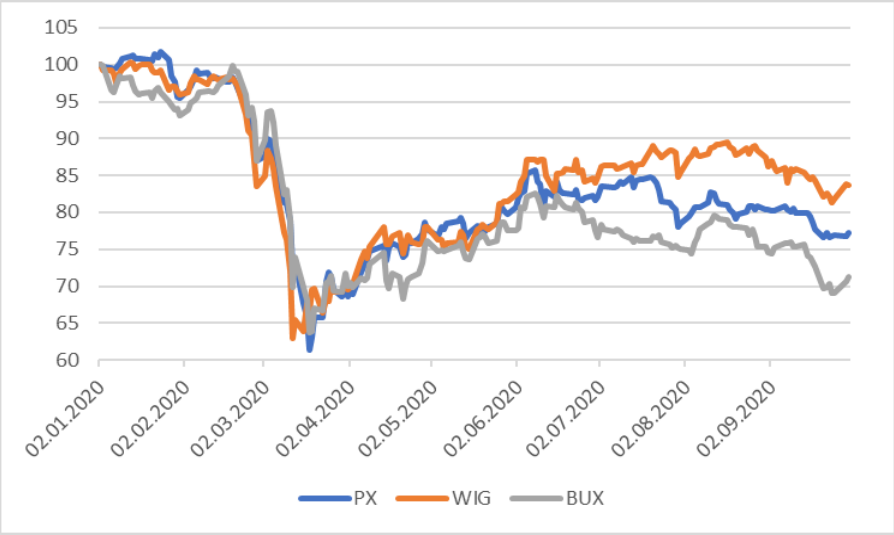
Source figure: Own compilation based on IMF

Volatilities of analyzed exchange rates were affected differently by the situation in 2020. The most volatile of the exchange rates – the rate CZK/HUF – experienced the highest average monthly volatility in 2010 reaching the value of almost 4 %. Therefore in comparison the increase of the average monthly volatility to 1,5 % in 2020 is not extraordinary and is within the band of the past years.

The exchange rate PLN/HUF experienced a year to year decrese of average monthly volatility in 2020 from 1,3 % to 1,1 %. This value is below the average of all analyzed years as the volatility peaked in years 2009 – 2011 at levels of 2,1 – 2,2 %.

On the contrary the rate PLN/CZK was moving at the quite stable level without extreme levels of volatility up to less than 2,1 %. This rate recorded an increase of volatility in 2020 from1,5 % to almost 2,2 % reaching the peak of average monthly volatility in the period 2007 - 2020.

Figure 5: National exchange indexes development in 2020



Source figure: Own compilation based on PSE, WSE and BSE

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
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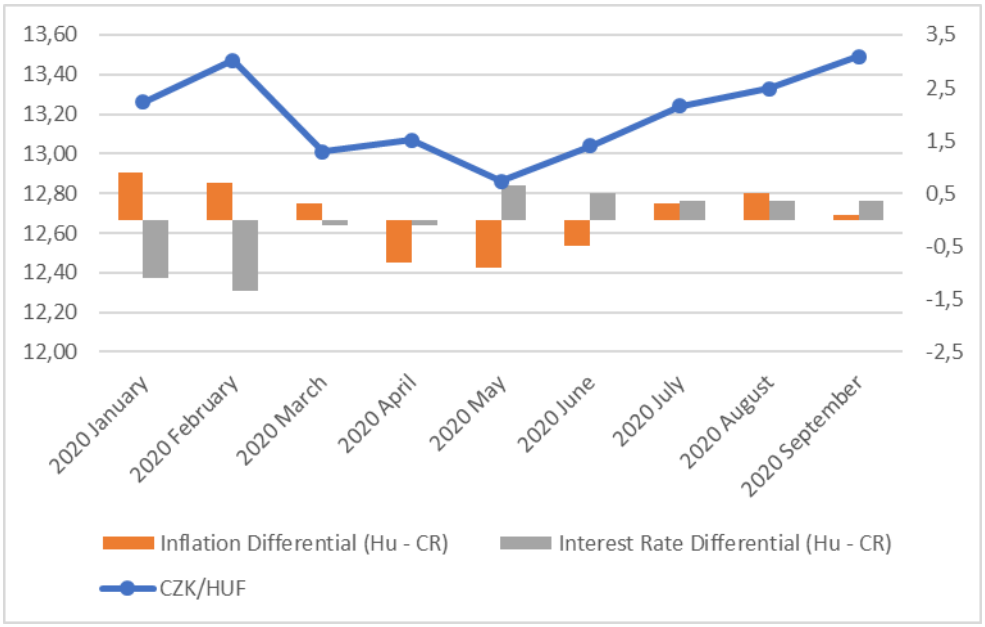
Up to date forecast of the economic development and its expectations to the future can be suggested by the movements of the stock markets. At the beginning of 2020 all the main indexes of the analyzed countries (PX – the Czech Republic, WIG – Poland, BUX – Hungary) recorded a decrease of few percent points. The most significant drop took place in Poland with a decline of 7 points within the first month. A dramatic fall of the indexes happened in the end of February and in March. At the lowest point in March the PX index dropped by 39 % compared to the values at the beginning of the year, the WIG and the BUX index by 36 %. The most significant recovery experienced the WIG index that managed to return to the area between 80 – 90 % of its initial value. The PX index managed to return to the area between 75 – 85 % and the BUX index to the range between 70 – 80 %.

