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# Exchange rate and inflation in Poland. The impact of foreign exchange loans

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## ABSTRACT

It has been widely believed that the exchange rate depreciation of local currency results in an increase of domestic inflation. This notion is based on the assumption that depreciation of local currency will give the economy's competitiveness a boost in international trade which in turn will increase overall demand and inflation. Additionally, some prices set on the international market will increase directly in terms of local currency after such a depreciation. The purpose of this article is to verify the hypothesis that local currency depreciation has a negative impact on inflation in Poland through the credit channel, i.e. foreign currency denominated loans. In Poland a significant open foreign exchange position is related to households' exposure to foreign currency loans (particularly Swiss franc mortgages). Taking this into consideration the depreciation of the Polish zloty results in lower demand from households indebted in foreign currencies and imbalances in the banking system. The hypothesis was verified through observation of the dependence between the share of foreign currency loans and core inflation in 2015-2016 for Poland and comparable economies. Observation of data in most of the countries confirms the hypothesis that the higher the share of foreign currency loans, the lower the core inflation (in the environment of local currency weakness). The article enriches economic science with an analysis of an open foreign exchange market position and its impact on inflation as potential tool for government and central bank policy. An analysis of the entire open foreign exchange position of the economy, including an analysis of the international trade channel could provide important findings in the area of optimal portfolio building in the foreign exchange market and can have possible regulatory implications.

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## Introduction

Inflation in Poland from January 2013 until January 2017 was below the inflation target set by Narodowy Bank Polski (NBP – the Polish central bank). Low inflation/deflation was believed to be influenced by global factors – a low inflation environment in the world, subdued economic growth and lower raw materials prices. Concurrently, the Polish zloty in the course of recent years was relatively weak, particularly in relation to developed countries' currencies. According to mainstream economics' theory, depreciation of local currency increases domestic inflation. This is the result of a direct increase in import prices and an aggregated demand increase for domestic goods and services stemming from a competitiveness boost.

However, the impact of local currency depreciation on inflation may be different when the economy has a significant position in the foreign exchange market, for example due to loans denominated in foreign currencies. The purpose of this article is to verify the hypothesis that local currency depreciation has a negative impact on inflation in Poland through the credit channel, i.e. foreign currency denominated loans.

The correlation between the share of foreign currency loans and core inflation was observed in 2015–2016 for Poland, comparable economies (non-euro members of the European Union located in Central Europe) and the euro area. This observation will be used to verify the hypothesis. The chosen time period followed the decision of the Swiss National Bank to resign from defending the 1.2 level of the Swiss franc against the euro, after which the Swiss franc strengthened considerably.

The article enriches economic science with a consideration of the open foreign exchange market position and its impact on inflation as a potential tool for government and central bank policy.

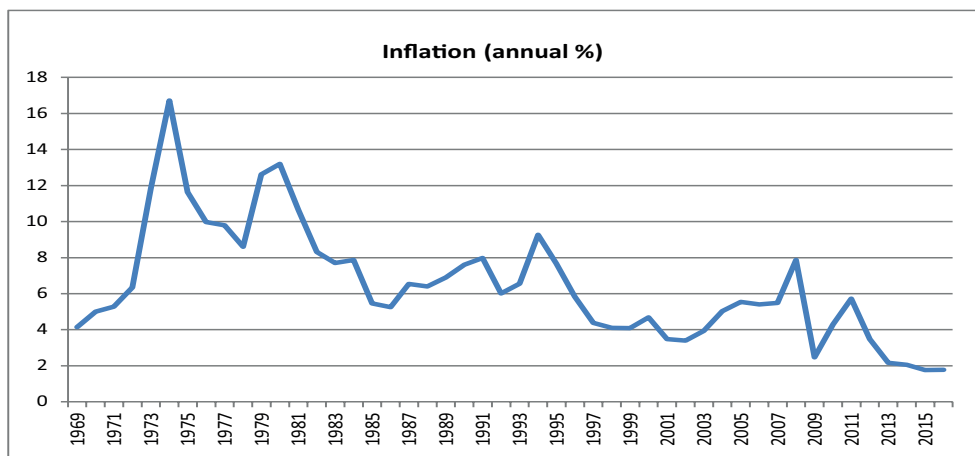
Apart from the introduction, the article consists of: a literature overview concerning the exchange rate pass-through effect on inflation, a describing potential impact of foreign currency loans on inflation with example of Poland, an observation of comparable countries data and the conclusion.

