
ANALYSIS OF THE CHANGES IN GROSS LOANS AND ADVANCES AND DEPOSITS IN BANKS IN BULGARIA

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Abstract: The article presents a trend model for the loans and advances and the deposits of banks in Bulgaria for the period 2007 – 2019. Assuming that the established trends will persist, the model was used to forecast the future values of the loans and advances and the deposits of these banks in 2020 and 2021.

Key words: banks, trend models, forecast, loans and advances, deposits.

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Introduction

Bank activities are very important for our country's economy. Banks act as intermediaries between economic agents that have freely available funds with economic agents that need investment capital. Banks extend loans not only to businesses for productive purposes but also to households for housing and consumption purposes; they keep the savings of the general population, provide card and other banking services, etc. (Mishkin, 2016). The good financial health and stable operation of banks is essential for the country's economic development.

Among the main activities carried out by banks are collecting deposits and granting loans. Deposits are an important indicator for banks' activities as

they represent the largest share in bank liabilities (Trifonova, 2002). The deposits collected by banks represent the major part of their debt capital which they use for their operations, among which lending is the most important one. Loans represent the greatest share of bank assets and are an important indicator for analyzing banks' activities (Trifonova, 2002). The loans granted by banks are their main source of revenue from operations. This is why the trends in some main bank indicators in Bulgaria and more specifically loans and advances and deposits have been analyzed in the paper and the future values of these indicators have been forecasted for the next few years.

The main objective of this paper is to examine the trends in loans and advances and deposits in banks in Bulgaria and to forecast the future values of these indicators for the next two years.

The main thesis of the research is that gross loans and advances and deposits in the banking system in Bulgaria have an upward trend in the period 2007–2019 and this trend is likely to continue in the future.

The trends related to bank indicators in Bulgaria in the period 2007–2019 were studied and analyzed using various trend models. These trends were then used to model and forecast the gross loans and advances and deposits in banks in Bulgaria for 2020 and 2021.

The source of the data is BNB. The analysis was carried out with the SPSS statistical software. The impact of the cost factor has not been taken into account in the analysis.

1. Modelling the trend

When modelling the trend, the bank indicators whose dynamics has been studied are being regarded as a function of time to define the dynamics in gross loans and advances and deposits in the banks in Bulgaria for the period 2007 – 2019.

Table 1 presents the values of *gross loans and advances* and *deposits* of banks in Bulgaria over the period 2007–2019.

In order to determine the trend in gross loans and advances and deposits in the banks in Bulgaria in the period 2007 – 2019 an analysis has been made at several stages (Atanassov, 2018):

- verification of the existence of a trend through estimating the Spearman's rank correlation coefficient (ρ) and Kendall's rank correlation coefficient (λ) and the autocorrelation coefficient of first order (r_1);
- for the time series for which it has been proven that there is a trend by means of the method of the least squares the form of the trend has been

investigated and the most relevant trend model has been selected. The choice of the most appropriate model is based on the coefficient of determination.

Table 1

***Gross loans and advances and deposits in the banks in Bulgaria
in the period 2007–2019 (in BGN bln)***

Year	Gross loans and advances	Deposits
2007	45.876	52.196
2008	56.939	60.884
2009	59.853	60.833
2010	61.508	63.011
2011	64.352	65.607
2012	64.726	70.702
2013	68.114	73.882
2014	66.567	73.529
2015	74.457	74.346
2016	77.517	78.585
2017	81.548	83.707
2018	89.024	89.704
2019	94.450	97.212

