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THE IMPACT OF THE CORONAVIRUS PANDEMIC CRISIS ON INFLATION AND INTEREST RATE POLICY IN POLAND

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Abstract: The aim of the article was to investigate the impact of the crisis caused by the coronavirus pandemic on the course of inflation and interest rate policy in Poland. The empirical analysis reveals that prices ceased to be procyclical during the pandemic, and thus the resulting economic crisis contributed to a drop in inflation just in the first months of the pandemic. The main factor behind the subsequent rise in inflation was the decline in aggregate supply brought about by the lockdown. That was also accompanied by other reflationary factors, including the increase in some taxes and administered prices, as well as expansionary fiscal and monetary policy. In the case of the latter, the measures taken by the NBP led to almost zero interest rates in Poland. Consequently, the instrument has ceased to be a basic tool for influencing the economy in the future, at least during the crisis, when those rates should be further reduced (the so-called zero lower bound).

Keywords: pandemic, economic crisis, inflation, interest rate.

1. Introduction

The coronavirus pandemic triggered a global economic crisis that Poland could not avoid. This problem is being widely described in the economic literature, while the impact of the pandemic on inflation is discussed much less frequently. The principal

aim of the article was to investigate the effects of the coronavirus pandemic manifested in the course of inflation and interest rate policy in Poland. This issue requires a broader study, among others, due to the negative effects of inflation: from worsening the living conditions of the population with fixed incomes and reducing incentives to save, to the complication of the economic calculation and the distortion of a resource allocation mechanism.

The article comprises this introduction, three main parts, and a summary. The first part discusses the theoretical aspects of the causes of inflation, however it was also noted that disinflation usually occurs in times of economic crisis, yet that is not necessarily the norm. The second part presents the course of inflation in Poland in 2006-2021, with particular emphasis on the pandemic period. The third part shows the changes in the basic NBP interest rate during the epidemic. Moreover, other factors are mentioned which, on the one hand, increased the inflationary pressure, but on the other, decreased it. The summary presents the final conclusions.

2. Inflationary processes during the economic crisis – theoretical aspects

The relations between GDP growth and inflation have long been the subject of much theoretical consideration. It should be noted, however, that attention was very often focused on the assumption of inflation being an exogenous variable. In such cases, it is usually emphasized that inflation exceeding an assumed target brings about, as a rule, adverse effects for economic growth. In addition to the aspects mentioned in the introduction, they can include the following: increased operating costs of economic activity, lowered consumer and investment demand, and deteriorated competitiveness of a given economy in relation to the rest of the world (Grabia, 2013, pp. 174-181).

As early as in the 20th century, the most comprehensive research confirming the negative impact of inflation on economic growth was carried out by Barro, who analysed the cases of more than 100 countries over a period of about 30 years (from 1960 to 1990). It is worth noting, however, that such adverse relations typically accompanied high, at least two-digit, inflation (Barro, 1996, pp. 157-159, 167-168).

Yet, arguments can also be made for a positive relation between inflation and GDP, especially when the former is relatively low. These include, first of all: lowered levels of real wages and interest rates, facilitated establishment of appropriate price relations and, sometimes, favourable changes in asset portfolio structure (Grabia, 2013, pp. 174-181). This may explain why the legal and institutional systems in most highly developed countries currently require inflation to be maintained at a low but positive, rather than zero, level. For instance, the inflation target is 2% in the euro area¹

¹ <https://www.ecb.europa.eu/mopo/html/index.en.html>

and 2.5% in Poland². Therefore, it was concluded that low inflation is a factor favourable to high economic growth.

In more recent analyses, the impact of inflation on output and employment has been explained by the so-called sand (adverse) and grease (beneficial) effects. Researchers who contributed to popularizing that type of analyses included, among others: Akerlof, Dickens and Perry (2000), Groshen and Schweitzer (1997), and Wyplosz (2001).