**Literature review**

Global inflation is in a long term declining trend after the oil shock in the 1970s, as depicted on the following chart.

Global inflation declined from the mid-nineties of the twentieth century and declined further after the financial crisis of 2008. Despite expansive monetary policy which included lowering interest rates and purchase of debt instruments by the main central banks,<sup>1</sup> inflation remained relatively low. Public interest shifted from concerns of high inflation to concerns about deflation [Bordo, Filardo 2004].

**Fig. 1. World Consumer Price Index**

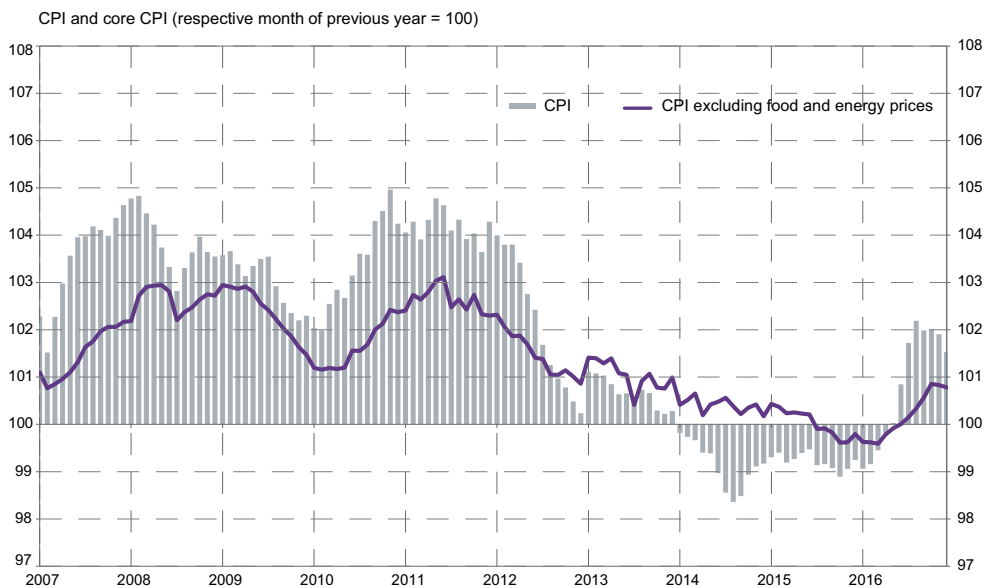


Source: World Bank

<sup>1</sup> Central banks from USA, Japan, Great Britain and the Eurozone.

Although deflation is treated as new phenomenon, it is certainly not new. During the nineteenth century, price levels in many countries declined as often as they increased [Bordo, Filardo 2004]. Deflation was observed not only during recessions. For this reason researchers tried to label deflation as good or bad. In Poland it was strongly believed that deflation was good as it was associated with declining prices of raw materials, of which Poland is a net importer.

**Fig. 2. The Consumer Price Index (CPI) and the Consumer Price Index excluding food and energy prices (core CPI) for Poland (respective month of previous year = 100)**



Source: NBP

From January 2013 till January 2017, inflation in Poland was below allowable deviation from the inflation target set at 2.5% with +/-1% percentage point deviation. According to the NBP's inflation projection from March 2017, inflation will stay in the allowable range in the 2017-2019 period.