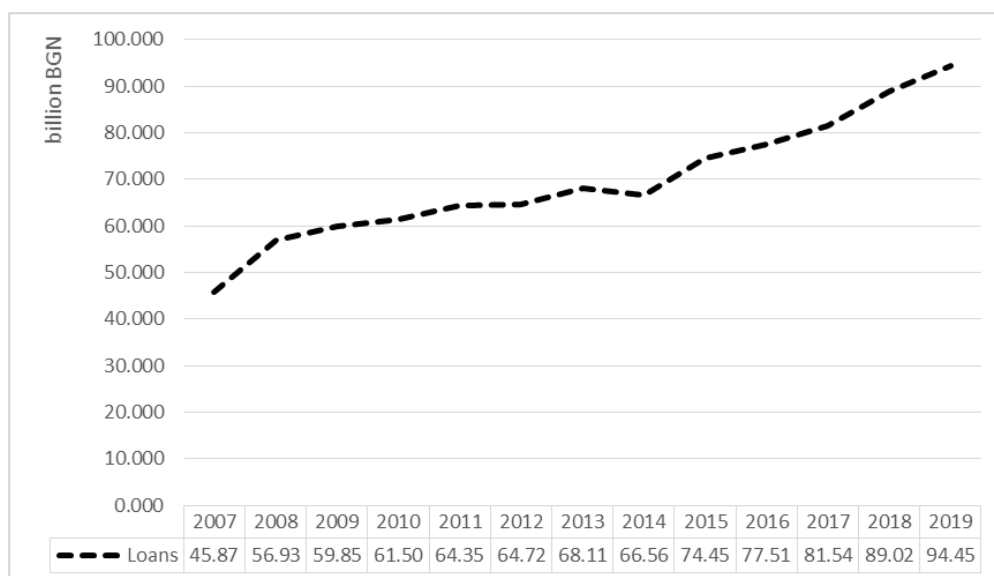
Source: BNB

1.1. Gross loans and advances

The trend of the studied time series can be determined by creating a line graph which shows the existing patterns in the time series. Table 1 presents the line graph of gross loans and advances in the banking system in Bulgaria for the period 2007–2019.

Bank lending was one of the factors behind the economic growth in the pre-crisis period. Bank loans in Bulgaria tend to increase. This is perhaps largely due to the low interest rates on loans and economic agents' positive expectations for the development of the Bulgarian economy during the analyzed period, which boosted all types of lending. Households have expectations of stable incomes in the future and take out house purchase and current consumption loans. As a result of the positive economic prospects, companies expect good financial results from their operations and take out

bank loans for investment projects intended to expand their activities and increase production.



Source: BNB.

Figure 1. Gross loans and advances in the banking system in Bulgaria in the period 2007 – 2019 (BGN bln)

The data in Table 2 shows that during the whole analyzed period there was a constant trend of increase of the volume of loans compared to 2007 with a more prominent increase in 2018, when there was a boom in lending. The dynamics of the absolute growth at chain basis shows that the greatest increase of bank gross loans and advances compared to 2007 was in 2008, immediately before the severe impact of the financial crisis on the Bulgarian banking sector. Another significant increase in absolute growth at chain basis was reported from 2015 to the end of the analyzed period. The calculated values of growth rate at 2007 permanent basis mean that the biggest growth against the reference period was registered in 2019.

The verification of the existence of a trend in the data time series for the bank indicators has been carried out through the developed in the statistical theory criteria – the Spearman's rank correlation coefficient and Kendall's rank correlation coefficient and the first order autocorrelation coefficient (Mishev and Goev, 2010).

One of the most frequently used criteria to detect the existence of a trend in a given time series is the first order autocorrelation coefficient. If there is a trend in a given time series, the data is autocorrelated, i.e. every dynamic time series member is correlated with the preceding member of the

same dynamic time series. Autocorrelation is defined as correlation between successive members in a given time series (Dimitrov, 2005).

Table 2

Absolute growth, relative growth and growth rate of gross loans and advances from banks in Bulgaria

Year	Absolute growth (BGN bln)		Relative growth		Growth rate (%)	
	Permanent basis 2007	Chain basis	Permanent basis 2007	Chain basis	Permanent basis 2007	Chain basis
2008	11.063	11.063	1.2412	1.2412	24.12	24.12
2009	13.977	2.914	1.3047	1.0512	30.47	5.12
2010	15.633	1.656	1.3408	1.0277	34.08	2.77
2011	18.477	2.844	1.4028	1.0462	40.28	4.62
2012	18.850	0.374	1.4109	1.0058	41.09	0.58
2013	22.239	3.388	1.4848	1.0523	48.48	5.23
2014	20.692	-1.547	1.4510	0.9773	45.10	-2.27
2015	28.581	7.890	1.6230	1.1185	62.30	11.85
2016	31.641	3.060	1.6897	1.0411	68.97	4.11
2017	35.672	4.031	1.7776	1.0520	77.76	5.20
2018	43.148	7.476	1.9406	1.0917	94.06	9.17
2019	48.574	5.426	2.0588	1.0609	105.88	6.09

Source: BNB and own calculations.

In order to carry out the analysis, we need to formulate two statistical hypotheses – the null (notation H_0) and the alternative hypothesis (notation H_1). The null hypothesis is a statement of no trend related to the bank indicator. It is accepted when the calculated value of the criterion is not statistically significant. The alternative hypothesis states that there is a trend in the time series under review. This hypothesis is accepted when the criterion's value obtained is statistically significant. The empirical values of the criteria were calculated and the hypotheses verification was carried out at risk of error that in this case is $\alpha=0,05$.

The verification for the existence of a trend in the change in gross loans and advances over the 2007–2019 period was carried out on the basis of the Spearman's rank correlation coefficient $\rho_{EM}=0,995$, Kendall's rank correlation coefficient $\lambda_{EM}=0,974$ and the first order autocorrelation coefficient $r_{1(EM)}=0,957$. The last coefficient's high positive value is typical of

time series containing a trend. The empirical values of these coefficients are higher than the theoretical ones, therefore the calculated coefficients are statistically significant and with 95% probability it can be presumed that the time series with data on bank loans during the period 2007–2019 contains a trend.

