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THE RATIONALE AND CONDITIONS FOR THE ISSUING OF POLISH TREASURY BONDS ON FOREIGN MARKETS

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Abstract

The aim of this article is to present the analysis of treasury bonds issued by the Ministry of Finance on international financial markets to finance debt. The author identifies the structure of bonds on the domestic and international markets. The study attempts to answer the question of whether the Ministry of Finance should issue bonds on foreign markets and what kinds of risk should be understood in the process of managing issues.

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Keywords: foreign debt, bonds, debt issue

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Introduction

The aim of this article is to analyse the economic rationale and formal conditions for issuing treasury bonds by the Ministry of Finance on foreign markets. Debt securities are issued on international financial markets in order to diversify sources of financing and reach foreign investors.

The article presents the rationale behind the issue of Polish treasury bonds on foreign markets, taking into account the structure and size of the issue as well as risk indicators of Polish treasury bonds issued on foreign markets. Furthermore, the analysis focuses on shaping the foreign debt level, depending on the EUR/PLN exchange rate. More specifically, the author examines the impact of depreciation of the EUR/PLN exchange rate on debt issued in EUR in 2019-2022. The analysis is aimed at providing information on differences between costs of issuing bonds on domestic and foreign markets to finance debt, which may be of particular importance for growing State Treasury debt. The author asks the question of what way to best finance the state budget's borrowing needs: by issuing debt securities on domestic or foreign markets.

The article is based on a number of the Ministry of Finance (MF) documents related to the management of the public finance sector debt, especially on The Public Finance Sector Debt Management Strategy in the years 2019-2022 (2018).

The paper is organized as follows: section 2 provides a brief overview of the related literature. Section 3 shows detailed information concerning rationale and conditions for issuing Polish treasury bonds by the State Treasury. Section 4 provides analysis with a methodology description and the results. The final section is the conclusion.

Classification of treasury bonds

The international bond market should be understood as issuing bonds and subscribing for bonds denominated in currencies of countries on the territory of which they are placed. What distinguishes this market from the domestic market is the disposal of financial instruments outside the issuer's home country and their acquisition by foreign entities (Najlepszy, 2013, pp. 349-351).

Bonds may be classified according to the following criteria: place of transaction, currency of issue and residency status of the issuer (Chrabonszczewska & Oręziak, 2000, pp.78-79).

While applying the above criteria, we may divide bonds into:

1) domestic bonds – debt securities issued in the domestic currency by residents,
2) international bonds, which include:

a) foreign bonds – issued by entities from outside of a given country, in the country's local currency. Zurich and New York are the most important markets for foreign bonds. Most popular bonds on the foreign bond market include the so-called Yankee bonds (foreign bonds issued in American dollars and placed in the United States), Samurai bonds (foreign bonds issued in Japanese yen and placed in Japan), Bulldogs bonds (foreign bonds issued in British pounds and placed in the United Kingdom), Rembrandt bonds (foreign bonds issued in Euro and placed in the Netherlands), Maple bonds (foreign bonds issued in Canadian dollars and placed in Canada),

b) Eurobonds– debt securities issued by residents and non-residents in all foreign currencies, placed in a country other than the currency of issue. State governments and enterprises as well as international financial institutions may be issuers of Eurobonds,

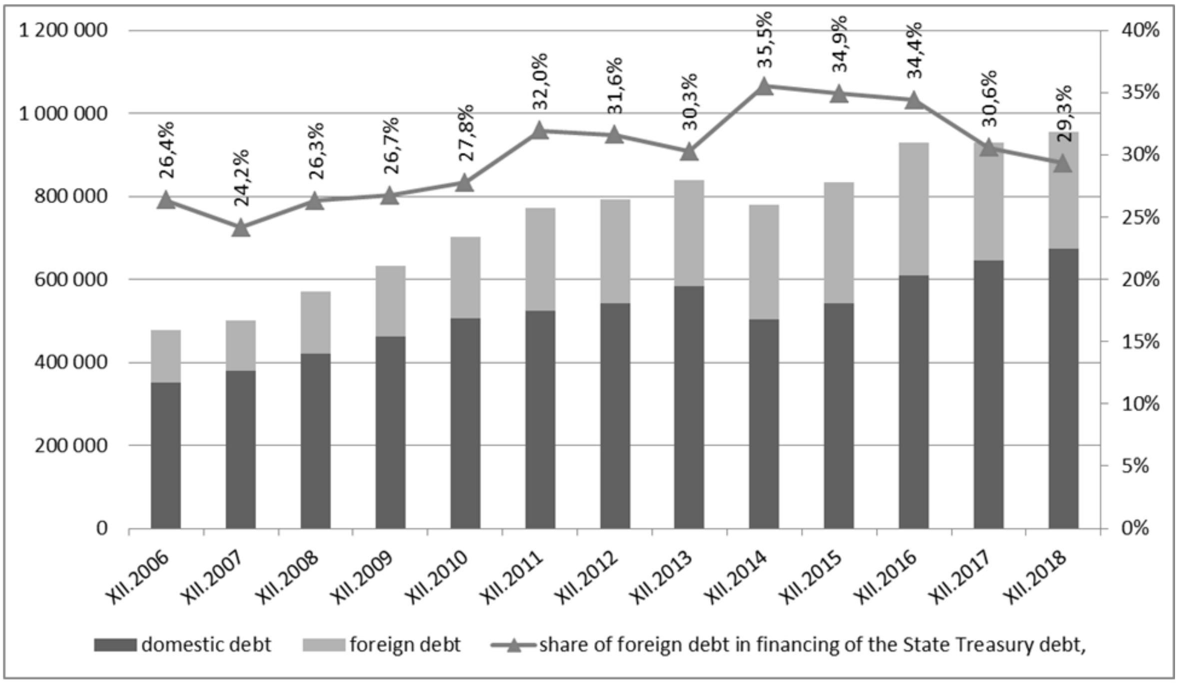
c) global bonds – debt securities issued simultaneously on a few international markets in the local currencies of the country of issue (Eun & Resnick, 2009, p. 12).

Rationale and conditions for issuing Polish treasury bonds by the State Treasury

The Ministry of Finance (MF, 2018, p. 4) issues treasury bonds on foreign markets with the intention of maintaining Poland's position on the international financial market and raising capital for covering financial needs of the state budget.

