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Capital Market Returns and Inflation Nexus in Croatia: Wavelet Coherence Analysis

Mile Bošnjak, Ivan Novak, Maja Bašić
The University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia

Abstract

Background: Hedging against inflation assumes instruments such as gold, stocks, fixed income securities, and real estate. There still exists a lack of appropriate strategy to hedge against inflation. **Objectives:** This paper examines the possibilities for hedging against inflation in Croatia offered by the Zagreb Stock Exchange indices. **Methods/Approach:** Based on monthly data from January 2000 to September 2019 and using a wavelet coherence approach, this paper brings the results across time and frequency domains. **Results:** Empirical results suggest that inflation was a leading variable in a statistically significant positive correlation between the inflation rate and Crobex returns in 2007-2011. The relationship between Crobex10, Crobis, and Crobistr returns on one side, and the inflation rate on the other side has statistically significant correlations only in specific and different periods, in which respective returns are a leading variable. **Conclusions:** The results imply that hedging against inflation is rather problematic under current Croatian capital markets conditions. Zagreb Stock Exchange indices could serve as a hedge against inflation for some periods but not during the whole observation period.

Keywords: inflation; hedging; wavelet analysis; stock market index
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Introduction

Financial cycles can be analysed concerning structural changes over time in which different time horizons are used to identify investment opportunities (Umar et al., 2020). Herein an interplay between financial and business cycles is important, and the ability to mitigate risk by hedging against inflation (Wang et al., 2020). Different commodities and stocks can save value and serve as an inflation hedge (Bampinas et al., 2016; Ivanov, 2017).

Although even in low inflation periods, hedging against inflation is important, opposing research on the topic emerged. By examining the Dow-Jones Industrial Average index as an inflation hedge, Johnson et al. (1971) did not find its hedging ability in three US inflationary periods. Bulent Gultekin (1983) did not find a positive relationship between rates of return on stocks and inflation when examining their relationship in 26 countries in the period after WWII. Neither did Spierdijk et al. (2015), who studied inflation hedging possibilities of the US stock, bonds, and T-bills. Their research found connection inflation and stock is more positive for the pro-cyclical stock than noncyclical stock after the 1980s; it possesses no hedging properties. After 2008 two factors occurred: (1) stock had started to portray hedging abilities in various economies (Spierdijk et al., 2015; Cifter, 2015), and (2) a decline in the number of firms that hedge against inflation (Bampinas et al., 2016). These factors affect firms' risk management abilities, especially in small open economies such as the Croatian economy.

Furthermore, the Eurozone stock market returns show almost perfect integration (Fernandez-Macho, 2012), stating that Croatia, currently in ERM II, and its firms could lose from lack of investment in their risk management capabilities. Risk management is especially important in a pre-crisis period. Mansor's (2011) study showed that the ability of Malaysian stock to hedge against inflation was only effective in the pre-crisis period. As stock returns are dependent on the time horizon and are country-specific (In et al., 2013), this paper studies the possibilities for hedging against inflation in Croatia offered by the Zagreb Stock exchange' indices (ZSE). Four ZSE indices are examined: Crobex, Crobex10, Crobis, and Crobistr. This study uses a wavelet coherence analysis to decompose inflation-stock indices nexus by time horizons. It aims to depict the variations in stages between leading and lagging variables (Ramsey et al., 1995; 1998). Following the research mentioned earlier, the issue of hedging against inflation on a capital market presents an ongoing topic with ambiguous empirical support. Empirical results seem to depend on the time being observed and the country or group of countries considered in research. This paper makes a step ahead and put some light on small and open European country. The linkage between inflation rates and capital market returns may be different. Hence, considering the nature of the relationship, this research employs a wavelet-based approach to reveal properties of the relationship across time and frequency domains. The results contribute to the ongoing discussion in empirical and theoretical literature while providing suggestions to investors interested in the Croatian capital market.

Scientific research of this paper adds to the previous literature on inflation hedging abilities of stock returns. Our paper is consistent with the late research of Johnson et al. (1971) and Mansor (2011), who confirmed that stock returns could serve as an inflation hedge. We add to the existing literature by examining the leading and lagging variables in a specific period using a new empirical approach, a wavelet-based analysis. Our analysis adds to a theoretical discussion about which actors incite inflation based on reviewed period.

The following section of the paper reviews the relevant literature in the field. Subsequently, the methodology is explained, and the results are illustrated and

described. Finally, the paper concludes with relevant research findings, limitations, and calls for further research.