The above chart shows the declining trend of inflation in Poland. Complementary to the consumer price index (CPI), the core consumer price index (CPI excluding food and energy prices) is depicted. Core inflation is one of the key considerations to central bank policy [Wiesiołek, Kosior 2010]. Moreover, in its essence core inflation eliminates changes of prices set on the international markets which are subject to significant volatility and on which domestic monetary policy has limited impact. Core inflation was used as an inflation indicator in the empirical part of the article as it is less volatile than traditional inflation measures [Bryan, Cecchetti 1994]. It was also assumed that the effect of changes in food and energy prices is similar in comparable countries.

In recent years the Polish zloty was relatively weak, particularly in relation to developed countries' currencies,<sup>2</sup> as depicted on the following chart for the period of 10 years.<sup>3</sup>

In open economies, changes in exchange rate impact inflation. The pass-through effect on inflation is defined as the result of exchange rate fluctuations on inflation and is an important consideration in monetary policy [Takhtamanova 2008]. The appreciation of the Polish zloty results in the decline of the price of goods subject to international trade [Greszta et al. 2012].

**Fig. 3. Polish zloty Index – 10 years**



According to mainstream economics which is used in NBP projections – a depreciation of local currency results in an increase of domestic inflation. The pass-through mechanism is described in this model's (NECMOD<sup>4</sup>) assumptions. The lower price of imported goods results in the decline of production costs, and as a consequence producer and consumer prices. Moreover, a stronger Polish zloty translates into lower food and energy prices as both are dependent on world prices translated into domestic currency. Lower net exports in gross domestic product results in lower demand for labor and investments. As a response to lower prices and lower economic growth, monetary policy is eased, supporting the economy in

<sup>2</sup> The Polish Zloty Index is a benchmark calculated by Stooq.pl which shows the reaction of the Polish zloty in relation to the average of the Swiss franc, British pound, US Dollar and euro. The value of the index is the sum of 100 (the base value of the index) and the arithmetic average of percentage changes of inverted exchange rates in relation to their values on 4 January 1993.

<sup>3</sup> Although the main thesis of this article refers to the 2015-2016 period, it is worthwhile to understand exchange rate and interest rate changes in the last 10 years as foreign exchange loans in Poland and comparable economies originated mostly in the 2006-2009 period.

<sup>4</sup> The NECMOD model is an econometric model used at the NBP for preparing inflation projections published in Inflation Reports. Core inflation developments in the model are affected by unit labour costs, import prices, labour market gap and model-consistent inflation expectations. Components of the CPI inflation are core inflation and growth in food and energy prices, driven by agricultural and energy commodity prices in the global markets, respectively.

recovering to the equilibrium. A foreign exchange impulse is defined as an unexpected single quarter change of nominal effective exchange rate by 10%.

In the case of core inflation, a lower pass-through effect than on traditional (headline) inflation is expected, as a result of the exclusion of food and energy prices. In the assumptions of the NECMOD model there is no credit channel impact of exchange rate transmission on inflation.

Some empirical studies indicate that the degree to which companies adjust their prices to exchange rates fluctuations has changed. In the 1990s a structural break was observed in the mutual dependence of real exchange rates and inflation in fourteen OECD countries [Takhtamanova 2008].

One of the characteristics of emerging economies is a high need for capital that can be fulfilled mainly by foreign capital. A significant part of the resulting debt is denominated in foreign currencies. It is beneficial for foreign investors, as this eliminates the risk of local currency depreciation. Demand for foreign currency denominated debt is fueled by usually lower interest rates for foreign currency debt. Currency crises stemming from increases in debt value when the local currency depreciates are typical (Latin America crisis in 1982, Asian crisis 1997–1998).