Additionally, the issue of debt securities on foreign markets helps to diversify the sources of financing of the state budget deficit. The growth of acquisition of financing on international markets was observed after Poland's accession to the European Union. The collapse of Lehman Brothers, which initiated the global financial crisis in September 2008, increased the risk aversion related to assets from the emerging markets. In the face of the

Chart 1: State Treasury debt in the years 2006-2018 according to the place of issue criterion (in PLN million)



Source: Own calculations based on (MF, 2019)

crisis, global investors were choosing debt instrument markets with a high level of safety. The fact that Poland was part of Eastern Europe, despite the good condition of its economy, had an adverse impact on Polish securities.

The growth of the State Treasury debt requires the acquisition of financing through the issue of Treasury securities on the domestic market and foreign markets (debt according to the criterion of the place of issue) (Chart 1).

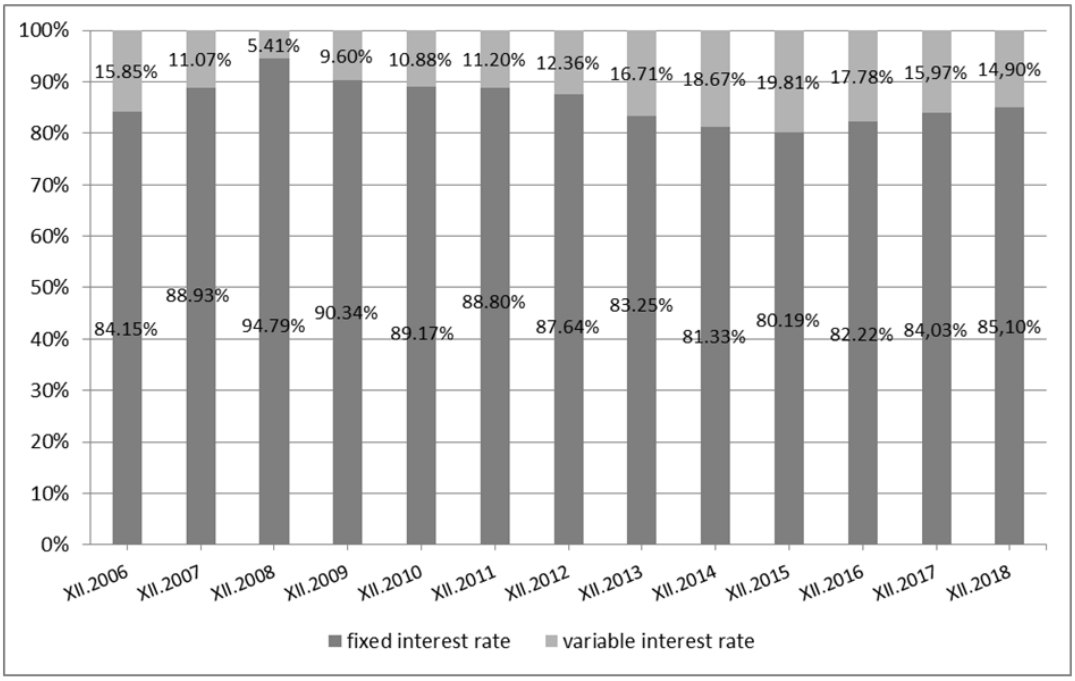
The State Treasury debt amounted to PLN 928,666.2 million in December 2016. To achieve the goal of the Strategy (MF, 2018) in 2019-22, it was assumed that the share of the debt denominated in foreign currencies should not exceed 30% of the total debt. Despite the formal condition concerning the share of foreign issues in the total debt, the share of the debt denominated in foreign currencies in the total debt of State Treasury in the years 2006-2018 has exceeded the assumed level since the end of 2011.

During the analysis period (i.e. in the years 2006-2018), the highest level of foreign debt occurred at the end of 2014 – 35.5%, reaching the value of PLN 275,859.4 million. This was due to the reform of the pension system which took place in February 2014 and which resulted in the reduction of the total debt of State Treasury by PLN 58,087 million at the end of 2014, as compared to the previous year. The transfer of all State Treasury bonds from Open Pension Funds to the Social Security Fund has reduced the domestic public debt. This also led to the change of the debt structure in terms of entities and maintaining of the same proportions in the subsequent years, along with the increase of the state budget's borrowing needs. There are countries, e.g. Turkey, with higher share of the debt denominated in foreign currencies in the total debt. The Republic of Turkey Ministry of Treasury and Finance (2018) has shown that 45,5% of debt at the end of 2018 was dominated in foreign currencies. This situation could cause problems if foreign lenders refuse to extend their loans to the Turkish government and the country's banks will need to find that amount in the foreign currencies.

The type of interest rate on the issued debt securities is an important factor affecting debt management. A vast majority of debt securities issued by the State Treasury is based on the fixed interest rate. The share of the debt based on variable interest rates did not exceed 20% in the foreign debt structure in the years 2006-2018.

The highest share of treasury securities and foreign loans with a variable interest rate was reached in 2015 – 19.81% (Chart 2), whereas the lowest share – 5.4% was recorded at the end of 2008. Foreign loans raised in international financial institutions constitute a substantial volume of instruments with a variable interest rate.

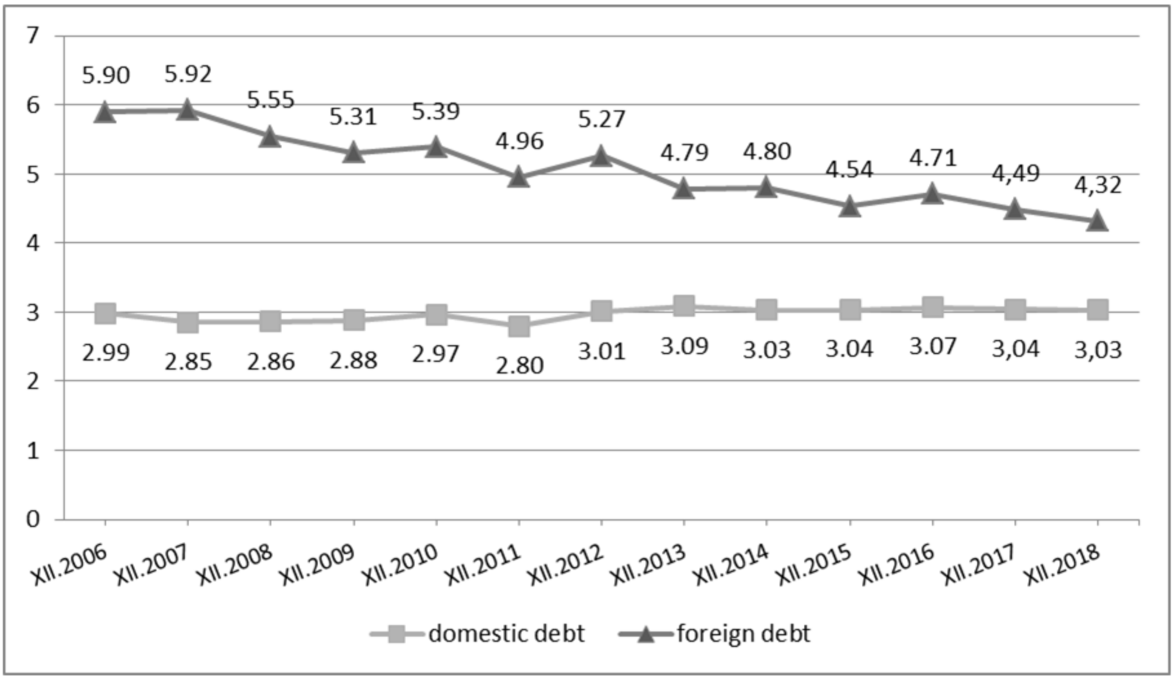
Chart 2: Foreign debt structure in the years 2006-2018 by type of interest rate (in %)