Literature review

Hedge against inflation reduces the risk of an investors' real return stemming from ambiguity about the upcoming price changes (Branch, 1974; Bodie, 1976). "*A complete hedge against inflation is defined as an asset where the nominal returns vary in a positive one-for-one way with inflation*" (Tarbert, 1996). Gold was examined as an inflation hedge (Chua et al., 1982; Dempster et al., 2010; Ghosh et al., 2004; Wang et al., 2011; Beckmann et al., 2013; Mensi et al., 2016), commercial property (Tarbert, 1996), common stocks (Alchian et al., 1959; Oudet, 1973; Bodie, 1976), real estate securities (Liu et al., 1997), oil (Ivanov, 2017) and other commodities (Zaremba et al., 2019).

Keynes's (1936) and Fisher's (1930) views state that the nominal value of the firm is equal to inflation; hence, it does not induce change in real terms, thereby contradicting the classical macroeconomic theory (Hong, 1977). In Keynes and Fisher's view, firms gain through inflation as it enables them to liquidate their debts with depreciated money, enabling creditors' losses to become the debtors' gains (Alchian et al., 1959). Keynes and Fisher's view is based on the propositions that: (1) firms are debtors and (2) interest rates reflect biased estimates of the future course of the increase in prices. In contrast, investment advisors state that common stocks' value does not significantly change in either direction due to inflation, while bond investments incur losses, which was confirmed by the German inflation following WWI, the Austrian and French inflations of the 1920s, Chilean inflation, and the US WWI and WWII stock price indices. Alchian et al. (1959) state this is especially true for banks, which are the largest debtors and ought to gain from inflation, but whose owners incurred real losses during the abovementioned periods of inflation. Tobin (1965) illustrates a positive real stock prices-inflation connection. Namely, a rise in inflation implies money devaluation, which results in pulling out of capital investments. In his research, Fama (1981) used negative affiliation among stock prices and inflation to portray that the nominal stock returns-inflation connection is an outcome of inflation (Gallagher et al., 2002; Bhanja et al., 2019). Hence, based on the asset returns-inflation rates interaction, the matters of data and methodology impede definite comparison of most studies and restrict a consensus on the relationship between asset returns and inflation rates (Arnold et al., 2015).

Geske et al. (1983) state that contrary to the economic theory, stock returns point to events preceding an increase in monetary expansion and, hence, are negatively related to expected inflation and unexpected inflation. Namely, money demand and counter-cyclical money supply form a basis for adverse stock return-inflation connection (Kaul, 1987). Furthermore, Schotman et al. (2000) show that regardless of negative relation with unexpected inflation, stock can be used to hedge against inflation contingent on the expected investment return periods. In the case of Chinese post-WWII hyperinflation, Zhao (2017) also differentiates between expected and unexpected inflation between 1945-1948 depicting differences between full and partial inflation hedge respectively, making the Fisher hypothesis applicable. Consequent research on the relationship between stock returns and inflation in China using a wavelet analysis shows a negative relationship in the intermediate periods.

In contrast, the relationship between short and long periods is different (Gu et al., 2013). Generally, the Fisher model is majorly applicable, suggesting the usage of stocks as an inflation hedge (Gu et al., 2013). On the other hand, Durai et al. (2009) examined the negative relationship between real stock returns and inflation that contradicts the

Fisher hypothesis for the Indian economy using wavelet analysis, according to which Fama's hypothesis of an adverse relationship between stock returns and inflation is confirmed for the long investment periods, and is ambiguous for the other investment periods. Wavelet analysis was also used to examine the relationship between stock returns and inflation in Pakistan by using monthly data between 1961 and 2012 (Tiwari et al., 2015). For longer periods, the study found that stock returns and inflation are positively related if using consumers' price change as inflation determinant and not when producers' price inflation is utilized; hence, indicating the long-term hedging ability. Pre- (1960-1990) and (1991-2014) post-structural economic reform experiences in India analysed by wavelet analysis of frequency-based causality suggest that stock returns are not connected to inflation across various investment periods lending support to stocks as instruments of hedge against inflation (Bhanja et al., 2019). However, monthly data from 1994M5 to 2014M11, analysed by spectral and wavelet techniques, did not portray substantial pro-cyclical inflation-stock returns linkages, depicting stock returns as inadequate inflation hedge in India (Bhandari et al., 2018), in addition to non-decisive evidence of inflation hedge of stocks in South Africa (van Rooyen et al., 2019). Moreover, Tiwari et al.'s (2019) wavelet analysis of the UK, the US, India and South Africa's inflation-stock returns links confirms frequencies and periods links, but abandons stock returns as an inflation hedge, whereas the example Islamic stock returns portrayed in Haniff et al. (2018) confirms them for shorter investment periods, i.e., those not exceeding 3 years, the FTSE Bursa Malaysia Emas Shariah Index, as constituent returns can be used as an inflation hedge, while investment periods exceeding 3 years are detrimental to investment returns.