In the case of a currency crisis, significant depreciation of local currency and high inflation takes place. In such an environment the obvious correlation in emerging economies seems to be that local currency depreciation results in an inflation increase. In developed countries this problem is generally not present, as unhedged foreign currency loans<sup>5</sup> incurred by households, companies or the government are not popular. In this context Central European countries are not typical emerging markets, as they are members of the European Union (i.e. they are highly integrated with developed countries). Moreover, the depreciation of Central European currencies since the 2008 financial crisis was not severe enough to be compared with a typical currency crisis.

Despite the fact that in many emerging economies a significant portion of the debt is denominated in foreign currencies, there is no research that questions the established theory that local currency appreciation result in lower inflation whereas depreciation of local currency result in an increase of inflation.

However, studies point out that the pass-through effect is rather low and has weakened in the last 20 years. One of the explanations suggests that low inflation itself reduces this dependence [Taylor 1999]. Others point to inflation-targeting policy as a limitation to the pass-through effect [Winkelried 2013].

Researchers' estimates show that there is a possible asymmetric impact of pass-through. This hypothesis was rejected in the case of the Polish economy by the research of Przystupa and Wróbel. The authors also indicated the need for further analysis of some premises pointing to the asymmetric reaction of inflation stemming from depreciation or appreciation of local currency.

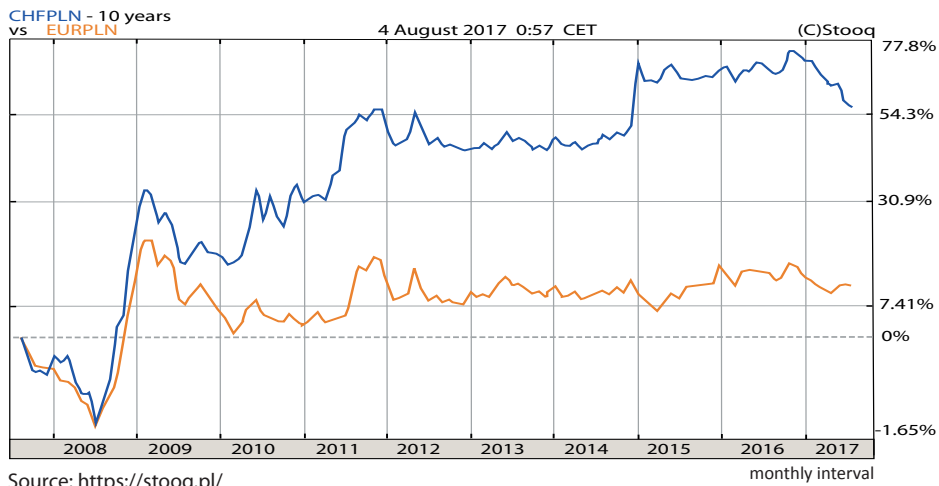
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<sup>5</sup> Opened positioned on the foreign exchange market, that do not have hedge with inflows in the currency of the loan.

**Potential impact of foreign currency loans on inflation**

Swiss franc-denominated mortgage loans are a significant part of the balance sheet structure in the Polish banking system. Assets stemming from these loans amounted to ca. 150 billion Polish zlotys at the end of 2015 and accounted for 35% of all households’ mortgage loans. Household spending constitutes ca. 1.04 trillion Polish zlotys (2015),<sup>6</sup> i.e. 60% of Polish GDP.

**Fig. 4. Swiss franc (blue) and euro (orange) rates to Polish zloty percentage change – 10-year period**



**Fig. 5. Libor 3m CHF – reference interest rate for Swiss franc loans**



<sup>6</sup> According to Central Statistical Office of Poland

Thus, taking into consideration the macroeconomic impact of local currency depreciation (for an economy with a significant portion of foreign currency loans), it could be treated similarly to an interest rate increase for loans denominated in the local currency. Depreciation will result in lower bank credit activity, household credit capacity and expenditure. One of the characteristics of Swiss franc-denominated loans in Poland is the significant change in debt value measured in Polish zloty that took place during the last 10-year period. This can be seen on Fig. 4, which also depicts changes in value of the euro against the Polish zloty.