The first of the effects – the sand effect – results, among others, from menu costs and time constraints. Furthermore, uncertainty in periods of inflation causes economic entities to make more mistakes in their decisions. In this case, nominal shocks – such as inflation – increase discrepancies in wage and price adjustments, changing their relations and, in turn, impacts negatively on resource allocation, which may lead to output reduction below the potential level. Such a situation primarily occurs in the case of high inflation, when real shocks are large (Wyplosz, 2000, p. 6).

Conversely, the grease effect (beneficial for output and the labour market) prevails in periods of low inflation, due to downward rigidity in nominal wages, which, in turn, is usually attributed to money illusion. Then inflation allows real wages and costs incurred by employers to decrease. This is consistent with, among others, the near-rationality model proposed by Akerlof, Dickens and Perry. According to the model, a fall in real wages and prices increases output and employment. Unlike in models based on complete rationality, firms ignore low inflation, not considering it when determining wages and prices of produced goods or, possibly, the nominal increases in those are proportionally smaller than expected inflation. Hence, wages and prices fall in real terms as the costs of frequent price changes in low inflation conditions could exceed the revenues associated with them. However, the situation changes with higher inflation, therefore it is fully taken into account in setting wages and prices, as in completely rational expectation models (Akerlof et al., 2000, pp. 20-23, 42-44).

In fact, an intermediate situation may occur too as inflation also increases differentiation in wage changes among particular jobs. Therefore, real wages rise only in certain occupations in which labour productivity increases as well. In other jobs, real wages decrease, which positively impacts on output (Groshen and Schweitzer, 1997, pp. 1-4).

It is worth emphasizing that, from the point of view of the aim of the article, the analysis of relations between inflation and GDP growth ought to be based on the assumption that it is economic growth, rather than inflation, that is an exogenous variable since, due to the chain of mutual macroeconomic relations in changing economic conditions, inflation can be presumed not only to affect economic growth but to also depend on it.

² https://www.nbp.pl/home.aspx?f=/polityka_pieniezna/polityka_pieniezna.html

Such relations can be explained on the basis of several theories. Firstly, the analysed problem can be presented as resulting from the traditional distinction between short-term Keynesian analyses and long-term neo-classical ones. In the former, based on the assumption of the occurrence of spare production capacities, expansionary macroeconomic policy leads to GDP growth with a simultaneous increase in inflation. In turn, restrictive policy causes GDP and inflation to decline. In the latter, based on the presumption of fully utilized production capacity, applying expansionary or restrictive macroeconomic policy results solely in an increase and decrease in inflation, respectively, as a further production rise is impossible. Thus any relations between GDP and inflation disappear.

Secondly, a different aspect is seen when the traditional distinction between demand-pull and cost-push inflation is highlighted, with the former falling, even to a negative rate, and the latter rising during the crisis.

Thirdly, contemporary economic trends, *i.e.* the new Keynesian school and the real business cycle school of thought draw attention to the so-called procyclical and countercyclical behaviour of the price level. Just like traditional Keynesians, the new Keynesians assume that prices depend mainly on demand, and thus they are procyclical (unidirectional changes in inflation and GDP occur). In turn, the real business cycle school refers to the concept of cost-push inflation, suggesting that the price level is mainly related to the supply side of the economy. Hence, it depends primarily on production capacity and supply shocks rather than aggregate demand. According to that approach, prices are countercyclical and inflation is the result of an adverse supply shock. The negative shock may be caused by a variety of factors, including:

- unfavourable climatic conditions,
- wars, political upheavals and social unrest,
- adverse changes in the natural environment resulting in various types of natural disasters, such as earthquakes, droughts and floods,
- significant increases in energy prices, most often arising from spikes in oil prices,
- deterioration of labour and capital input quality (Snowdon, Vane, and Wynarczyk, 1998, pp. 256-277).

Obviously, the coronavirus pandemic can be put on that list of shocks, too.

Aside from the theories discussed above, it should be emphasized that the price level is usually determined by both demand and supply factors in economic reality, with the former prevailing in some periods, and the latter in others. Moreover, in certain cases, the fact whether one considers inflation to be demand-pull or cost-push may depend solely on what period was used as the base one in the analysis, since the inflation process involves a series of dynamic interactions in which successive impulses become the source of subsequent ones, the latter still generating new impulses and so forth (Żukowski, 1997, pp. 216-217).