Additionally, Albulescu et al. (2017) analysed the U.S. sector stock indices from 2002M7–2015M10. They found that inflation and its uncertainty negatively impact stock prices in the long run, as opposed to the well-known Fisher effect. Namely, for various sectors' stock indices, a negative effect of inflation perished following the start of the recession. In detail, a negative effect of uncertainty is visible in the short investment periods, with no significant effect on stock prices, apart from the consumption indices. In the case of Croatia, we are only familiar with the research of Benazić (2013), who tested the Fisher hypothesis using a vector error correction model and confirmed its existence for the long investment periods. Hence, inconclusive research on stock indexes implies the research gap, which should be explored and tested in the Croatian case.

Methodology

Research data

This study uses data containg different indices retrieved from Zagreb Stock Exchange (ZSE) and inflation index (HICP) retrieved from Croatian National Bank (CNB). Timespan differs for different indices due to data availability. The considered time series development is depicted in Figure A1 (see the Appendix), and descriptive statistics of the observed time series are presented in Table A1 in Appendix. The observed series was first transformed into (natural) log returns and analysis performed on a transformed series.

Analysis

Kang et al. (2019) employed the wavelet coherence to analyse the co-movement between Bitcoin and gold. Ferrer et al. (2016) followed a wavelet-based analysis to establish the association between Interest rate and stock returns. Some previous papers employed wavelet coherence analysis to examine the relationship between

stock returns and inflation rates (Bhanja et al., 2012; Bhandari et al., 2018). Firstly, the Morlet wavelet is defined in equation (1):

$$\psi^M(t) = \frac{1}{\pi^{\frac{1}{4}}} e^{i\omega_0 t} e^{\frac{-t^2}{2}} \quad (1)$$

where t represents time and ω_0 central frequency. After, the continuous wavelet transforms presented in equation (2) were employed to transform each considered series.

$$W_x(\tau, s) = \frac{1}{\sqrt{s}} \int_{-\infty}^{\infty} x(t) \overline{\psi\left(\frac{t-\tau}{s}\right)} dt \quad (2)$$

Where $x(t)$ Represents time series under consideration and s represent scale while τ represents location determining the position of the wavelet. Based on the wavelet transform defined in equation (2), considered time series $x(t)$ is decomposed in terms of wavelets. Based on the transformed time series, the paper studies the size and significance of the local correlation between the two time series under consideration. To examine the size and significance of the local correlation between the two observed time series, cross wavelet transform and cross wavelet power must first be explained. The cross wavelet transform of two-time series $x(t)$ and $y(t)$ is given in equation (3):

$$W_{xy}(\tau, s) = W_x(\tau, s)\overline{W_y(\tau, s)} \quad (3)$$

Where $W_x(\tau, s)$ represents continuous wavelet transform of the observed time series $x(t)$ and $\overline{W_y(\tau, s)}$ denotes complex conjugate continuous wavelet transform of the observed time series $y(t)$. The cross wavelet power is represented as $|W_{xy}(\tau, s)|$. Eventually, the squared wavelet coherence coefficient is presented in equation (4):

$$R^2(\tau, s) = \frac{\left|S\left(s^{-1}W_{xy}(\tau,s)\right)\right|^2}{S(s^{-1}|W_x(\tau,s)|^2)S\left(s^{-1}|W_y(\tau,s)|^2\right)} \quad (4)$$

Where S represents a smoothing operator, similar to Pearson squared correlation coefficient, the squared wavelet coherence coefficient ranges from zero to one. Furthermore, wavelet coherence analysis provides phase differences between considered time series. Wavelet coherence phase difference was identified following equation (5):

$$\varphi(\tau, s) = tan^{-1}\left(\frac{\Im\left(W_{xy}(\tau,s)\right)}{\Re\left(W_{xy}(\tau,s)\right)}\right) \quad (5)$$

where $\Re$ represents the real part, and $\Im$ imaginary part of the cross wavelet transform in equation (3). Arrows illustrate the phase difference. A zero phase difference indicates that the considered time series are positively correlated and move together. The arrows pointing right indicate a positive correlation, whiles the arrows pointing left represent a negative correlation. The arrows pointing up to indicate that the first time series leads the second by a right angle, and the arrows pointing down indicate that the second time series leads the first by a right angle. Consequently, the arrows can indicate a combination of positions.

