

LABOUR PRODUCTIVITY IN THE MINING INDUSTRY – TRENDS AND PERSPECTIVES

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ABSTRACT. The report summarizes the trends in the labour productivity index of the world, European (EU-28), and Bulgarian economies for the period between 2000 and 2016. It represents a prediction of the International Labour Organization for its dynamics up to 2021. The changes in the labour productivity of Bulgaria and in the "Industry" sector for the indicated period are examined. They are determined on the basis of current prices and of 2010 prices per employee and per hour worked. The tendencies in the change of the labour productivity for the "Mining and Quarrying" sub-sector for the period between 2008 and 2015 are described, based on the income generated by the activity per employee, and some conclusions are drawn.

Keywords: labour productivity, mining industry, economic analysis

ПРОИЗВОДИТЕЛНОСТ НА ТРУДА В МИННАТА ИНДУСТРИЯ – ТЕНДЕНЦИИ И ПЕРСПЕКТИВИ

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РЕЗЮМЕ. В доклада са обобщени тенденциите в изменението на производителността на труда на световната, европейската (ЕС-28) и българската икономика за периода 2000 ÷ 2016 г. Представена е прогноза на Международната организация на труда за нейното развитие до 2021 г. Проследено е изменението ѝ за България и за сектор „Индустрия“ през посочения период, като е определена на база текущи цени и по цени от 2010 г. на един зает и на един отработен час. Изведени са тенденциите в производителността на труда за подсектор „Добивна промишленост“ за периода 2008 ÷ 2015 г., изчислена на база приходи от дейността на едно заето лице и са направени някои заключения.

Ключови думи: производителност на труда, минна индустрия, икономически анализ

Introduction

The increase in world production and consumption of mineral deposits has become a favourable factor for the dynamics of mining and processing of underground natural resources and, hence, for the realised labour productivity in the mining industry. In recent years, the Bulgarian mining industry has achieved one of the highest rates of labour productivity as compared to the other sub-sectors within the "Industry" sector, as well as within this country's national economy.

The objective of the current report is to outline some trends and perspectives for the development of the labour productivity indicator and to reveal the factors for its raising through the analysis of the available statistical information on a global, European, national and industrial branch level.

Situation and dynamics of labour productivity for the period between 2000 and 2016

Fig. 1 shows the dynamics of variation for labour productivity determined in US \$ in terms of the Purchasing Power Parity (PPP) per employee in the world, the European (EU 28) and the Bulgarian economies for the period between 2000 and 2016. The figure also gives the International Labour Organisation (ILO) forecast for its development until 2021. The figure is based on ILO data.

The data in Fig. 1 shows that during the period 2000 ÷ 2016, the world, American, European and Bulgarian economies have achieved a steady rise in labour productivity, determined in international US\$ in terms of purchasing power parity per employee. The only exception is the value of the 2009 indicator, when the negative effects of the global financial and economic crisis on all economic systems were sensed most acutely. In 2009, the indicator for Bulgaria shrank by US\$ 280 per employee, or by 0.80%; for the EU, this drop was by 2054 US\$ per employee, or by 2.63%; on a global scale it was by US\$ 166 per employee, or 0.71%. In 2008, the American economy reported a fall of US\$ 166 per employee, or 0.16%.