The international trade volume between Poland and Switzerland is very low. Polish exports amounted to only 1.5 billion euros in 2015 or 1% of the value of Polish exports. The international trade channel is thus unable to provide equilibrium in the foreign exchange market as a potential increase in export volume from Poland to Switzerland would be insignificant.

The analysis can be extended by a detailed analysis of corporate and sovereign debt. Impact of such debt on aggregated demand if the local currency depreciates is similar to household debt, however corporate debts are usually hedged with future operating cash flow in the currency of the debt. The Polish State Treasury can expect net future cash inflows from the European Union and is entitled to 95% of the profits from NBP which keeps its assets in foreign currencies.

**Fig. 6. Wibor 3m – Interbank and reference interest rate in Poland**



Potential asymmetric or low pass-through effects can, as confirmed by literature, be caused by changes in aggregated demand stemming from indebted household budget constraints (due to the increase of the Swiss franc against the Polish zloty). Partially, the increase of the Swiss franc was offset by a decline of interest rates in Switzerland, even into negative values. The Fig. 5 presents the Swiss interbank rate Libor 3m over a 10-year period.

Poland the interest rate also significantly decreased during a similar period. The Fig. 6. presents the Polish interbank rate Wibor 3m over a 10-year period.

A comparison of average Swiss franc-denominated loans<sup>7</sup> with their equivalents in Polish zlotys, taking into account the significant decline of interest rates in Poland, showed that the service of Swiss franc loans is more expensive than that of their Polish zloty equivalents. Despite the big difference in instalments in favor of Swiss franc loans at the time of their origination (mostly 2006–2009).

In 2016 the Polish Financial Supervision Authority presented an analysis which concludes that borrowers in Swiss francs suffered effective tightening of monetary policy despite interest rates in both Poland and Switzerland having significantly declined. This effect is particularly visible from 2012 and strengthened in 2015, when the debt service for Polish zloty loans significantly decreased while increasing for Swiss franc loan borrowers. The instalment of an average loan in Polish zlotys declined by 25% from 2005 to 2015, while the instalment of a comparable Swiss franc loan increased by 40% during this period.

Apart from the effect on household income, there is also significant wealth effect. Nominal indebtedness measured in Polish zlotys for foreign currency loan borrowers significantly increased, thus decreasing households' net assets. It is an important factor in assessing the credit standing of households and the factor that influences their propensity for consumption.

Increase of foreign currency loan debt measured in domestic currency also hampers real estate trade and reduces demand for real estate among households indebted in foreign currency such as the Swiss franc. Such loans are practically not repayable before maturity as their earlier repayment would cause significant foreign exchange losses to households. It also forces the banks to keep these loans on their balance sheets longer than originally expected. Capital requirements for these loans reduce the credit activity of the banks. This weakens the transmission of lower interest rates in Poland into money creation and inflation. If the issue involved euro-denominated loans, one could expect that international trade channels will be more efficient in restoring the equilibrium by forcing net exports to increase (as the majority of Polish exports is to euro area countries).

Political risk and additional capital requirements for foreign currency mortgage loans might reduce bank capitalization, credit activity and hamper inflation pressure.

### **Observation of comparable economies**

To assess the possible influence of foreign currency loans on inflation, the dependence between core inflation and share of foreign currency loans was analyzed in Poland and other European countries. Comparable economies were chosen from non-euro Central European members of the European Union: Croatia, Bulgaria, Romania, the Czech Republic and Hungary. All these countries lowered their share of foreign currency loans in recent years as a result of regulatory decisions (cf. Table 1). Since 2008, when the market for foreign currency loans boomed, their local currencies were in a downward trend in relation to developed