Validity

To provide insights into the validity of results, the standard Pearson correlation coefficient was first calculated. Comparison of the empirical results from the standard correlation approach and wavelet-based approach illustrates the validity of the wavelet-based approach and its advantage over the standard approach.

Results

As illustrated in the section entitled Research data and methodology, correlation coefficients were calculated firstly, and results were summarized in Table 1.

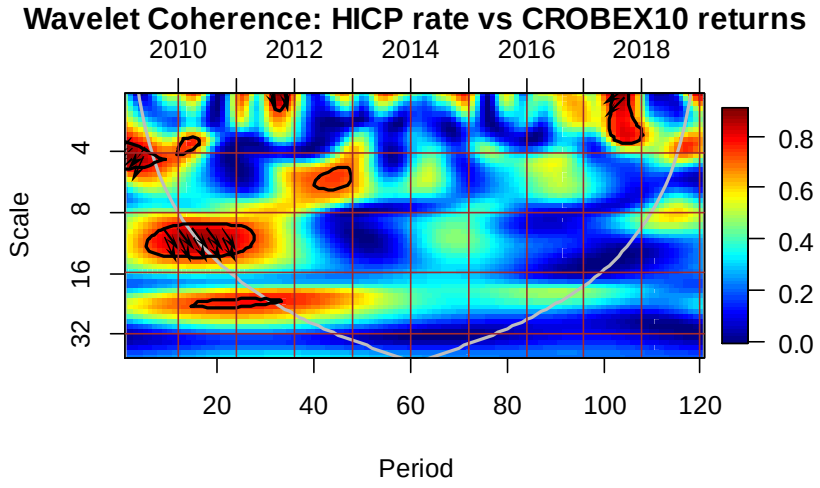
Table 1
HICP Rate and Index Returns

	HICP&Crobex	HICP&Crobex10	HICP&Crobis	HICP&Crobistr
Pearson cor. coef.	0.1247825	0.06476976	0.04339767	0.3193913
t-statistics (p-value)	2.0201 (0.04441**)	0.70804 (0.4803)	0.61585 (0.5387)	3.2152 (0.001805***)

Note: ** statistically 5%; *** 1%
Source: Authors' estimates

Table 1 indicates a low but significant correlation between inflation rate and Crobex index returns while holding a significance level at 5 %. A slightly higher and more significant correlation was found between Crobistr returns and inflation rates, while Crobex10 index returns and Crobis index returns were not significantly correlated with inflation rates. However, the correlations might depend on the time and frequency domain. So, Figure 1 illustrates wavelet coherence between inflation rates and Crobex10 returns.

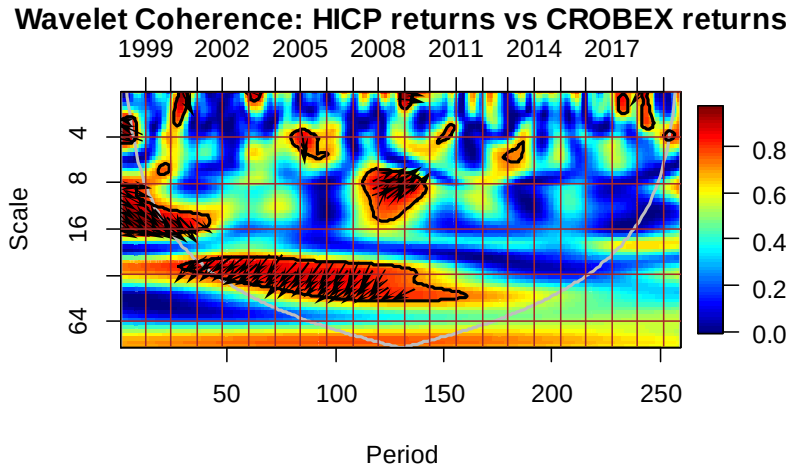
Figure 1
Inflation Rates in Croatia and Crobex 10 Returns



Source: Authors' estimates

As illustrated in Figure 1, the comovements between inflation rates and Crobex10 returns were more prominent at lower frequencies than before 2012. The CROBEX10 returns were the leading variable, and the correlation was positive. The comovements between CROBEX returns and inflation rates in Croatia are illustrated in Figure 2.