Table 3

Empirical values of the criteria for verification of the existence of a trend in gross loans and advances from banks in Bulgaria

Indicators	Spearman's rank correlation coefficient		Kendall's rank correlation coefficient		First order autocorrelation coefficient	
	ρ_{EM}	ρ_T	λ_{EM}	λ_T	$r_{1(EM)}$	$r_{1(T)}$
Gross loans and advances	0.995	0.484	0.974	0.359	0.957	0.348

Modelling the trend is limited to determining the equation which represents the analyzed phenomenon as a function of time (Velichkova, 1981):

$$Y = f(t) + \varepsilon,$$

where:

Y is the relevant bank indicator;

t – an artificial variable through which time is expressed;

ε – a random component in the model.

When studying the trends it is possible to use various models, as from a statistical point of view the most appropriate is the model that has the highest coefficient of determination (R^2). The coefficient of determination expresses the relative share of deviation due to the existence of a trend.

When trying out the various functions in respect of the same statistical data, the higher the coefficient of determination the better the curve that describes the trend in the analyzed time series (Velichkova, 1981).

In order to determine the trend, eleven different econometric models¹ (linear and non-linear) were used (Goev, 1996). The trend was defined using the model that has the highest explanatory power (Pavlova, 2007).

¹ SPSS assesses trend models through the procedure Curve Estimation that is intended to conduct a simple linear and non-linear regression.

Table 4

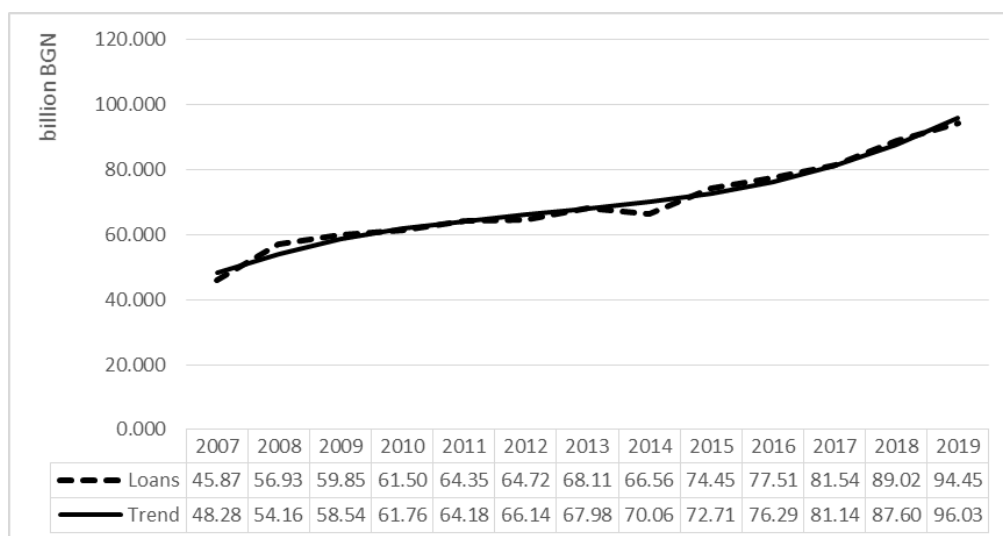
Results from the constructed eleven econometric models describing the dynamics of gross loans and advances from banks in Bulgaria

Models	Characteristics of the models				
	Coefficient of determination	F _{em}	Degree of freedom 1	Degree of freedom 2	Significance level
$Y_t = \beta_0 + \beta_1 \times t + \varepsilon_t$	0.938	166.916	1	11	0.000
$Y_t = \beta_0 + \beta_1 \ln t + \varepsilon_t$	0.826	52.149	1	11	0.000
$Y_t = \beta_0 + \frac{\beta_1}{t} + \varepsilon_t$	0.590	15.831	1	11	0.002
$Y_t = \beta_0 + \beta_1 \times t + \beta_2 \times t^2 + \varepsilon_t$	0.951	96.124	2	10	0.000
$Y_t = \beta_0 + \beta_1 \times t + \beta_2 \times t^2 + \beta_3 \times t^3 + \varepsilon_t$	0.982	164.875	3	9	0.000
$Y_t = \beta_0 \times \beta_1^t + \varepsilon_t$	0.935	157.292	1	11	0.000
$Y_t = \beta_0 \times t^{\beta_1} + \varepsilon_t$	0.891	90.220	1	11	0.000
$Y_t = e^{\beta_0 + \frac{\beta_1}{t}} + \varepsilon_t$	0.699	25.532	1	11	0.000
$Y_t = e^{\beta_0 + \beta_1 \times t} + \varepsilon_t$	0.935	157.292	1	11	0.000
$Y_t = \beta_0 \times e^{\beta_1 \times t} + \varepsilon_t$	0.935	157.292	1	11	0.000
$Y_t = 1/(1/u + \beta_0 \times \beta_1^t) + \varepsilon_t$	0.935	157.292	1	11	0.000

The cubic model was chosen for the characterisation of the trend in the change of bank loans. This model best describes the trend in the change of bank loans, as it has the highest coefficient of determination, i.e. it has the highest explanatory power. As the coefficient of determination $R^2 = 0.982$, it was determined that 98.2% of the value of gross loans and advances can be explained by the cubic model used.