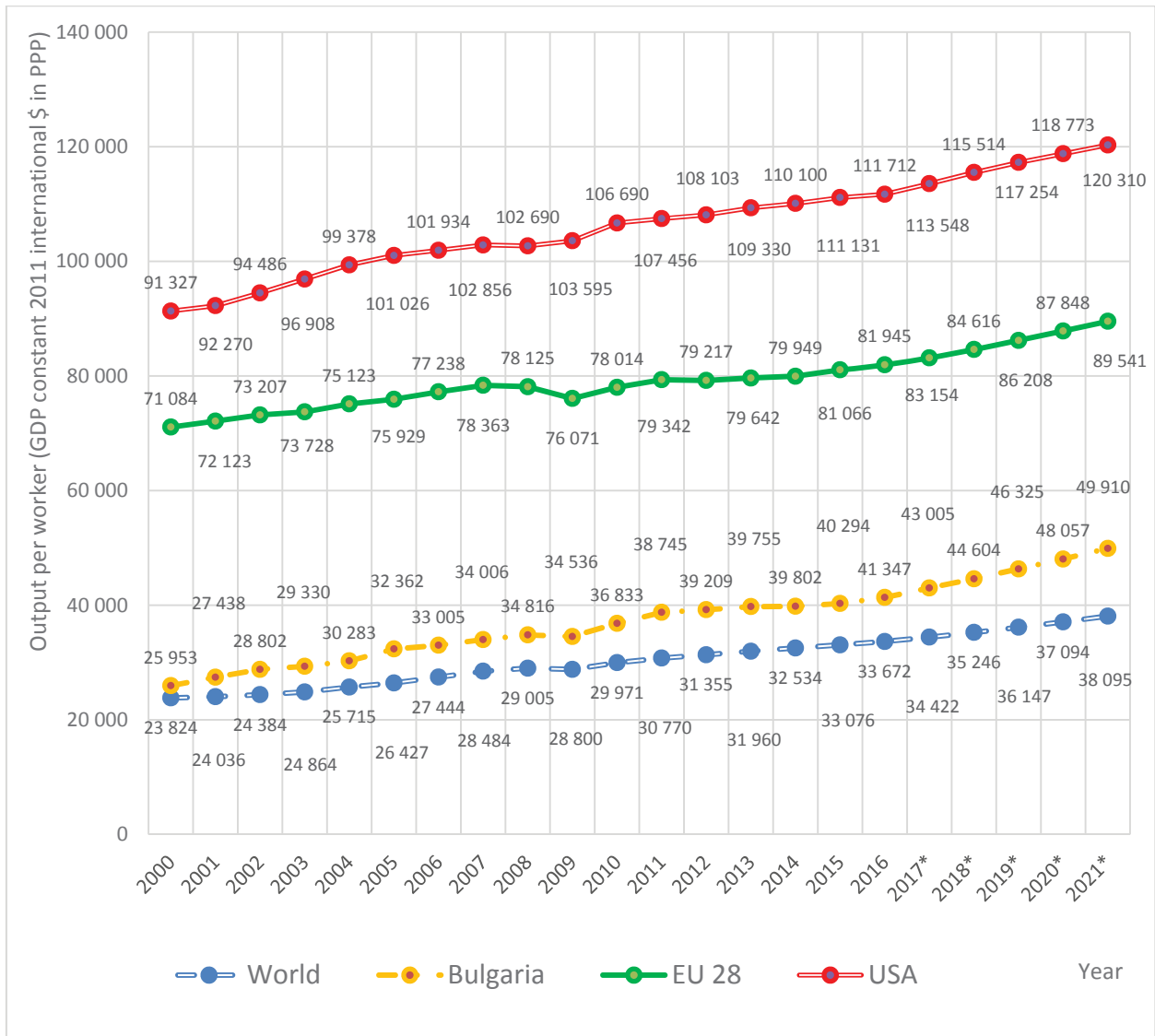


Fig. 1. Labour productivity per worker (GDP constant 2011 international US\$ in PPP)
Source: International Labour Organization, www.ilo.org, 2017.

The ILO's forecast for the period 2017 ÷ 2021 is for a sustainable growth. Of all monitored economies, the highest average annual growth for the forecast period, amounting to 3.21%, is envisaged for Bulgaria. The world economy ranks next with a rate of 2.13%, followed by the EU and the US - with rates of 1.54% and 1.19%, respectively. Expectations for Bulgaria are justified as this country started at very low levels: US\$ 41,347 per employee, as compared to US\$ 81,945 per employee in the EU 28 (about 50% lower) or to US \$ 111,712 per employee (63% lower) in 2016.

Labour productivity in Bulgaria

The *Infostat* information system of the National Institute of Statistics (NSI) offers information about the analysed period between 2000 and 2016 concerning the realised labour productivity in the national economy of Bulgaria which is determined on the basis of the gross domestic product (GDP)

per employee at current prices and at constant prices as of 2010. Labour productivity is also determined on the basis of the GDP per spent man-hour at current prices and at constant prices as of 2010.