The impact of the changes in aggregate supply and demand on GDP and inflation is presented *caeteris paribus* in Table 1, which shows that the net effect on inflation is uncertain during an economic crisis, with both supply and demand

Table 1. Impact of changes in aggregate supply and aggregate demand on GDP and inflation

Specification	GDP	Inflation
Increase in aggregate supply	increases	decreases
Increase in aggregate demand	increases	increases
Decrease in aggregate supply	decreases	increases
Decrease in aggregate supply	decreases	decreases

Source: own study.

falling at the same time. This would depend on whether the drop in demand is greater (thus inflation, and even the price level, decrease) or the fall in supply is bigger (then inflation increases). If automatic stabilizers operate during a ‘normal’ crisis, aggregate demand falls more slowly than aggregate supply, hence prices should ultimately rise, although to a lesser extent than during an economic boom. Nevertheless, if one takes into account that aggregate supply probably decreased to a greater extent during the coronavirus pandemic in 2020 (due to the freezing of a large part of the economy), inflation, or at least the price level, should continue to rise. The related analyses are discussed later in the study.

3. The course of inflation in Poland in 2006-2019 and during the pandemic

Figure 1 indicates that the CPI inflation rate showed a declining long-term trend before the pandemic, although it significantly slowed down after the 2015-2016 deflation (among others, due to the base effect), whereas Figure 2 presents an increasing short-term (of around twenty months) trend.

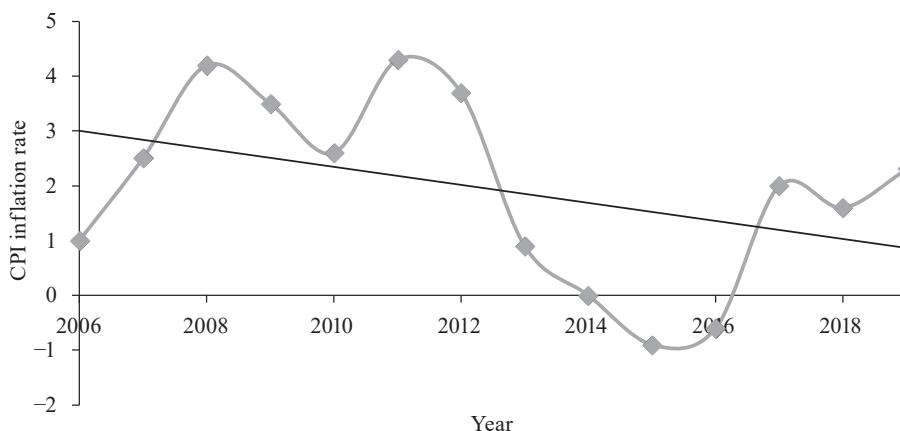


Fig. 1. CPI inflation rate in Poland in 2006-2019

Source: own study based on GUS data.

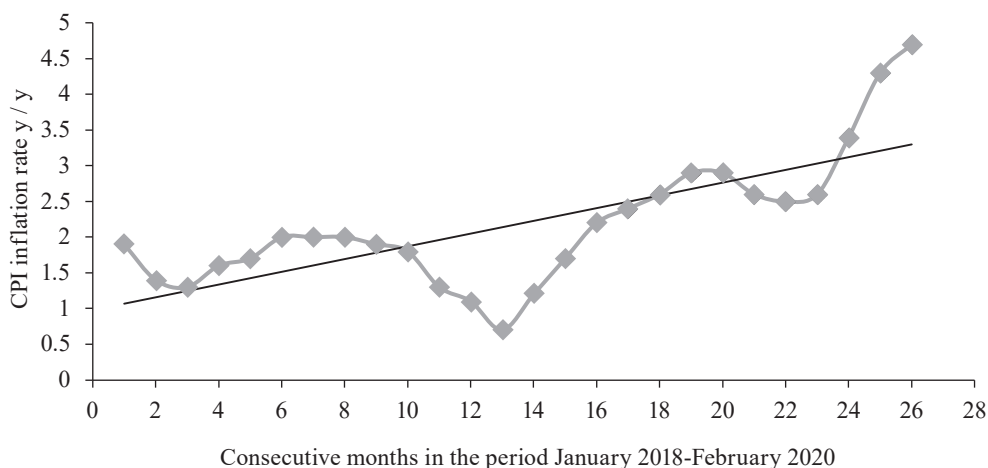


Fig. 2. CPI inflation rate in Poland in the period January 2018-February 2020

Source: own study based on GUS data.