The particular look of the cubic model on the basis of which the components of the model have been calculated is:

$$Y = 40,562 + 8,760 \times t - 1,096 \times t^2 + 0,058 \times t^3 + \varepsilon$$



Source: BNB, own calculations.

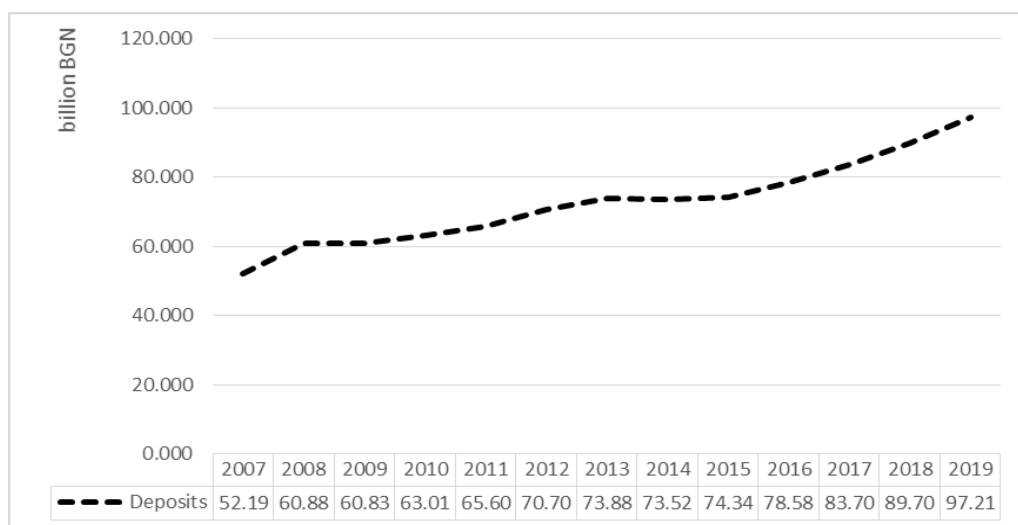
Figure 2. Dynamics of gross loans and advances of the banking system in Bulgaria and a trend in the period 2007 – 2019 (billion BGN)

The statistical significance of the model parameters was verified. The results obtained suggest that the parameters of the cubic model are statistically significant. The trend is for the gross loans and advances to keep to their asymptote, which is around 40.6 billion BGN.

1.2. Deposits

Figure 3 shows the line graph of deposits in the banking system in Bulgaria for the period 2007 – 2019.

The figure shows an upward trend of development of deposits in banks in Bulgaria during the analyzed period 2007–2019. Their volume increased significantly to BGN 97.212 bln in 2019. The Bulgarian banking sector is characterised by persistently high inflow of deposits and strong competition between banks. An important indicator is that deposits constitute a major share of commercial banks' liabilities, which is indicative of the confidence of both the households and the businesses in commercial banks despite the low interest rates. Household deposits play a key role in this process. The increase of the volume of deposits in commercial banks is a positive factor because it leads to intensification of lending (Trifonova, 2002).



Source: BNB.

Figure 3. Deposits in the banking system in Bulgaria in the period 2007 – 2019 (billion BGN)

Table 5

Absolute growth, relative growth and growth rate of deposits in banks in Bulgaria

Year	Absolute growth (BGN bln)		Relative growth		Growth rate (%)	
	Permanent basis 2007	Chain basis	Permanent basis 2007	Chain basis	Permanent basis 2007	Chain basis
2008	8.687	8.687	1.1664	1.1664	16.64	16.64
2009	8.637	-0.051	1.1655	0.9992	16.55	-0.08
2010	10.815	2.178	1.2072	1.0358	20.72	3.58
2011	13.410	2.595	1.2569	1.0412	25.69	4.12
2012	18.505	5.095	1.3545	1.0777	35.45	7.77
2013	21.686	3.181	1.4155	1.0450	41.55	4.50
2014	21.333	-0.354	1.4087	0.9952	40.87	-0.48
2015	22.150	0.817	1.4244	1.0111	42.44	1.11
2016	26.389	4.239	1.5056	1.0570	50.56	5.70
2017	31.511	5.122	1.6037	1.0652	60.37	6.52
2018	37.508	5.997	1.7186	1.0716	71.86	7.16
2019	45.016	7.508	1.8624	1.0837	86.24	8.37

Source: BNB and own calculations.