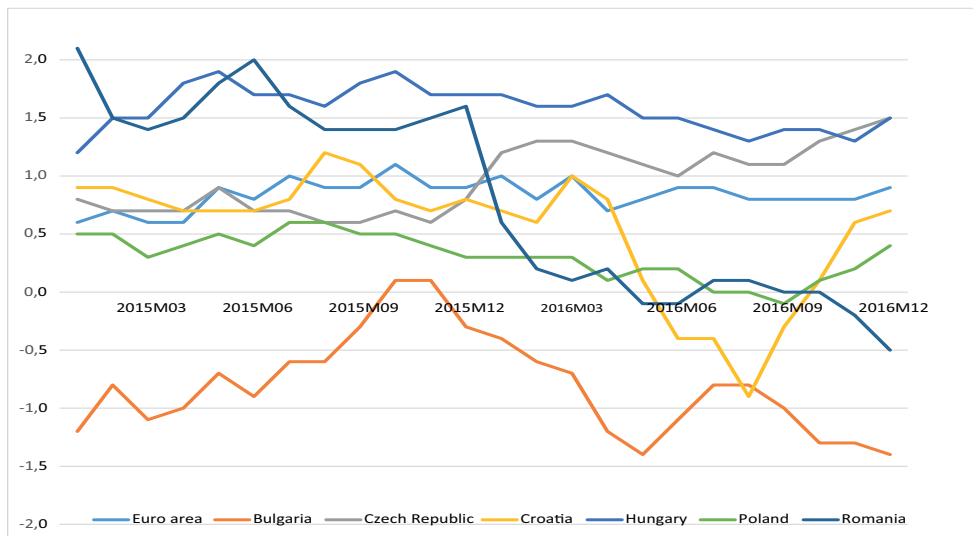
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<sup>7</sup> The average loan from credit boom years (2005–2008) is a theoretic scheme that was estimated through averaging values of loans incurred as of 30 June and 31 December 2005, 2006, 2007, 2008 and 2009 (for example, instalments of loans in a specific period constitute the average of instalments for all generations of loans, etc.) – Information of the Polish Financial Supervisory Authority.



countries' currencies until the end of 2016 (except for Bulgaria which has a fixed exchange rate with the euro). There are also no significant differences in monetary policy targets, with the exception of Bulgaria where an inflation target is not set. For comparative purposes, the euro area<sup>8</sup> core inflation measure was also shown in Fig. 7. The HICP measure was used for better comparison between countries.

**Fig. 7. Core HICP – Harmonized Index of Consumer Prices, excluding food, energy, tobacco**



Source: Eurostat

**Table 1. Share of foreign currency-denominated loans in total bank assets, share of Swiss franc loans and inflation targets**

Country	2015	2016	Swiss franc loans share at the end of 2016	Inflation target
Poland	23%	22%	14% and declining	2,5%
Croatia	60%	55%	insignificant	Not set, 2,5% on average treated as satisfactory
Bulgaria	51%	45%	insignificant	Not set
Romania	50%	43%	insignificant	2,5%
Hungary	19%	18%	insignificant	3%
Czech Republic	18%	17%	insignificant	2%

Source: Polish FSA, Croatian National Bank, Bulgarian National Bank, National Bank of Romania, Magyar Nemzeti Bank, Czech National Bank, own calculation

<sup>8</sup> Foreign currency lending in the euro area as a whole is not significant.

It should be noted that the share of Swiss franc loans in Poland was relatively high (15% in 2013) in relation to the other economies. Only Hungary had a higher share (25% in 2013). Hungary, Romania (10% share in 2013) and Croatia (5% share in 2013) managed to revalue Swiss franc loans into local currency loans and as of 2016 there are almost no Swiss franc loans in these countries.

An above average core inflation can be noticed in Hungary and the Czech Republic where the share of foreign currency loans is relatively low. Romania and Bulgaria, on the other hand, with a core inflation below average, have a relatively high share of foreign currency loans. Core inflation for Poland and Croatia are close to the average but below the euro-area level. In the case of Poland this can be explained by a significant portion of Swiss franc mortgage loans despite the overall relatively low share of foreign exchange loans. Data for Croatia does not follow the same pattern as its share of foreign currency lending is very high, however it does not experience above average inflation to decisively deny the hypothesis either.