Source: Own calculations based on (MF, 2019)

A fixed interest rate, which is determined before placing of the issued debt instruments, is not changed during the entire term until redemption. Data presented on Chart 2 confirm that the substantial share of securities with a fixed interest rate in the structure of the State Treasury debt mitigates the interest rate risk. However, taking into account the prevailing trends on international markets leading to the decrease of interest rates, the issuer also increased the share of instruments based on a variable interest rate in the debt structure (National Bank

Chart 3: Duration of the State Treasury debt (in years) in the period Dec. 2006 – Dec. 2018



Source: (MF, 2019)

of Poland [NBP], 2016, p. 256).

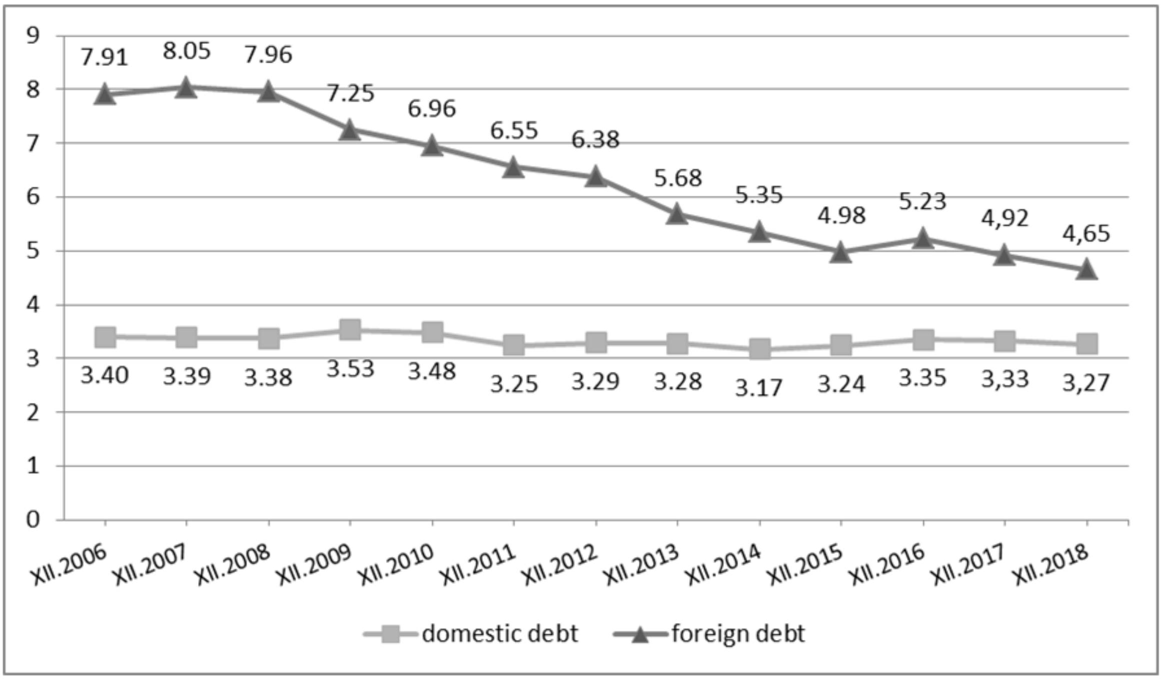
The assessment of interest rate risk and the assessment of State Treasury debt's refinancing risk are important matters in the process of debt management.

Interest rate risk is related to the probability of fluctuation of the interest rate of the already issued debt securities. This risk is assessed using a measure of 'duration'. It estimates the volatility of debt servicing costs in response to fluctuation of market interest rates (Fabozzi, 2001, pp. 556-559). Duration is also explained as a weighted average duration of the period after which the costs of debt servicing will match the current value of market interest rates (Fabozzi, 1999, pp. 5-12). This measure applies to treasury bonds with a variable interest rate, because the change of market interest rate means the change of the bond interest rate. A decreasing duration points to the growing interest rate risk. This measure for the domestic debt is stable and ranges from 2.85 to 3.09 years (Chart 3). Whereas the duration for foreign debt reaches higher values, which indicates that there is a lower interest rate risk. During the analysis period, the measure of duration at the end of 2006 reached the value of 5.90 years, whereas at the end of 2018 a weighted average duration of the period after which the costs of debt servicing will match the current value of market interest rates already dropped to 4.32 years. A continuing decrease of duration for the foreign debt should be monitored, because it affects the risk related to the foreign debt rollover.

ATR (average time to refixing), that is an average time during which the State Treasury bears the costs of debt servicing, is an important measure of interest rate risk. Interpretation of this measure indicates that the growth of the share of short-term debt or variable interest debt leads to a higher interest rate risk and a lower value of ATR (Uryszek, 2010, pp. 75-76). During the analysis period, the ATR indicator of the foreign debt of the State Treasury has been in a downward trend, dropping from 8.05 at the end of 2007 to 4.65 at the end of 2018 (Chart 4). This is a result of debt aging, as well as the interest rate change. The ATR indicator for domestic debt has been on a similar level of 3.40 to 3.27 during the analysis period. ATR, the measure of interest rate risk of domestic debt, indicates a higher interest rate risk for the debt issued on the domestic market as compared to the issue on foreign markets.