Table 2. Correlation coefficients between CPI inflation rate and real GDP growth rate in Poland in the period 2006-2019

Annual data	Quarterly data
$GDP_t - CPI_t = 0.03$	$GDP_t - CPI_t = 0.03$
$GDP_t - CPI_t = 0.50$	$GDP_t - CPI_{t+1} = 0.18$
	$GDP_t - CPI_{t+2} = 0.28$
	$GDP_t - CPI_{t+3} = 0.39$
	$GDP_t - CPI_{t+4} = 0.46$

Source: own study based on GUS data.

Taking into account the possible reaction of inflation to the economic crisis caused by the pandemic, it is worth analysing the issue of procyclical/countercyclical behaviour of prices in Poland. Assuming the annual real GDP growth rates and the average annual CPI inflation rates in the 2006-2019 period, it was possible to carry out an analysis based on 14 observations. Table 2 (annual data) shows that if the same periods are considered, the correlation between prices and GDP is near zero. It is possible, however, that the change in the price level lagged behind the changes in the economic situation, as indicated by a positive and quite high (0.5) correlation coefficient between GDP in the current year and the CPI in the year later by one unit. Similar conclusions can be drawn on the basis of calculations presented in Table 2 for quarterly data (which allows increasing the number of observations to 56). It is worth noting that the correlations intensified with longer lags. Considering a 4-quarter delay, the correlation coefficient was also close to 0.5.

The procyclical behaviour of prices in Poland would indicate that the price level, or at least inflation, ought to fall in times of crisis. Figure 3 shows that this was the case merely in the first few months of the pandemic, while a definitely opposite tendency could be observed in 2021; as a result, the inflation rate was almost 5% in May.

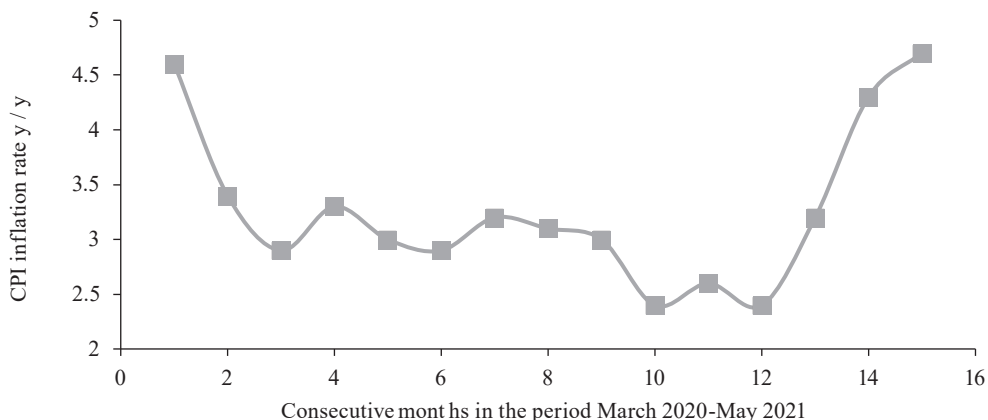


Fig. 3. CPI inflation rate in Poland during the coronavirus pandemic (March 2020-May 2021)

Source: own study based on GUS data.