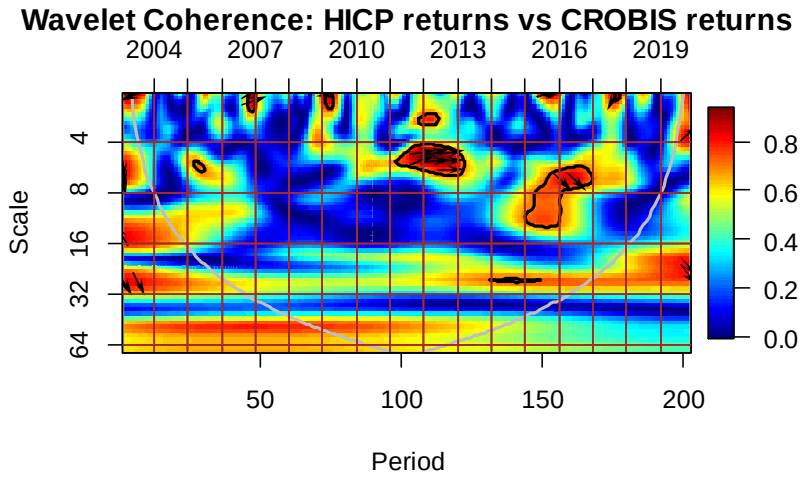
Figure 2
Inflation Rates in Croatia and Crobex Returns



Source: Authors' estimates

As illustrated in Figure 2, significant comovements were found before 2011. Crobex returns were the leading variable at the lower frequencies domain. Before 2001, the correlation was positive. Afterward, the sign of correlation depends on the frequency domain. The correlation was positive at higher frequencies between 2007 and 2011; the inflation rate was the leading variable, and Crobex could serve as hedging instruments for short periods. However, the correlation was negative at lower frequencies, and the CROBEX returns variable appeared as the leading one. Recalling Table 1, the standard correlation coefficient was positive and low. Therefore, relying on a standard correlation coefficient might indicate a misleading conclusion. The comovements between the inflation rate and Crobis returns are depicted in Figure 3.

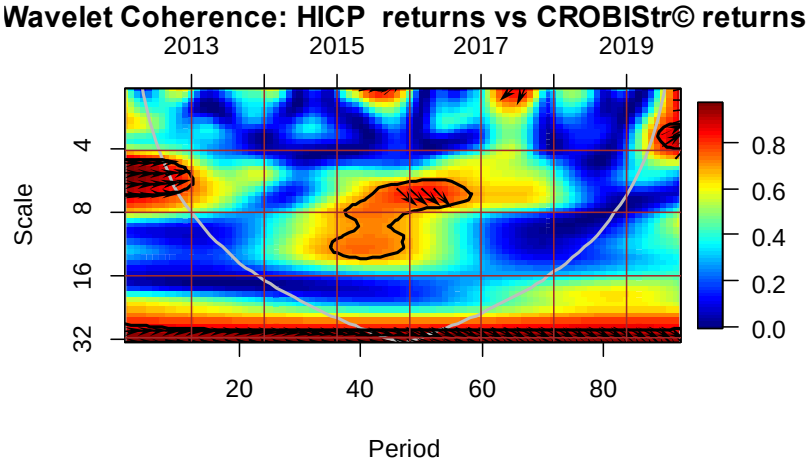
Figure 3
Inflation Rates in Croatia and Crobis Returns



Source: Authors' estimates

Following Figure 3, significant comovements were found between 2011 and 2013, with inflation rate as a leading one and positively correlated with Crobis returns. Furthermore, the comovement was significant and positive between 2015 and 2017, while the Crobis returns were the leading variable. Figure 4 presents wavelet coherence between inflation rate and Crobistr.

Figure 4
Inflation Rates in Croatia and Crobistr returns



Source: Authors' estimates

Following presented in Figure 4 Crobis returns and inflation rates were almost perfectly correlated before 2013. A correlation between 2015 and 2017 and Crobistr was the leading variable.