Figure 6: CR – Hu exchange rate, inflation and interest rate differential development in 2020



Source figure: Own compilation based on IMF, Eurostat and BIS

The CZK/HUF exchnage rate moves at the beginning of the year were towards an appreciation of the koruna. This was supported by an increase of the interest rate differential as the interest rate in the Czech Republic increased by 0,25 percent points in February. This corresponds to the poor performance of the BUX index and the stable movements of the PX index at the beginning of the year. In March the exchange rate decreased as the forint appreciated to the level of 13. From the perspective of the stock market the hungarian stock market performed better at this period than the Czech one as the PX index dropped even lower than the BUX. At the same time the Czech national bank reacted to the markets decline and decreased the interest rates by 1,25 percent point while in Hungary the interest rate remained at the same level of 0,9 %. Furthermore there was a decline of inflation in Hungary by 0,5 percent points (while in the CR only 0,1). This trend prevailed until June when the koruna started to appreciate agains the forint again. In June the Hungarian national bank started to lower the interest rates in order to support the economy resulting in a decrease of interest rate differential between both countries followed by increasing inflation in Hungary and better performance of the Czech stock market. This movements pattern remained for the rest of the analyzed period as the ER reached its value from February in September.

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
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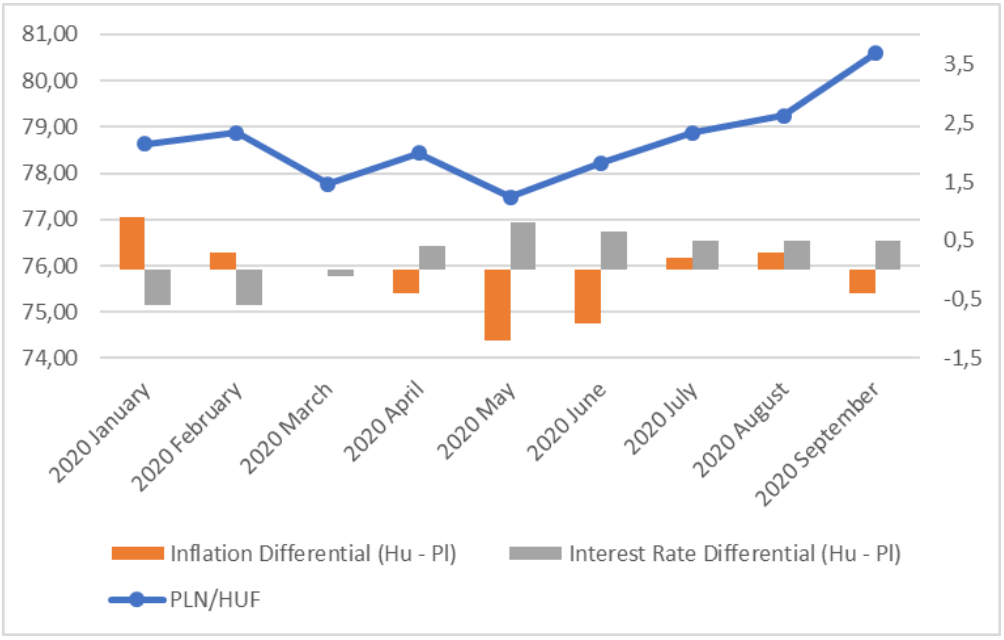
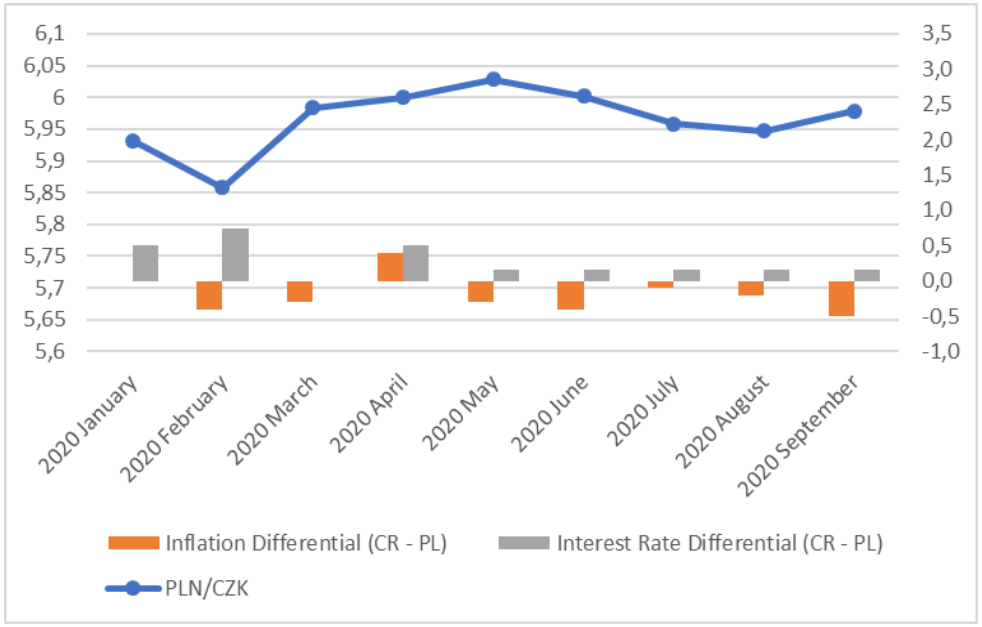
Figure 7: Pl – Hu exchange rate, inflation and interest rate differential development in 2020