Decisions made by the Ministry of Finance about selection of the market for debt issue depend on a risk of guaranteeing the timely repayment of debt. A refinancing risk is mitigated by accumulating funds required for the redemption of debt securities of the maturing issue by utilizing funds from a new issue. This type of operation consists in replacing the old debt with a new issue. An

Chart 4: ATR of the State Treasury debt (in years) in the period Dec 2006 – Dec 2018



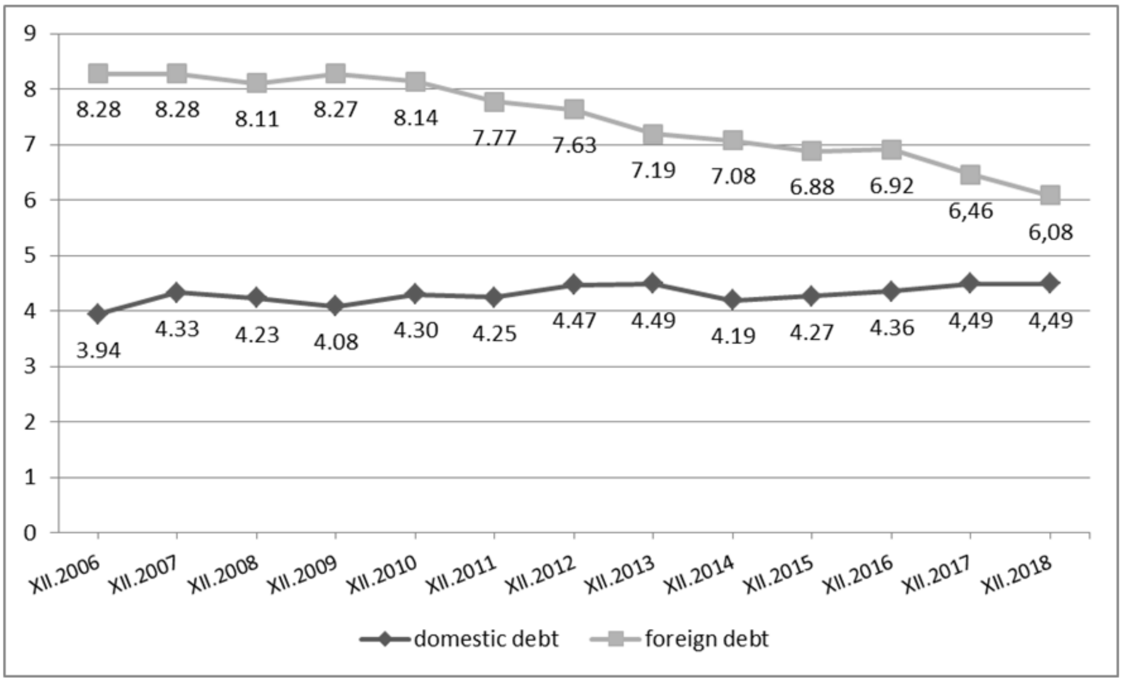
Source: (MF, 2019)

average maturity, which informs investors about the average duration of the period after which the debt is redeemed, is a measure used for assessment of the refinancing risk related to the State Treasury debt. The average maturity of foreign debt has been decreasing since December 2006, when it amounted to 8.28 years, until December 2018, when the measure of the average foreign debt maturity reached the level of 6.08 years, due to debt aging (Chart 5). Despite the decreasing value of the average maturity of foreign debt, it is still higher than the average maturity of domestic debt, which has been stable over the years, ranging from 3.94 to 4.49 years. Although a longer tenor (time-to-maturity) of the foreign debt means a lower risk of debt refinancing, extension of terms for which debt securities are issued leads to longer periods in which the costs of debt servicing have to be incurred.

Refinancing risk is another factor determining the selection of a type of bond issue on financial markets. Its value grows if there is a substantial share of short-term securities in the structure of the State Treasury debt issues and if there are many repayments (redemptions) of debt instruments within a short period of time (Marchewka - Bartkowiak, 2003, pp. 41-42). A longer debt maturity reduces the refinancing risk, but also burdens the state budget for a longer time. Due to the growing value of State Treasury debt, the maturity of treasury securities is an important issue. The financial crisis and economic slowdown in Poland contributed to the growth of borrowing needs of the State Treasury. The increased number of issues of treasury securities with shorter maturity periods led to the reduction of the average maturity of all the already placed treasury debt securities. However, due to the fact that the economy has stabilized, which was confirmed by a growing GDP, short-term instruments were replaced with bonds with longer maturity. As a result, the issue of short-term instruments during the crisis has not changed the structure of debt maturity.

In the years 2010 – 2018, the debt securities issued for a period from 5 to 10 years had the biggest share in the maturity structure of the State Treasury debt. As the total debt grows, this issue tenor is still the most popular. At the end of 2018, the value of debt with maturity from 5 to 10 years amounted to PLN 329,430 million (Table 1). A stable share of debt by maturity is also visible in the range from 1 to 3 years inclusive and from 3 to 5 years inclusive (Chart 6). On the other hand, debt instruments with maturity up to 1 year and over 10 years are less and less popular. Despite the growth of the total debt over the years, the value of debt issue with maturity over 10 years has decreased from PLN 94,374 million at the end of 2010 to PLN 51,997 million at the end of 2018. A

Chart 5: Average maturity of the State Treasury debt (in years)



Source: (MF, 2019)

Table 1: Maturity of the State Treasury debt (PLN million)

	Up to 1 year (inclusive)	From 1 to 3 years (inclusive)	From 3 to 5 years (inclusive)	From 5 to 10 years (inclusive)	Over 10 years
XII 2010	104,058	191,680	118,218	193,519	94,374
XII 2011	129,600	159,303	158,016	223,510	100,697
XII 2012	99,702	178,098	163,590	261,638	90,824
XII 2013	72,681	219,952	184,567	282,790	78,032
XII 2014	89,373	185,265	179,953	251,592	73,752
XII 2015	110,837	177,416	184,305	294,648	67,342
XII 2016	99,060	224,640	238,074	296,387	70,502
XII 2017	110,266	222,943	240,231	292,155	62,775
XII 2018	119,677	258,006	195,135	329,430	51,997