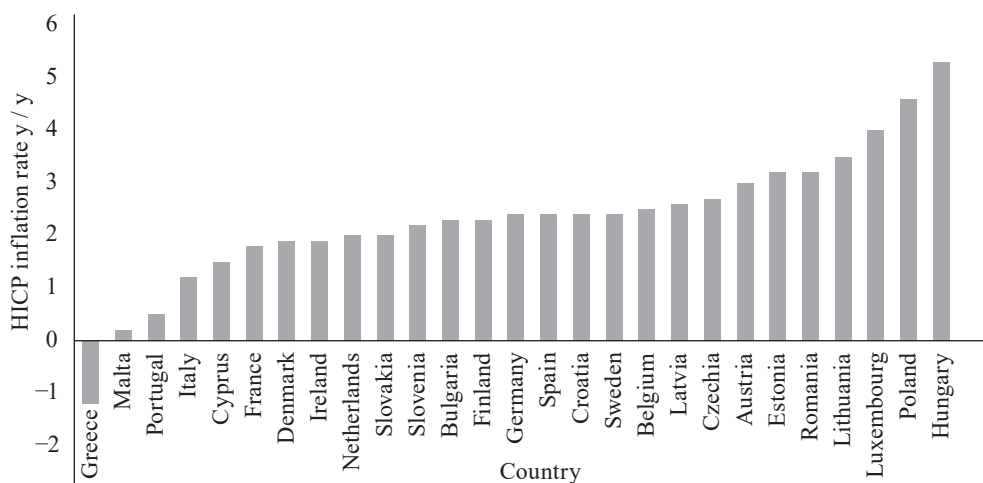


Fig. 4. HICP inflation rate in the European Union countries in May 2021

Source: own study based on Eurostat data.

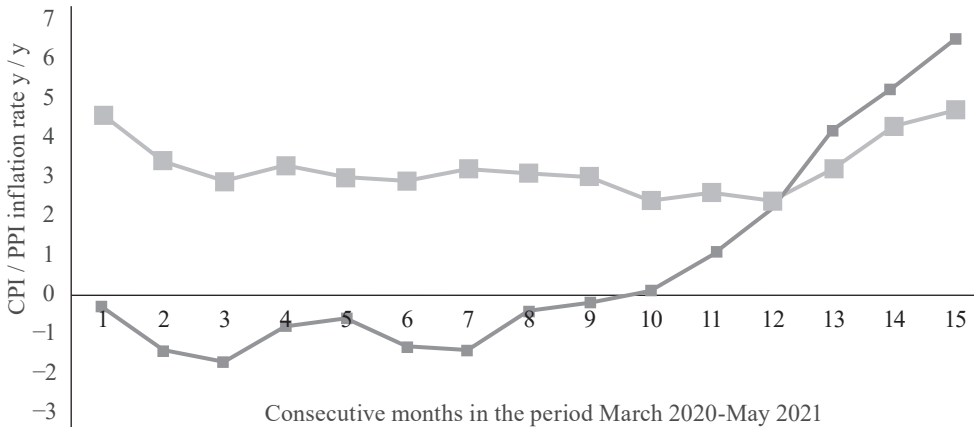


Fig. 5. CPI (bold line) and PPI (plain line) inflation rate in Poland during the coronavirus pandemic (March 2020-May 2021)

Source: own study based on GUS data.

It is worth emphasizing that this was the highest rate in the EU, except for Hungary (see Figure 4). Additionally, it is important to note the worrying phenomenon of the recent, even more dynamic, rise in the producer price index, despite deflation for the index up to September 2020 (see Figure 5). Taking into account that PPI is a leading indicator to CPI, it can be assumed that inflationary pressure will continue to rise in the upcoming months. With PPI, as the leading index, being higher than CPI, strong inflationary pressure resulting from the economic recovery and other factors indicate that inflation will probably continue to increase, or at least remain at the current level in the months to come.

4. The NBP interest rate policy and other inflation-changing factors during the pandemic

The decrease in inflation in the first months of the pandemic was caused by the negative output gap related to decreased aggregate demand, which, in turn, was connected with the limited supply of goods and services in some sectors of the economy (due to the lockdown) and the loss of income by owners operating in those sectors. Moreover, inflation fell at that time also due to:

- the drop in the prices of food raw materials and oil,
- deflation of sold industrial output prices (until September 2020),
- weakened economic activity and deflation in the euro area,
- lowered rate of wage growth and sometimes also of wages themselves in the enterprise sector,
- slightly increased unemployment (NBP, 2020b, 2020c, 2020d, 2020e).