Discussion

Theorethical implications

As mentioned in the introduction of this paper, empirical literature points out ambiguous conclusions regarding the linkage between inflation rates and capital market returns. Hedging against inflation is defined as an asset where the nominal returns vary in a positive one-for-one way with inflation (Tarbert, 1996).

Although Keynes (1936) and Fisher's (1930) views that the nominal value of the firm is equal to inflation, i.e., not causing a change in real terms as firms gain through inflation that enables them to liquidate their debt with depreciated money, it challenges the classical macroeconomic theory, which states that creditors lose convert to debtors' gains (Alchian et al., 1959). On the other hand, investment advisors state that common stocks' value does not significantly change in either direction due to inflation, while bond investments incur losses. As we are challenged with the inconclusive views, our paper attempted to inspect the causal relationship between inflation rates and capital market returns, both equity and debt-based, in the case of Croatian, i.e., Zagreb's, stock exchange market.

The results of our study are consistent with Johnson et al. (1971), who find that only a small sample of stock returns could serve as an inflation hedge, and with Mansor (2011), who found hedging abilities of Malaysian stock only in the pre-crisis period.

Similarly, Zhao (2017) found that stock could serve as an inflation hedge in periods of crisis. Our study on the ZSE Crobex index in the period 2007-2011 reflects the conclusions of Gu et al. (2013), Zhao (2017) and Bhanja et al. (2019) study, and Geske et al. (1983) view that stock returns point to events preceding an increase in monetary expansion making the Fisher model applicable. In our sample,e this notion is consistent with a positive correlation between inflation rate and Crobex returns in 2007-2011, in which inflation served as the leading variable. Our research adds to this notion by including the debt index Crobis returns and conducting a wavelet coherence analysis on debt instruments. Our results suggest that debt instruments could serve as an inflation hedge in the crisis period.

On the other hand, Fama's (1981) proposition on the adverse relationship between stock prices and inflation due to prices, i.e., stock returns reacting to the inflation, is consistent with the Crobistr index suggesting that consumers price change as inflation determinant (similar as in Tiwari et al., 2015).

For most studies, there is no indication of stock returns serving as an inflation hedge, especially in the longer periods, i.e., those exceeding three (3) years. This notion in our study is consistent with Haniff et al. (2018) and Albulescu et al. (2017).

Implications for practice

This paper attempted to answer the underlying question: "Which is the first: the chicken or the egg?" In that manner, it examined the inflation hedging possibilities of four various stock returns. These stock returns are indexed on Zagreb Stock Exchange (ZSE) and consist of Crobex, Crobex 10, Crobis, and Crobistr.

Crobex and Crobex 10 are equity indices. Crobex index was launched in 1997 with a base value of 1,000.00 HRK. It consists of 15 to 25 trading shares with a free-float market capitalization. Currently, it is composed of 18 companies' indexes in which the highest weight is born by Podravka d.d. (11%), Ericsson Nikola Tesla d.d. (10.48%), and Atlantic Grupa d.d. (10.45%). Crobex 10 index was launched in 2009 with the same base value but consisting of the top 10 constituents of the Crobex index, i.e., all three mentioned companies. Herein however top three constituents include: HT d.d. (19.46%), Podravka (19.02%), and Adris grupa (14.20%).

Crobis and Crobistr are debt indices revised quarterly. Crobis was launched in 2002 with a base value of 100 HRK and included the Republic of Croatia's bullet bonds at fixed interest rates with a nominal value greater than 75 million EUR and at least 18 months to maturity. It currently contains 13 bonds whose maturity is from 2022 to 2040 and is denominated in Euros and Croatian kunas. The greatest weight is born by bond whose value is 12.46 billion HRK with an interest rate of 4,26% maturing in 2026 (13.18%), then by 1.4 billion EUR bond with an interest rate of 5,75% maturing in 2024 (10.70%) and 13.3 billion HRK with an interest rate of 1.75% maturing in 2023 (10.16%). Crobistr consists of 13 indices that were launched in 2011with a base value of 100 HRK. Its weights are similar to those of the Crobis index, i.e., the highest weight is born by 12.46 billion HRK bonds maturing in 2026 (13.25%).