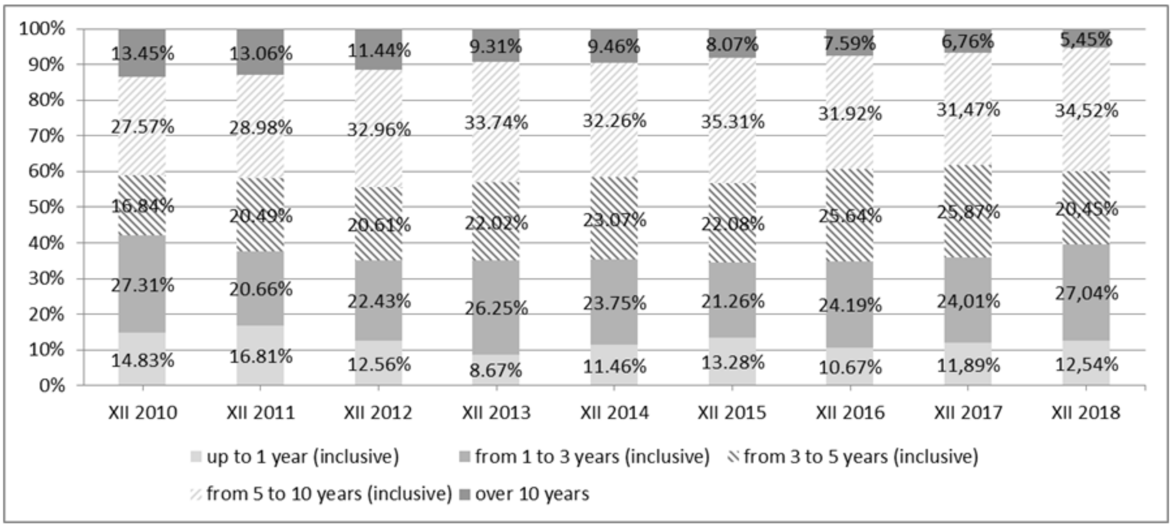
Source: (MF, 2019)

similar situation occurs in the case of the issue of debt instruments for a period of up to 1 year, where at the end of 2010 the volume of issued debt was PLN 104,058 million, whereas at the end of 2018 this value reached almost the same level of PLN 119,667 million.

The budget deficit in Poland is growing because of the growth of budget expenditure which considerably exceeds budget revenue. During the financial crisis on the global markets, because of the fact that Poland belonged to emerging economies, the State Treasury was committed to incur even more debt. Due to the situation in the global financial environment and the prevailing risk aversion, the acquired financing was of a short-term nature. This had an adverse impact on the risk assessment in debt management. Prior to the financial crisis the short-term instruments were rarely used, whereas the crisis forced decision-makers to utilize short-term instruments to maintain the liquidity on a larger scale. The subsequent years saw the issue of treasury debt securities with longer maturity, which had a positive impact on the structure of the State Treasury debt.

According to MF (2018), the domestic market is the main market for financing borrowing needs of the state budget, whereas acquisition of funds on foreign markets supplements the domestic financing. Decisions regarding the market on which the capital is raised result from evaluation of the market situation, in particular the demand from investors, interest rates, a comparison of profitability curves on the domestic and foreign markets, estimated exchange rate fluctuations and a summary

Chart 6: Maturity of the State Treasury debt (in %)



Source: own calculations based on (MF, 2019)

Table 2: Structure of the State Treasury foreign debt (PLN billion)

	XII 2010	XII 2011	XII 2012	XII 2013	XII 2014	XII 2015	XII 2016	XII 2017	XII 2018
foreign bonds	155.5	195.3	199.9	193.8	208.4	215.6	241.5	213.1	211.1
foreign loans	39.4	51.2	50.9	59.9	68.4	75.6	77.9	70.8	68.7

Source: (MF, 2019)

of costs of acquisition of financing in long-term, while accounting for the limitations related to risk level.

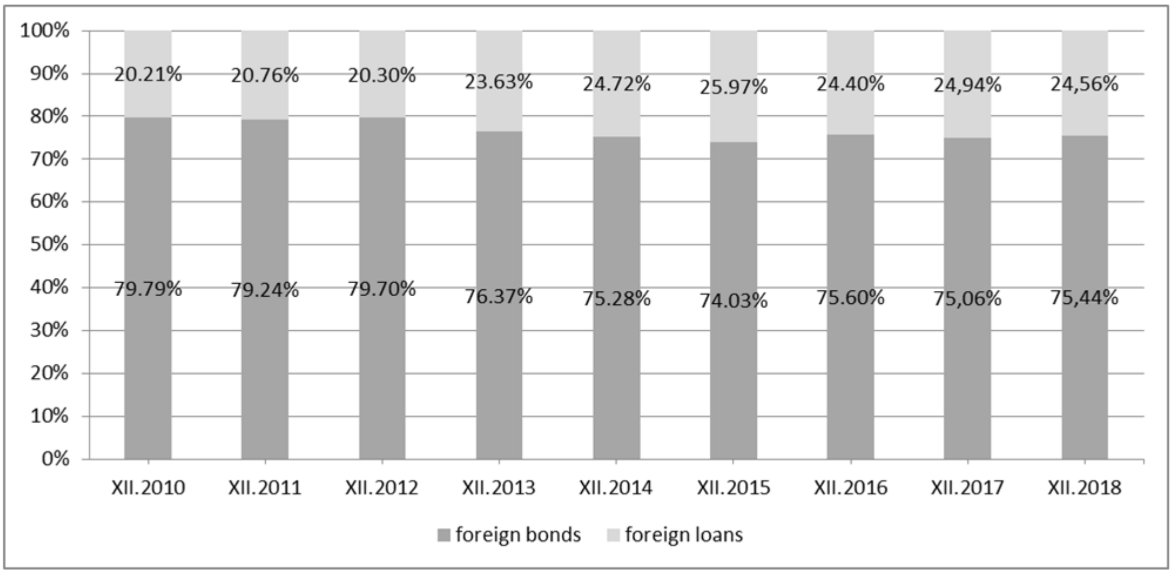
The cost of capital acquisition on foreign markets is lower than on the domestic market. This is explained by the difference in interest rate levels on the core markets, resulting from the monetary policy conducted by central banks. The European Central Bank, central banks of the United States and Japan, while promoting the policy of cheap money, reduced interest rates to the lowest levels in history. On the domestic interest rate market, a restrictive monetary policy of the National Bank of Poland contributes to maintaining a high profitability of domestic debt securities.

When deciding on a market and currency of the issue, the Ministry of Finance always tries to minimize costs, while limiting risk, mainly related to the exchange rate fluctuations. Furthermore, when managing the debt's currency structure, the inflow of foreign investors to the Polish treasury securities market should be supervised, because apart from the bond issue on foreign markets, also these entities generate exchange rate risk.

Analysis of the foreign debt structure shows that the capital may be acquired either through the bond issue on foreign markets or the acquisition of funds by raising foreign loans. The current lenders are: European Investment Bank, World Bank, and Council of Europe Development Bank. In the past, European Bank for Reconstruction and Development (till 2007) and the Paris Club (till 2013) also operated as lenders.