A more sustained drop in inflation was prevented, among others, by an extremely expansionary monetary policy. In March 2020, the required reserve ratio was significantly lowered from 3.5% to 0.5% (NBP, 2020b, p. 4). Additionally, the Monetary Policy Council made three significant cuts in interest rates in Poland (see Table 3)³. Further reductions were no longer possible due to the problem of the zero lower bound. Therefore, the pandemic has caused interest rates to cease being a basic instrument of monetary policy, at least in terms of its expansionary nature. Thus, it is the same phenomenon that the euro area has not been able to cope with since the previous economic crisis of 2008-2009. At that time, the European Central Bank had already cut interest rates to almost zero. In monetary policy, that meant a kind of revolution, manifesting itself in the necessity to replace the existing basic instruments with unconventional policies, such as Forward Guidance and quantitative easing. The NBP started to use the latter instrument too. As a result, until June 2020, the scale of the asset purchase programme carried out by the NBP exceeded 4% of GDP, being the highest among the selected economies classified as emerging by the NBP⁴.

Table 3. Changes in the NBP reference rate in Poland in 2020

Data	Monetary Policy Council decision on the reference rate
18 March	Reduction from 1.5% to 1%
9 April	Reduction from 1% to 0.5%
29 May	Reduction from 0.5% to 0.1%

Source: NBP (2020b, 2020c, 2020d).

The expansionary monetary policy was also accompanied by an expansionary fiscal policy, as the application of the anti-crisis shield and departure from the applicable public finance rule resulted in a record state budget deficit of PLN 109 billion, despite the balanced budget planned in the original act⁵.

In addition to the expansionary macroeconomic policy, it should be stressed that the most direct effect of the pandemic was the significantly reduced aggregate supply (due to the closure of many branches of the economy). This, in turn, had to accelerate inflation (see Table 1).

The other factors increasing inflation during the pandemic (although not all of them arose directly from it) include:

³ Since May 2020, the remaining NBP interest rates have been as follows: Lombard rate – 0.5%, deposit rate – 0%, bill rediscount rate – 0.11%, bill discount rate – 0.12% (NBP, 2020d, pp. 4-5).

⁴ That meant a higher level than, for example, in Croatia, Chile, Turkey, Israel, India, Indonesia, Hungary, Malaysia, the Republic of South Africa and Romania. However, among the selected economies classified as developed by the NBP, purchases were made on a larger scale by central banks in the USA (about 11% of GDP), Great Britain and Canada (over 8% of GDP) and New Zealand (about 6% of GDP). (NBP, 2020a, p. 17).

⁵ <https://inwestomat.eu/budzet-panstwa-w-2020-roku/>

- increase in aggregate demand in periods of eased restrictions (realization of pent-up demand),
- zloty depreciation⁶,
- increase in administered prices (energy, waste disposal fees),
- ‘rebound’ of commodity prices (including oil) in 2021,
- increased operating costs of enterprises,
- inflation basket adjustment (more food in the basket, the prices of which grew relatively faster),
- a significant increase in the inflation of sold industrial output prices (in 2021),
- introduction of sugar and trade taxes,
- increased inflation expectations (NBP, 2020b, 2020c, 2020d, 2020e, 2021)⁷.

5. Conclusions

The article presents a literature review which shows that there are various theories indicating that the relations between inflation and real GDP can be both uni and multi-directional. Thus the behaviour of the price level may be both procyclical and countercyclical. On the one hand, inflation may be of the cost-push nature and mainly depend on supply factors – according to the real business cycle school. On the other hand, inflation may be a price-pull factor – in line with the Keynesian theories.