According to the values obtained for absolute growth at permanent basis 2007 for the period 2007 – 2019 deposits in banks in Bulgaria rose continuously. Absolute growth at chain basis values indicate that the most significant increase in deposits compared to 2007 was observed immediately prior to the crisis in 2008 and again in 2019 compared to 2018. The highest growth rate of 86.24% compared to the permanent basis of 2007 was reported in 2019.

Table 6

Empirical values of the criteria for verification of the existence of a trend in deposits in the Bulgarian banking system

Indicators	Spearman's rank correlation coefficient		Kendall's rank correlation coefficient		first order autocorrelation coefficient	
	ρ_{EM}	ρ_T	λ_{EM}	λ_T	$r_{1(EM)}$	$r_{1(T)}$
Deposits	0.989	0.484	0.949	0.359	0.969	0.348

The verification of the existence of a trend in deposits in the banking system in Bulgaria in the period 2007 - 2019 show that the empirical values of the Spearman's rank correlation coefficient, Kendall's rank correlation coefficient and the first order autocorrelation coefficient exceed their theoretical values. The conclusion that can be drawn is that there is a trend in the time series.

Table 7

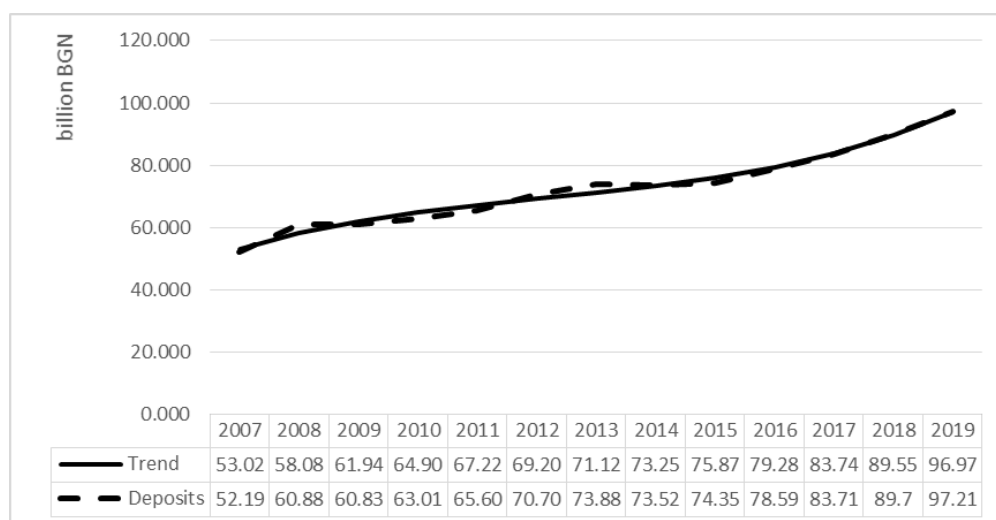
Results from the constructed eleven econometric models describing the dynamics of deposits in banks in Bulgaria

Models	Characteristics of the models				
	Coefficient of determination	F_{em}	Degree of freedom 1	Degree of freedom 2	Significance level
$Y_t = \beta_0 + \beta_1 \times t + \varepsilon_t$	0.949	203.762	1	11	0.000
$Y_t = \beta_0 + \beta_1 \ln t + \varepsilon_t$	0.820	49.962	1	11	0.000
$Y_t = \beta_0 + \frac{\beta_1}{t} + \varepsilon_t$	0.557	13.850	1	11	0.003
$Y_t = \beta_0 + \beta_1 \times t + \beta_2 \times t^2 + \varepsilon_t$	0.961	123.241	2	10	0.000
$Y_t = \beta_0 + \beta_1 \times t + \beta_2 \times t^2 + \beta_3 \times t^3 + \varepsilon_t$	0.985	194.704	3	9	0.000
$Y_t = \beta_0 \times \beta_1^t + \varepsilon_t$	0.959	256.962	1	11	0.000

Models	Characteristics of the models				
	Coefficient of determination	F _{em}	Degree of freedom 1	Degree of freedom 2	Significance level
$Y_t = \beta_0 \times t^{\beta_1} + \varepsilon_t$	0.881	81.818	1	11	0.000
$Y_t = e^{\beta_0 + \frac{\beta_1}{t}} + \varepsilon_t$	0.643	19.831	1	11	0.001
$Y_t = e^{\beta_0 + \beta_1 \times t} + \varepsilon_t$	0.959	256.962	1	11	0.000
$Y_t = \beta_0 \times e^{\beta_1 \times t} + \varepsilon_t$	0.959	256.962	1	11	0.000
$Y_t = 1/(1/u + \beta_0 \times \beta_1^t) + \varepsilon_t$	0.959	256.962	1	11	0.000

The cubic model has been chosen as the most appropriate. The trend in the change in deposits is best presented through it. It has the highest values of the coefficient of determination of more than 90% and more precisely 98.5%, therefore around 98% of deposits' variation is covered by the model. The specified trend model is:

$$Y = 46,499 + 7,357 \times t - 0,877 \times t^2 + 0,047 \times t^3 + \varepsilon$$



Source: BNB, own calculations.