The share of foreign loans granted in the years 2006 - 2018 ranged from 20.21 to 25.97% of the total foreign debt of the State Treasury (Table 2). Due to the growth of the total debt of the State Treasury, the level of foreign debt also increased. European Investment Bank is the institution which lent the biggest amount in the form of foreign loans, and the share of loans raised in this institution exceeds half of the State Treasury debt on account of the raised foreign loans, reaching the value

Chart 7: Structure of the State Treasury foreign debt (in %)



Source: Own calculations based on (MF, 2019)

Table 3: Maturity of the State Treasury foreign bonds (PLN million)

	Up to 1 year (inclusive)	From 1 to 3 years (inclusive)	From 3 to 5 years (inclusive)	From 5 to 10 years (inclusive)	Over 10 years
XII 2010	3,960	24,876	27,427	63,060	36,143
XII 2011	14,911	30,340	30,999	74,468	44,552
XII 2012	11,363	30,937	26,599	81,204	49,850
XII 2013	13,292	29,176	23,015	90,547	37,750
XII 2014	15,192	26,900	36,677	101,961	27,688
XII 2015	11,862	26,724	49,559	107,681	19,802
XII 2016	13,190	43,437	55,696	101,195	27,968
XII 2017	14,604	46,026	47,959	80,897	23,625
XII 2018	24,233	53,400	33,964	78,159	21,370

Source: (MF, 2019)

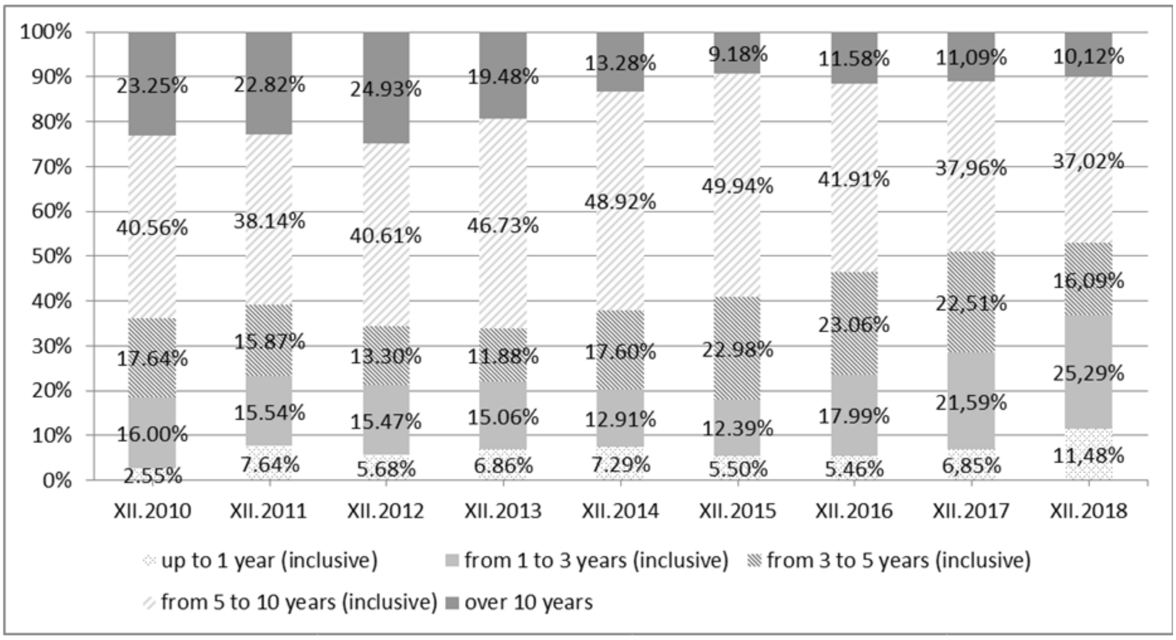
of PLN 38,725 million at the end of 2018. The remaining liabilities are in the form of bonds issued by the State Treasury on foreign markets, and constitute over 70% of foreign debt during the analysis period (Chart 7).

Total maturity of foreign bonds of the State Treasury in December 2010 amounted to PLN 155,468 million, whereas at the end of 2018 it increased to the equivalent of PLN 211,128 million (Table 3).

There was a decrease of share of bonds with maturity over 10 years in the maturity structure of the State Treasury foreign bonds whereas, there was an increase of share of debt securities issues with maturity from 3 to 5 years inclusive and from 5 to 10 years inclusive (Chart 8).

The comparison of maturity of all issued bonds and debt securities placed by the State Treasury only on foreign markets, shows certain similarities in the term structure and a preferred tenor from 5 to 10 years inclusive. A much bigger share of debt maturity in this period may be a reason for concern, especially in the light of exchange rate risk and interest rate risk. Foreign debt of the State Treasury in foreign currencies at the end of 2007 constituted 24.2% of the debt structure by currencies, reaching the value of PLN 121.1 billion (Table 4). In subsequent years, there was an upward trend of debt financing in foreign currencies. The highest share of debt

Chart 8: Maturity of the State Treasury foreign bonds (in %)



Source: Own calculations based on (MF, 2019)

Table 4: State Treasury debt (by currency) in %

	XII 2006	XII 2007	XII 2008	XII 2009	XII 2010	XII 2011	XII 2012	XII 2013	XII 2014	XII 2015	XII 2016	XII 2017	XII 2018
PLN	73.6	75.8	73.7	73.3	72.2	68.0	68.4	69.7	64.5	65.1	65.6	69.4	70.7
EUR	18.7	17.4	18.9	18.9	19.8	21.4	21.9	21.5	25.1	25.9	25.3	23.5	22.5
USD	3.6	2.7	2.5	3.6	3.8	5.8	5.6	5.1	6.7	5.9	6.2	5.0	5.1
other currencies	4.1	4.1	4.9	4.3	4.1	4.8	4.1	3.7	3.7	3.1	2.9	2.2	1.7