## **Conclusion**

The pass-through effect on domestic inflation changed in recent years. The reasons indicated by researchers included: a low level of inflation, inflation-targeting policy, reluctance of companies to change prices as a response to exchange rate fluctuations. The impact of foreign currency loans can be added to the list of distortions to the traditional pass-through effect of exchange rate changes into inflation. In Poland a significant foreign exchange position is related to household exposure to the Swiss franc due to mortgage loans. Taking this into consideration, a significant depreciation of the Polish zloty results in lower demand from households indebted in Swiss francs and imbalances in the banking system.

Observation of data concerning core inflation in Poland, comparable economies and the euro area confirms the hypothesis that local currency depreciation negatively impacts core inflation through the credit channel. Economies in which households have a relatively high share of debt in foreign currency loans (in an environment of local currency weakness) – mostly have lower core inflation.

The net effect of changes in exchange rates on aggregated demand should be the subject of further analysis. In-depth research should take into account the open foreign exchange position at the level of households as well as corporate entities, the Polish State Treasury, NBP, and can be conducted for other economies. Findings may possibly point to an alternate explanation for the observed distortion in the pass-through effect than can be found in current literature.

An analysis of the entire open foreign exchange position of the economy, including an analysis of international trade channels and other demand factors, can provide important findings in the area of optimization of portfolios of assets and liabilities in the foreign exchange market and may have possible regulatory implications.

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## Kurs walutowy a inflacja w Polsce. Wpływ kredytów walutowych

### STRESZCZENIE

Utrwalony pogląd w teorii ekonomii wskazuje, że deprecjacja kursu waluty krajowej powoduje wzrost inflacji krajowej. Pogląd ten oparty jest na założeniu, że deprecjacja krajowej waluty spowoduje wzrost konkurencyjności krajowej gospodarki w handlu międzynarodowym, co spowoduje wzrost zagregowanego popytu i w konsekwencji również inflacji. Dodatkowo, część cen ustalanych na międzynarodowych rynkach bezpośrednio wzrośnie w walucie krajowej w związku z deprecjacją. Celem tego opracowania jest weryfikacja hipotezy o negatywnym wpływie deprecjacji kursu walutowego poprzez kanał kredytowy (kredyty walutowe) na inflację w Polsce. Istotną otwartą pozycją walutową w Polsce związana jest z kredytami walutowymi dla gospodarstw domowych (w szczególności kredytów hipotecznych denominowanych we frankach szwajcarskich). Biorąc ten fakt pod uwagę deprecjacja polskiego złotego powoduje zmniejszenie popytu gospodarstw domowych zadłużonych w walutach obcych oraz zaburzenia równowagi w systemie bankowym. W celu weryfikacji hipotezy dokonano obserwacji zależności pomiędzy udziałem kredytów walutowych w kredytach ogółem oraz inflacji bazowej w latach 2015-2016 dla Polski oraz gospodarek porównywalnych. Obserwacja danych potwierdza hipotezę dla większości krajów, iż wyższy udział kredytów walutowych związany jest z niższą inflacją bazową (w otoczeniu słabej waluty lokalnej). Artykuł wnosi do nauki analizę otwartej pozycji walutowej wpływającej poprzez zagregowany popyt na inflację jako potencjalny element polityki rządu oraz banku centralnego. Analiza całkowitej otwartej pozycji walutowej połączona z analizą otwartej pozycji walutowej w kanale handlu międzynarodowego mogła by potencjalnie prowadzić do istotnych wniosków w zakresie budowy optymalnego portfela walutowego aktywów i zobowiązań oraz może mieć zastosowanie regulacyjne.

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