Regarding equity indices, our wavelet coherence analysis confirms a statistically significant positive correlation between inflation rate and Crobex returns in the period 2007-2011 with inflation as the leading variable, implying Crobex returns could serve as an inflation hedge. Then, a positive correlation between inflation rates and Crobex10 returns proved to be more prominent at lower frequencies before 2012, with CROBEX10 returns as the leading variable implying Crobex10 returns could not serve as an inflation hedge. Although small differences exist between the two indices, the attributing companies' weights direct us towards the conclusion that Crobex returns could serve as an inflation hedge due to its slightly larger emphasis on food and trade

companies, while the Crobex10 index is slightly more leaned towards services (HT d.d.) and tobacco industry which in times of inflation tend to experience lower revenues.

The inflation rate was the leading variable in terms of debt indices when the correlation between inflation and Crobis returns between 2011 and 2013 was examined. In that period, Crobis return index could serve as an inflation hedge. It is observed that this is a period after the Crobex index (2007-2011) could prove to serve as a valuable inflation hedge. Crobistr returns' positive correlation with inflation in two different periods did not add to the usability of Crobistr as an inflation hedge as Crobistr was a leading variable.

Conclusion

This paper examined the inflation hedging possibilities in Croatia offered by the Zagreb Stock exchange indices. It used a wavelet coherence analysis to produce decomposition of inflation-stock indices nexus by time horizons and depict the differences between the leading and lagging variables. Four ZSE's indices examined: Crobex, Crobex10, Crobis, and Crobistr, have shown a positive and small correlation between Crobex returns and inflation rate and Crobistr returns and inflation rate when examined by standard correlation coefficient; and no significant comovements between Crobex10 returns and inflation rates neither between Crobis returns and inflation rate. The results suggest several important findings when using a wavelet coherence analysis across time and frequency domains to identify the leading and lagging variables. Firstly, statistically significant positive correlation between inflation rate and Crobex returns in the period 2007-2011, with inflation as the leading variable; hence Crobex returns could serve as an inflation hedge. Secondly, the positive correlation between inflation rates and Crobex10 returns is more prominent at lower frequencies before 2012, with CROBEX10 returns as the leading variable. Thirdly, positive correlation between inflation and Crobis returns between 2011 and 2013 with inflation rate as the leading variable, and between 2015 and 2017 with the Crobis returns as the leading variable. Eventually, positive correlation between Crobistr returns and inflation rates before 2013, and between 2015 and 201, with Crobistr being the leading variable.

The contribution of our study is threefold. Firstly, we use a method that has not been formerly used to examine the inflation hedging possibilities in Croatia, namely a wavelet coherence approach. Secondly, a wavelet coherence analysis allows us to study different time horizons that appropriate investor returns by identifying a leading variable in the time-frequency domain. In the context of inflation in Croatia and ZSE indices, only the Crobex index in 2007-2011 has leading variable inflation, which could serve as a hedging instrument, thereby answering the question that comes first: a chicken or the egg question based on specifically examined periods. In the shorter periods, i.e., those not exceeding 3 years, stock returns could serve as an inflation hedge. Our study confirmed this with the equity-based Crobex index for 2007-2011. The Fisher hypothesis states that prices reflect inflation is confirmed on the Crobistr index for 2011-2013. These results are consistent with the results of Gu et al. (2013), Zhao (2017), and Bhanja et al. (2019) study making the Fisher model applicable by stating that stock returns point to events preceding an increase in the monetary expansion (Geske et al., 1983). However, for the majority of examined periods, there exists no indication of stock returns being beneficial for inflation hedging, especially for periods exceeding three (3) years, whereby our study is in line with the studies of Haniff et al. (2018) and Albulescu et al. (2017), showing that an investment period exceeding 3 years is detrimental to investment returns.

Our study examined four indices and their relationship with inflation. Two indices Crobex and Crobex10 are equity indices, while the remaining two Crobis and Crobistr are debt indices. Our study showed that in times of crisis equity index Crobex, whose weights are attributed more towards food and trade services, and after crisis periods debt index Crobis, could serve as a hedge against inflation.

Limitations of our study include observation of merely two variables within the time-frequency domain, which is, however, a limitation of a wavelet coherence analysis. However, suppose our purpose is to examine a rationale behind the identified time-frequency domains. Future research should find and categorize causes of events preceding each period and analyze financial and business cycles jointly. Future research should incorporate different assets as an inflation hedge and make prescriptions for different time-horizons of investment in more detail. Inflation might be determined from abroad, while in the case of capital markets, the drivers might be more internal or show integration to the Eurozone markets (Fernandez-Macho, 2012).