The article does not exhaust the topic which requires further observations and research based, among others, on econometrics and taking into account the change of the inflation basket. Nevertheless, on the basis of the analysis carried out, several interesting conclusions can be drawn:

1. The long-term trend before the pandemic could indicate a possible inflation drop in Poland in 2020-2021. In turn, the short-term trend could point to a possible increase in inflation in Poland in that period. In both the cases, however, the so-called base effect, reducing the impact of trends, should be considered.

2. In Poland, prices were procyclical in the period 2006-2019, which might suggest that inflation should fall, even to a negative level, during the economic crisis.

3. In an economic crisis, when both supply and demand fall, the net effect on inflation is uncertain. It depends on whether the fall in demand is greater (thus inflation, and even the price level, decreases), or the drop in supply is bigger (hence inflation increases). If one takes into account that the aggregate supply probably decreased to a greater extent during the coronavirus pandemic in 2020 (due to the freezing of a large part of the economy), inflation, or at least the price level, should

⁶ From February 2020 to May 2021, the zloty also appreciated in the short term. However, the months in which the zloty weakened prevailed (especially in March and November 2020 and March 2021). As a result, throughout the period, the euro price (the average NBP exchange rate) increased from around 4.25 to around 4.55 zlotys (<https://www.money.pl/pieniadze/nbparch/srednic/?symbol=EUR.n>).

⁷ For reasons of space, it has not been possible to take a broader view of those factors.

continue to rise, which has been the case since the beginning of 2021. Conversely, a noticeable fall in inflation occurred just in the first few months of the pandemic.

4. Along with the decline in aggregate domestic demand, causing a negative output gap, the reduced inflation, particularly in the first months of the pandemic, was also driven by: a fall in food raw materials and oil prices, deflation of sold industrial output prices (until September 2020), weakened economic activity and deflation in the euro area, a fall in wages in the enterprise sector and a slight increase in unemployment.

5. Apart from the decline in the aggregate supply, resulting from the negative shock, the most important contributors to increased inflation during the pandemic, especially in the first months of 2021, were also: extremely expansionary monetary and fiscal policy, increased aggregate demand in periods of eased restrictions (realization of pent-up demand), zloty depreciation, increased administered prices and the introduction of new taxes, a ‘rebound’ of raw material prices (including oil), as well as increased inflation expectations.

6. In the first months of the pandemic, the NBP lowered interest rates three times. As a result, the reference rate has been as low as 0.1% since May 2020. Thus, the pandemic has caused interest rates to cease being a basic instrument of monetary policy during the crisis as, due to the zero lower bound, further reductions are practically impossible.

7. Currently the CPI inflation rate in Poland is the highest in the European Union, except for Hungary. The PPI, as a leading indicator being higher than CPI, strong inflationary pressure stemming from economic recovery and other factors indicate that it will probably not be possible to lower inflation in the upcoming months, either.

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WPŁYW KRYZYSU WYWOŁANEGO PANDEMIĄ KORONAWIRUSA NA PRZEBIEG INFLACJI I POLITYKĘ STOPY PROCENTOWEJ W POLSCE

Streszczenie: Celem artykułu jest zbadanie wpływu kryzysu wywołanego pandemią koronawirusa na przebieg inflacji i politykę stóp procentowych w Polsce. Z analizy empirycznej wynika, że w czasie pandemii ceny przestały mieć charakter procykliczny, w związku z czym wywołany kryzys gospodarczy przyczynił się do spadku inflacji jedynie w początkowych miesiącach pandemii. Do późniejszego wzrostu inflacji w największym stopniu przyczynił się spowodowany lockdownem spadek agregatywnej podaży. Towarzyszyły temu również inne czynniki reflacyjne, w tym wzrost niektórych podatków i cen administrowanych, a także ekspansywna polityka fiskalna i pieniężna. W przypadku tej ostatniej działania NBP doprowadziły do niemal zerowych stóp procentowych w Polsce. W efekcie instrument ten przestał być podstawowym narzędziem wpływania na gospodarkę w przyszłości, przynajmniej w czasie kryzysu, kiedy stopy te należałoby dalej obniżać (tzw. *zero lower bound*).

Słowa kluczowe: pandemia, kryzys gospodarczy, inflacja, stopa procentowa.