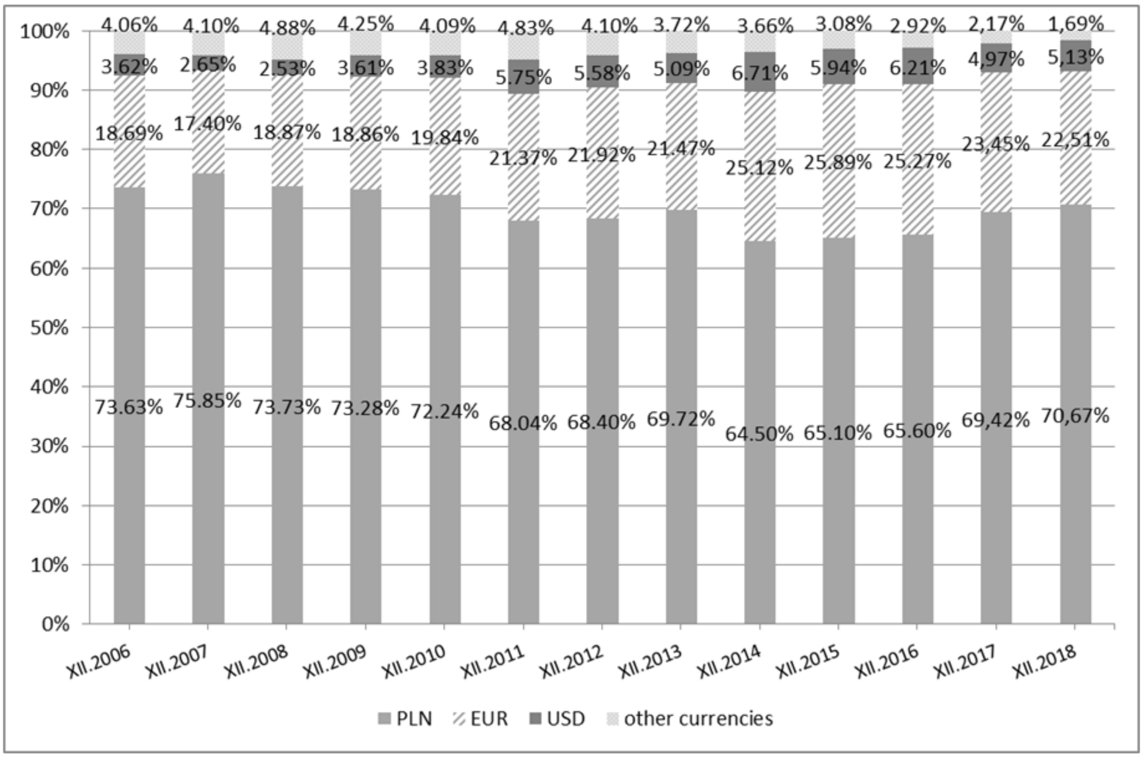
Source: (MF, 2019)

in foreign currencies occurred in 2014 – 35.5%. This was related to the reform of the pension system. Nevertheless, in subsequent years this trend continued, reaching 34.4% share of foreign currencies in debt financing at the end of 2016, which translated into equivalent of PLN 319.4 billion. Most issues are carried out in EUR – 25.3% at the end of 2016. The share of American dollar and other currencies during the analysis period does not exceed 10%. When issuing securities on foreign markets, the exchange rate risk must be monitored, and the global macroeconomic situation must be analysed.

Polish zloty (PLN) had 64.5-75.8% share in the State Treasury debt by currency in the years 2006-2018 (Chart 9). This indicates that the financing of the State Treasury debt was at a safe level, similar to the formal conditions adopted in the (MF, 2018).

Monitoring of risk related to considerable exchange rate fluctuations is an important element of management of debt denominated in foreign currencies. It is essential in the situation where a substantial part of the State Treasury debt is issued in foreign currencies, since it may prevent reliable and thorough evaluation of the expenditures connected with servicing of the debt's costs. The share of treasury instruments issued in foreign currencies exceeding 30% of the total debt of the State Treasury contributes to the growth of exchange rate risk.

Chart 9: Currency structure of the State Treasury debt



Source: Own calculations based on (MF, 2019)

Exchange rate risk has a major impact on the costs of servicing State Treasury debt. Its extent depends on the share of the debt issued in foreign currencies. Debt denominated in EUR had the biggest share in the total foreign debt of the State Treasury in the years 2006 - 2018. The value of debt denominated in EUR in December 2006 constituted 18.69% in the structure of State Treasury debt, reaching the value of PLN 89,439 million (Chart 9). During one decade the share of debt denominated in EUR increased by nearly 7% in the structure of State Treasury debt. Due to this, at the end of 2016 the nominal value of debt in EUR was at the level of PLN 234,666 million. The share of debt denominated in USD has also increased, the value of debt in American dollars was equivalent to PLN 57,690 million. The percentage share of other currencies, i.e. CHF and JPY, in the debt structure is decreasing, however due to the total growth of debt their value is at a similar level during the analysis period. The phenomenon under analysis confirms an upward trend in raising debt in foreign currencies over the years.

A simulation of the foreign debt level, depending on the level of the EUR/PLN exchange rate, has been conducted in this study. The analysis covered shaping of the level of debt acquired from the issue of foreign securities in response to the change of the EUR/PLN exchange rate. The goal of the analysis is to examine the impact of depreciation of the EUR/PLN exchange rate on the value of foreign debt. Nominal values of the State Treasury debt (in PLN million) were taken from (MF, 2019). It was assumed in the calculations that starting from 2019 the foreign debt is growing every year by PLN 10,626.02 million. It is an average growth of foreign debt in the years 2010-2018. Furthermore, for the needs of the analysis it was assumed that the growth of foreign debt from 2019 is financed only through the issue of bonds on foreign markets. In the conducted analysis, the level of foreign loans remains unchanged as compared to the value recorded at the end of 2018 (Table 5).

An average EUR/PLN exchange rate at the last day of the year in individual years, based on the historical average exchange rates published by the National Bank of Poland, was used in calculations (Table 6).

The forecast of EUR/PLN exchange rate until 2022 (Table 7) was adopted according to the assumptions of (MF, 2018).

Based on the tables above, the State Treasury debt's values in EUR billion are presented below (Table 8).