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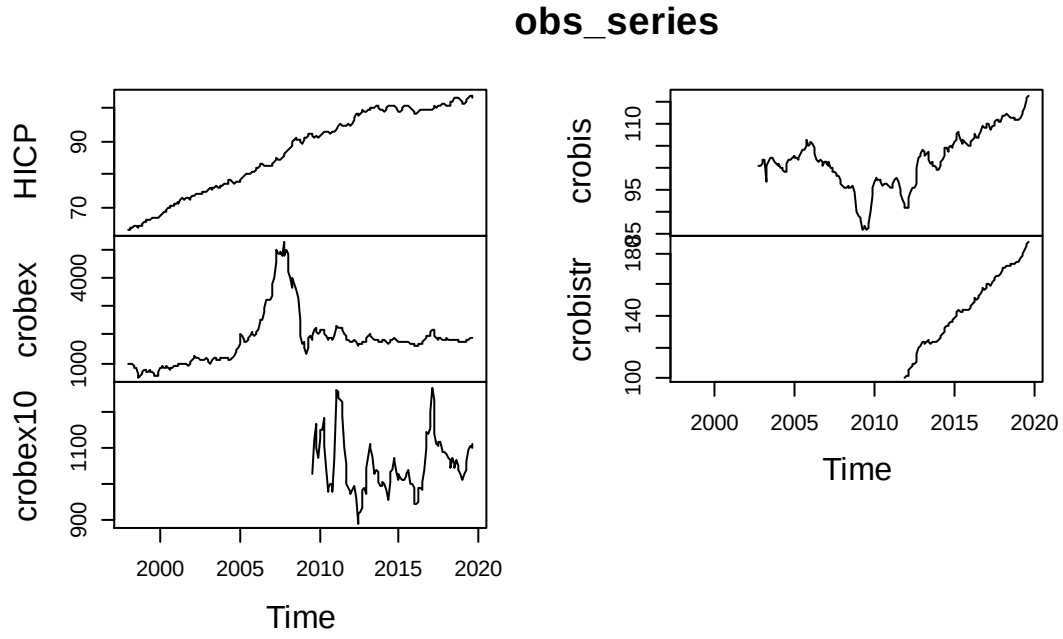
Appendix

Figure A1
Development of the Observed Series in Levels



Source: Authors' estimates

Table A1
Descriptive Statistics of the Considered Time Series

	HICP	Crobex	Crobex10	Crobis	Crobistr
Min.	62.88	523.9	891.0	85.57	101.0
1st Qu.	75.89	1160.2	999.1	96.99	123.6
Median	90.61	1771.4	1037.9	101.70	144.0
Mean	86.99	1810.3	1054.7	101.78	145.3
3rd Qu.	99.55	1961.8	1097.2	106.01	165.6
Max.	104.12	5263.1	1264.8	116.79	187.5

Source: Authors' estimates

About the authors

Mile Bošnjak acquired his master's degree in computer science from the Faculty of Electrical Engineering and Computing and MA and Ph.D. degrees in economics from the Faculty of Economics and Business, University of Zagreb. He served as Chief Risk Officer within several financial institutions in Croatia. He teaches international economics at the University of Zagreb and statistics at Mostar. His research interests incorporate Statistics, Economics and Finance, Time Series Analysis, Bayesian Econometrics, and Deep Learning Algorithms. He published numerous papers in prestigious journals with impact factors above the median and presented his work at numerous international conferences. The author can be contacted at **mile.bosnjak76@gmail.com.**

Ivan Novak is an Assistant Professor at the Faculty of Economics and Business University of Zagreb. He acquired his Ph.D. degree (2015) at the Faculty of Economics and Business University of Zagreb. Ivan participated in many international and national conferences and published as author and co-author several papers including in international journals such as Small Business Economics, Panoeconomicus, Zbornik radova Ekonomskog fakulteta u Rijeci, South East European Journal of Economics and Business, and others. His research interests are International Economics and Finance, Quantitative Methods and Models in Economics, Time Series Analysis, Financial Economics. The author can be contacted at **inovak@efzg.hr.**

Maja Bašić is a Lecturer at the Faculty of Economics and Business University of Zagreb. She acquired her Ph.D. degree (2015) at the Faculty of Economics and Business University of Zagreb. Maja participated in many international conferences and published several papers including in international journals such as the International Journal of business and globalization, International Journal of Gender and Entrepreneurship, Miscellanea Geographica. Her research interests are International Economics, Innovation, Entrepreneurship, and Economic Development. The author can be contacted at **mbasic1@net.efzg.hr.**