Figure 4. Dynamics of deposits in the banking system in Bulgaria and a trend over the period 2007 – 2019 (in BGN bln)

The analysis shows that the parameters of the model are statistically significant and there is a consistent upward trend of deposits during the reviewed period.

2. Forecast of the gross loans and advances and deposits in banks in Bulgaria in 2020 and 2021

In addition to describing patterns of gross loans and advances and deposits in banks in the country in the period 2007–2019, trend modelling can also be used to forecast the development in the next several years. Although gross loans and advances and deposits in banks in the country depend on various factors, an attempt was made to forecast their values in the following years using econometric models.

The forecast of the change in bank indicators was carried out on the basis of their determined and modelled trend. The forecast was carried out on two stages:

- First stage – the trend in gross loans and advances and deposits in banks in Bulgaria was modelled on the basis of data for the forecasted indicators for the period 2007–2019;

- Second stage – assuming that the established development patterns of the bank indicators chosen during the analyzed period will continue in the forecasted period, a forecast of their future development for 2020 and 2021 was made.

In order to obtain realistic and trustworthy statistical forecasts the following key moments should be kept in mind:

- choosing appropriate functions for modelling the trends – the functions were selected at the previous stage using eleven econometric models;

- the parameters obtained can be considered as stable, as no different behaviour of the studied time series was observed in the different periods;

- it can be presumed that trends in gross loans and advances and deposits in banks in the country will continue in subsequent years;

- the modelled trends will be extrapolated until 2021 and a prediction will be made for the average (expected) values of gross loans and advances and deposits in banks in Bulgaria;

- the forecast confidence intervals (i.e. the limits between which the values of gross loans and advances and deposits in banks may fluctuate in the following years) were calculated with 95% probability.

2.1. Gross loans and advances

The forecast was developed under the assumption that the estimated patterns for the period 2007 – 2019 will remain unchanged in the forecast period. A cubic model was chosen as the most appropriate methods for modelling the trend in gross loans and advances in the Bulgarian banking system. This model was also used to predict the indicator values in the short

term. The prediction for gross loans and advances in banks in 2020 and 2021 was made on the basis of the following model:

$$Y_{N+L}^* = 40,562 + 8,760 \times t_{N+L} - 1,096 \times t_{N+L}^2 + 0,058 \times t_{N+L}^3$$

where:

N is the number of subperiods (years) in the historical period for which the trend of developments has been modelled;

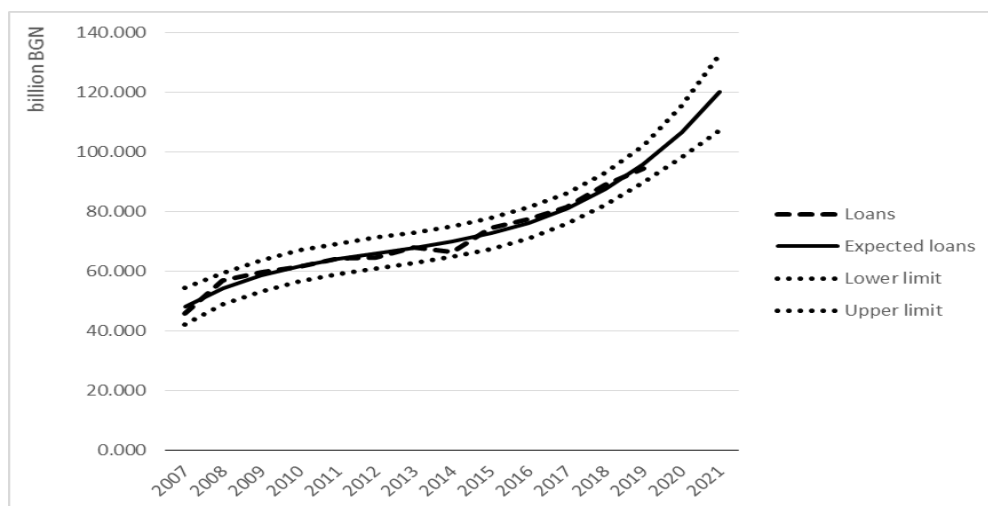
L – the forecast subperiod (forecast year).