During the analysis period, the highest value of EUR/PLN exchange rate depreciation, between the end of 2010 and the last day of 2016, amounted to 11.71%. Taking into account the fact that the issues of debt securities with maturity from 5 to 10 years inclusive have the highest share in the debt structure, the said time range should be especially analysed. Given the growth of foreign debt, as a result of growing total debt of the State Treasury,

Table 5: State Treasury foreign debt in the years 2010-2018 and the forecast for the years 2019-2022 (PLN billion)

	XII.2010	XII.2011	XII.2012	XII.2013	XII.2014	XII.2015	XII.2016	XII.2017	XII.2018	2019	2020	2021	2022
Foreign debt	194.8	246.4	250.9	253.8	276.9	291.3	319.4	383.9	279.8	290.4	301.1	311.7	322.3

Source: (MF, 2019)

Table 6: Historical EUR/PLN exchange rates

	XII.2010	XII.2011	XII.2012	XII.2013	XII.2014	XII.2015	XII.2016	XII.2017	XII.2018
EUR/PLN exchange rate	3.9603	4.4168	4.0882	4.1472	4.2623	4.2615	4.4240	4.1709	4.3000

Source: (NBP, 2018)

Table 7: Macroeconomic assumptions / forecast of EUR/PLN exchange rate*

	2019	2020	2021	2022
EUR/PLN forecast	4,1461	4,1461	4,1461	4,1461

*at the end of the year

Source: (MF, 2018)

Table 8: State Treasury foreign debt in the years 2010-2018 and the forecast for the years 2019-2021 (in EUR billion)

	XII.2010	XII.2011	XII.2012	XII.2013	XII.2014	XII.2015	XII.2016	XII.2017	XII.2018	2019	2020	2021	2022
Foreign debt	49.2	55.8	61.4	61.2	65.0	68.4	72.2	68.1	65.1	70.1	72.6	75.2	77.7

Source: Own calculations based on (MF, 2019)

Table 9: Simulation of the value of State Treasury foreign debt in the years 2019-2022 (in PLN billion)

years	foreign debt (in EUR billion)	foreign debt at the exchange rate according to the Ministry of Finance forecast (in PLN billion)	foreign debt with depreciation of EUR/PLN exchange rate vs. exchange rate included in the forecast of the Ministry of Finance (in PLN billion)			
			by 5%	by 10%	by 15%	by 20%
2019	70.1	290.5	305.0	319.5	334.0	348.6
2020	72.6	301.0	316.1	331.1	346.2	361.2
2021	75.2	311.7	327.3	342.9	358.5	374.0
2022	77.7	322.3	338.4	354.5	370.7	386.8

Source: Own calculations based on (MF, 2019)

the level of change in the currency exchange rate at which increasing of the foreign debt entails an excessive exchange rate risk should be analysed.

Detailed calculations showed the forecast of foreign debt growth at the end of 2022 by 57.92%, as compared to December 2010. According to the Debt Management Strategy, a maximum of 30% of total debt should be issued as a foreign debt. Depreciation of the market EUR/PLN exchange rate to the higher level than forecasted in (MF, 2018) would be a threat to the increase of foreign debt issue. It is worth adding that when issuing debt securities, the scenario of depreciation of EUR/PLN exchange rate should be taken into account. Table 9 shows a simulation of the foreign debt value assuming the depreciation of EUR/PLN by 5%, 10% ,15% and 20%.

Analysis of data included in Table 9 indicates a need to analyse the level of the EUR/PLN exchange rate. Exchange rate risk increases with the growth of the debt. Depreciation of the EUR/PLN exchange rate by 20% in 2022 would almost double the value of foreign debt, as compared to the end of 2010. However, in the case of appreciation of the EUR/PLN exchange rate, these changes might be also positive for the state budget, and the value of foreign debt in domestic currency would be reduced. The Ministry of Finance should, despite the lower costs of foreign debt issue, limit the scale of foreign bond issue due to the exchange rate risk. Depreciation of the EUR/PLN exchange rate by 11.71% in the years 2006-2016 and a high share of 5 – 10 year tenor of debt securities issue, would point to a need of reducing the share of issue of foreign securities from 30% to 20%. Despite the fact that Poland may use funds from a flexible credit line granted by the International Monetary Fund to protect itself against the risk of financial instability, it is worth mentioning that the demand of foreign investors for debt securities is linked to global macroeconomic conditions. Development of the domestic investors' base is an important element of debt management. This would allow for mitigating the outflow of foreign capital and limiting of the exchange rate risk related to the issue of debt on foreign markets.

Conclusions

Based on the conducted analysis, it may be concluded that the State Treasury diversifies the sources of financing of the state budget's borrowing needs by issuing debt securities on domestic and foreign markets. Issue of Polish treasury bonds on foreign markets also acts as a benchmark for Polish institutions, those financial institutions and enterprises which issue debt securities on foreign markets.

The conducted analysis of the debt structure by interest rate type showed a considerable volume of issues of fixed rate debt securities, which has a positive impact on the interest rate risk of the State Treasury debt. Maintaining this debt structure helped to avoid negative consequences related to debt financing during the financial crisis. A big share of short-term debt securities in the State Treasury debt structure may increase the refinancing risk. A threat may also appear in the case of accumulation of redemptions of treasury debt instruments within a short period of time. Extension of the debt's maturity reduces the refinancing risk, but at the same time it increases the burden on the state budget for a longer period of time. An average maturity, which is a measure of a debt's refinancing risk, decreases for debt securities issued on foreign markets. This is an effect of debt aging, however this value is higher than an average maturity of the domestic debt in the period under review. A longer tenor of foreign debt helps to mitigate the refinancing risk. However, extension of terms for which treasury debt securities are issued extends the period during which the costs related to debt servicing are incurred. Interest rate risk is also an important element of debt management. This risk is related to the probability of fluctuation of interest rate of the already issued debt securities. In order to analyse this type of risk, a measure of duration was used, i.e. a weighted average duration of a period after which the costs of debt servicing will match the current value of market interest rates. The observed higher value of duration for the foreign debt indicates that there is a lower interest rate risk. This indicator should be monitored, because apart from the exchange rate risk it has a major impact on extension of the foreign debt's repayment. MF (2018) assumes the share of debt in foreign currencies below 30% of the total debt. In the analysis period, the maximum deviation of 16% above the assumed level was observed. In the years 2006 – 2018, the State Treasury issued nearly 70% of the total debt in Polish zloty. The adopted level of debt issue according to the currency structure has been maintained. The defined goal is related to monitoring of the level of exchange rate risk. Nevertheless, scenarios related to the depreciation of the EUR/PLN exchange rate should be also considered, as most of the foreign debt issues are carried out in this currency. It is also important due to the probability of a crisis arising in the future. A substantial part of debt issued by the State Treasury denominated in foreign currencies might make it difficult to manage financial resources intended for servicing the debt's costs. Furthermore, the author's own analysis pointed to a risk related to the impact of the EUR/PLN exchange rate fluctuations on the State Treasury foreign debt. Depreciation of PLN versus EUR by 11.71%, in 2016 comparing to 2006 intensified a need for monitoring of the EUR/PLN exchange rate fluctuations and the macroeconomic environment when making further decisions about issuance of foreign bonds.

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