Source figure: Own compilation based on IMF, Eurostat and BIS

At the beginning of the year the PLN/HUF exchange rate was rather stable. With the fall of the economies in March the forint appreciated as inflations in both countries leveled and the Polish national bank decreased the interest rate from 1,5 to 1 %. In May the ER decreased even lower to 77,5 as the reduction of the Polish interest rates continued to 0,1 % at the same time as inflation increased resulting in a negative Hu-Pl inflation differential. From June on the zloty started to appreciate hand in hand with the decrease of the hungarian interest rates and increase of inlafation in Hungary. At the same time the WIG index recorded significantely better results than the BUX.

Figure 8: CR – Pl exchange rate, inflation and interest rate differential development in 2020



Source figure: Own compilation based on IMF, Eurostat and BIS

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ISSN: 1804-1299 (Print), 1805-353X (Online
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In February the koruna appreciated against the zloty as the Czech interest rate incerased simultaniously with the better performance of the PX index than the WIG index. In the period between March and May the zloty appreciated as the reduction of the interest rate in Poland was compensated by higher level of inflation differential in April. In May the Czech interest rates were decreased and since then the interest rate differential remained at the level of 0,15 with higher level of inflation in Poland which resulted in slight appreciation of the koruna. In September the zloty appreciated again despite higher level of inflation in Poland. This increase of the ER could be however given by the relatively worse pandemic situation in the Czech Republic at that time.

6 Discussion

The analyzed currencies – the Czech koruna, the Polish zloty, the Hungarian forint – were established in early 90s in connection with the end of the era of communism. At the period following the establishment the currencies were pegged to the basket of currencies in order to tackle high levels of inflation that occured as a part of the economy transition process.

Mutual exchange rates of the currencies were analyzed for the period 2007 – 2020. General trends for the whole period were appreciation of the koruna against the forint and a decrease of Hu – CR inflation differential, appreciation of the zloty against the forint and a decrease of Hu – Pl inflation differential and appreciation of the koruna against the zloty and rather stable level of CR - Pl inflation differential with the exception in 2008 and 2009. Following the theoretical background of the paper the connection between exchange rate and the interest rate and inflation differential can be spotted with the decrease of the inflation leading towards an appreciation of the currency and decrease of the interest rate resulting into a depreciation of the currency.

The year 2020 was highly influenced by the pandemic of the covid-19 that caused a significant decline in the financial markets and economies. However monthly volatilities of the mutual Exchange rates did not show any significant increase of their volatility measured by the standard deviation except for the PLN/CZK Exchange rate that reached its peak of monthly volatility within the first 3 quarters of a year for the period 2007 – 2020.

The decline of financial markets in 2020 can be described on the fall of indexes of the national exchanges. All three indexes fell down to the range of 60-65 % of their value from the beginning of the year. Until the end of the analyzed period the most successful recovery recorded the Polish index followed by the Czech one. Among all three countries there were significant changes of the inflation and interest rate differential that effected the developments of the exchange rates. As a result the forint appreciated against the koruna in the March – May period and lost the gained value again until the end of September. The forint slightly appreciated against the zloty in the March – May period as well and depreciated in the following months to an Exchange rate above the value from the beginning of the year. The koruna appreciated against the zloty before the drop of markets in February. After the drop it deppreciated and stayed above the average value from January until the end of the analyzed period.

The impact of the study in practice could be used as a first input for the development of exchange rate risk hedging strategies in companies involved in the business among the Central European countries. In terms of the standard deviation as a tool for the exchange rate risk measurement the enterpreneuers could compare their expected risk with hedging costs.

Acknowledgement

This paper was supported as an output of a project IGS VŠE F2/65/2019 „Mechanismus sudden stop v různých režimech měnového kurzu “.

EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
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EMI, Vol. 13, Issue 1, 2021
ISSN: 1804-1299 (Print), 1805-353X (Online
www.emijournal.cz

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