The calculated forecast values will only be observed if there is patterned development or will be observed if the development in the change of gross loans and advances in banks is a result only of the influence of constantly acting factors that do not change their strength and direction of influence. The estimated forecast values for gross loans and advances in banks in Bulgaria in 2020 and 2021 are:

- for 2020: $y_{2020}^* = \hat{y}_{N+1} = \hat{y}_{14} = 106.769$ billion BGN; $98.201 \leq y_{2020}^* \leq 115.336$.

- for 2021: $y_{2021}^* = \hat{y}_{N+2} = \hat{y}_{15} = 120.158$ billion BGN; $107.380 \leq y_{2021}^* \leq 132.936$.

Confidence intervals are valid at 95% confidence level. Figure 5 shows the predicted values of the gross loans and advances in banks in 2020 and 2021.



Source: BNB, own calculations.

Figure 5. Forecast values for gross loans and advances from banks in Bulgaria until 2021 (billion BGN)

Table 8

Forecast values for gross loans and advances from banks in Bulgaria until 2021 (billion BGN)

Year	Expected gross loans and advances	Lower limit of the forecast	Upper limit of the forecast
2020	106.769	98.201	115.336
2021	120.158	107.380	132.936

Source: BNB, own calculations.

On the basis of the forecast, if it is assumed that trends in loans from banks continue for the future, with 95% probability it can be accepted that in 2021 their volume will be between BGN 107.380 bln and BGN 132.936 bln. Based on the performed analysis we can assume that if the trend related to bank loans in the country from the previous years remain unchanged in the next two years, in 2021 the gross loans and advances in the Bulgarian banking system can be expected to total BGN 120.158 bln (Table 8).

Gross loans and advances from banks grew year by year throughout the reviewed period except in 2014. The results of the forecast also show that in the future the volume of bank gross loans and advances will grow. These results reflect the trend of increase in bank lending in recent years and show that it will continue in the short term.

2.2. Deposits

The cubic model was chosen to define the trend and forecast its future development as it has the highest coefficient of determination, i.e. the highest explanatory power. The forecast was made under the assumption that the established trend during the period 2007 – 2019 will continue over the forecast period. The expected volume of deposits in banks in 2020 and 2021 was estimated on the basis of the specified non-linear trend model:

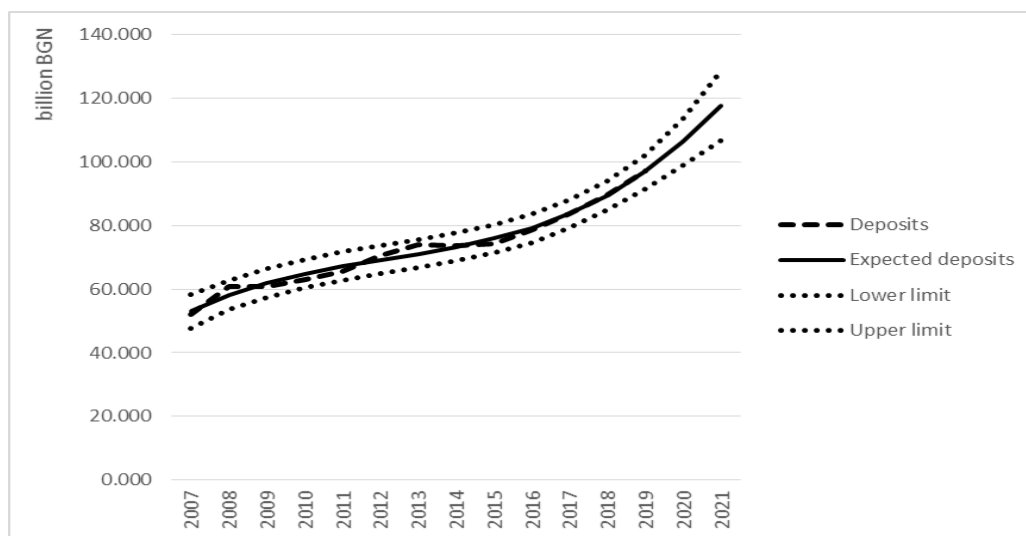
$$Y_{N+L}^* = 46,499 + 7,357 \times t_{N+L} - 0,877 \times t_{N+L}^2 + 0,047 \times t_{N+L}^3$$

The following forecast values for deposits in banks for 2020 and 2021 were calculated:

- for 2020: $y_{2020}^* = \hat{y}_{N+1} = \hat{y}_{14} = 106.303$ billion BGN; $98.917 \leq y_{2020}^* \leq 113.689$;

- for 2021: $y_{2021}^* = \hat{y}_{N+2} = \hat{y}_{15} = 117.815$ billion BGN; $106.799 \leq y_{2021}^* \leq 128.831$.

Confidence intervals are valid at 95% confidence level. Figure 6 presents the predicted values for deposits in banks for 2020 and 2021.



Source: BNB, own calculations.

Figure 6. Forecast values for deposits in banks in Bulgaria until 2021 (in BGN bln)

Table 9

Forecast values for deposits in banks in Bulgaria until 2021 (in BGN bln)

Year	Expected deposits	Lower limit of the forecast	Upper limit of the forecast
2020	106.303	98.917	113.689
2021	117.815	106.799	128.831

Source: BNB, own calculations.

Results from the forecast indicate that, assuming that the trends in deposits in the Bulgarian banking system continue in the short term, it can be predicted with 95% probability that in 2021 their volume will be between BGN 106.799 bln and BGN 128.831 bln. On the basis of the analysis it can be assumed that if trends in deposits in the banking system during the years under consideration also continue for the following years, it can be expected that in 2021 deposits in banks will amount to BGN 117.815 bln (Table 9).

The forecast results show that in the short term deposits in banks will rise. Depositors have confidence in the stability of the Bulgarian banking system and this is reflected in the increase in household savings in banks. These funds are a key resource for banks that they grant in the form of loans.

Due to the less developed financial market, in Bulgaria banks are a key source of financing for households and non-financial corporations. Customers keep a considerable amount of financial resources in the form of deposits in banks. Thus the Bulgarian banking system accumulates large amounts of financial resources and the banks are highly liquid. An increase of the volume of bank loans to households and non-financial corporations was observed as well.

The positive trend of the banks' development is expected to continue in the short term. If the existing trends in the development of gross loans and advances and deposits in banks continue, their values should continue to grow.

The negative impact of the COVID-19 pandemic and measures for social distancing have highest impact on the real economy. Many companies, especially small and medium-sized enterprises, as well as natural persons affected by the coronavirus pandemic may face shortage of liquidity and difficulties in repayment of their financial and other obligations in a timely manner. This could in turn influence credit institutions, as the delay in repayment of debts increases the number of defaults and additional costs and capital requirements for credit institutions (BNB. Press release from 3 April 2020, bnb.bg/PressOffice/POPressReleases/POPRDate/PR_20200403_BG).

The European banking authority (EBA), the ECB and central banks of the EU Member states take measures aiming at decreasing the impact of the crisis caused by COVID-19 on the EU banking sector. These measures provide for the opportunity for greater flexibility of banks in alleviating the negative effects from the crisis for their clients. These measures provide for alleviations for the debtors affected by the COVID-19 pandemic as payments suspension or deferment for a certain period which allows for debtors to restart their regular payments after the situation comes back to normal (EBA, Guidelines on legislative and non-legislative moratoria on loan repayments applied in the light of the COVID-19 crisis, 2 April 2020).

More than eighty thousand bank clients affected by the COVID-19 pandemic have deferred their obligations in the first three months of the implementation of the rules voted by the BNB (Association of Banks in Bulgaria, Quarterly bulletin, July 2020).

The BNB has taken a package of measures of BGN 9.3 bln to mitigate the effects of the crisis. These measures are intended to maintain the stability of the banking system and increase its flexibility in reducing the negative effects of the limitations during the pandemic for natural persons and companies (BNB, Press release from 19 March 2020, bnb.bg/PressOffice/POPressReleases/POPRDate/PR_20200319_BG).

The government also took certain measures to support the banking sector, such as a moratorium on penalties in case of delay in payment on bank loans and increase in the capital of Bulgarian Development Bank AD with 700 million BGN of which 500 million BGN were allocated to guarantees on bank loans and 200 million BGN were intended for the interest-free loans for consumption to natural persons on unpaid leave (Association of Banks in Bulgaria, Quarterly bulletin, March 2020).

Conclusion

The main conclusions which can be made from the analysis are:

- in analyzing the trends in the change in gross loans and advances and deposits in banks strong trends have been established in the change of all indicators;
- gross loans and advances from banks in the country have a strong upward trend and this trend is very likely to continue in the future;
- deposits in the banking system in Bulgaria also have a strong upward trend during the analyzed period and it can be expected that this trend will continue in the next two years;
- it should be noted that the most adequate econometric model for describing the trends in the bank indicators studied is the cubic model. This could probably be explained with the interrelation between loans and deposits

and their dynamics, which is affected by the ongoing processes in the banking sector in Bulgaria and at international level;

- the calculations show that no significant changes are expected in 2021 in the analyzed bank indicators. According to the forecasts the upward trend in gross loans and advances and deposits in banks will continue;

- the measures taken in Bulgaria for reducing the impact of the COVID-19 pandemic on the banking sector were timely and were coordinated with the EBA. The acceptance of Bulgaria to the ERM II and the banking union is likely to have a beneficial effect;

- the developed models' high explanatory power (the high values of the coefficient of determination) reaffirms the opinion that the reviewed trends in the bank indicators included in the study will also continue to be observed in the following years and it gives high level of reliability to the developed predictions.

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