Fig. 2 presents the change in labour productivity for Bulgaria, determined on the basis of GDP per employee at current prices and at constant prices as of 2010. The graph is made using *Infostat* data

From the information provided in Fig. 2, it can be seen that the realised labour productivity for the period 2000 ÷ 2016 at constant prices and at constant prices was marked by a sustainable growth. Again, the year 2009 is an exception: then the constant price index as of 2009 was down by BGN 382 per employee, i.e. by 1.90%. For the period 2000 ÷ 2016, the indicator realised a 245.01% growth at current prices, whereas at constant prices the rise was 63.58%.

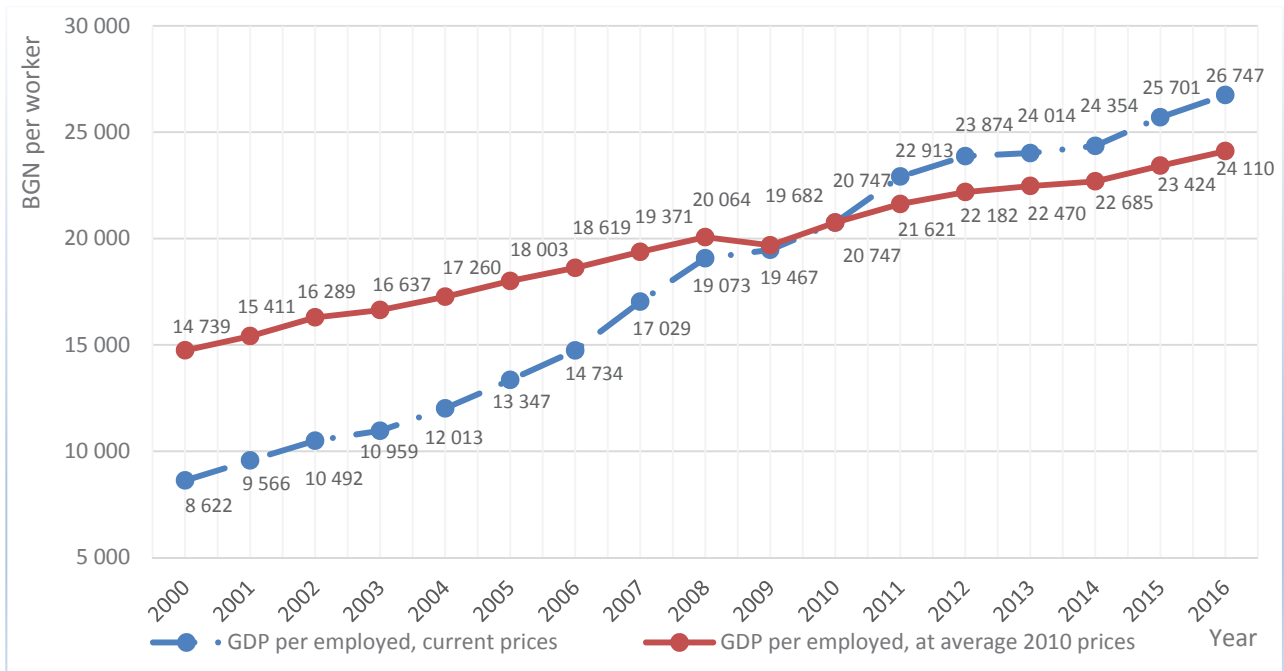


Fig. 2. Labour productivity in Bulgaria
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

In 2013 and 2014, labour productivity slowed down, but in 2015 and 2016 this delay was compensated and faster growth was reported. In 2016, the growth of labour productivity at constant prices was BGN 686 per employee, or by 2.93%, whereas at current prices it was BGN 1,046 per employee, or by 4.07%. It is important that this trend of labour productivity growth be maintained, since it leads to an increase in

competitiveness against the framework of shrinking labour supply and the presence of wage pressures.

Fig. 3 shows the change in labour productivity for Bulgaria, determined on the basis of GDP per hour worked at current prices and at constant prices as of 2010. The graph is made using *Infostat* data.

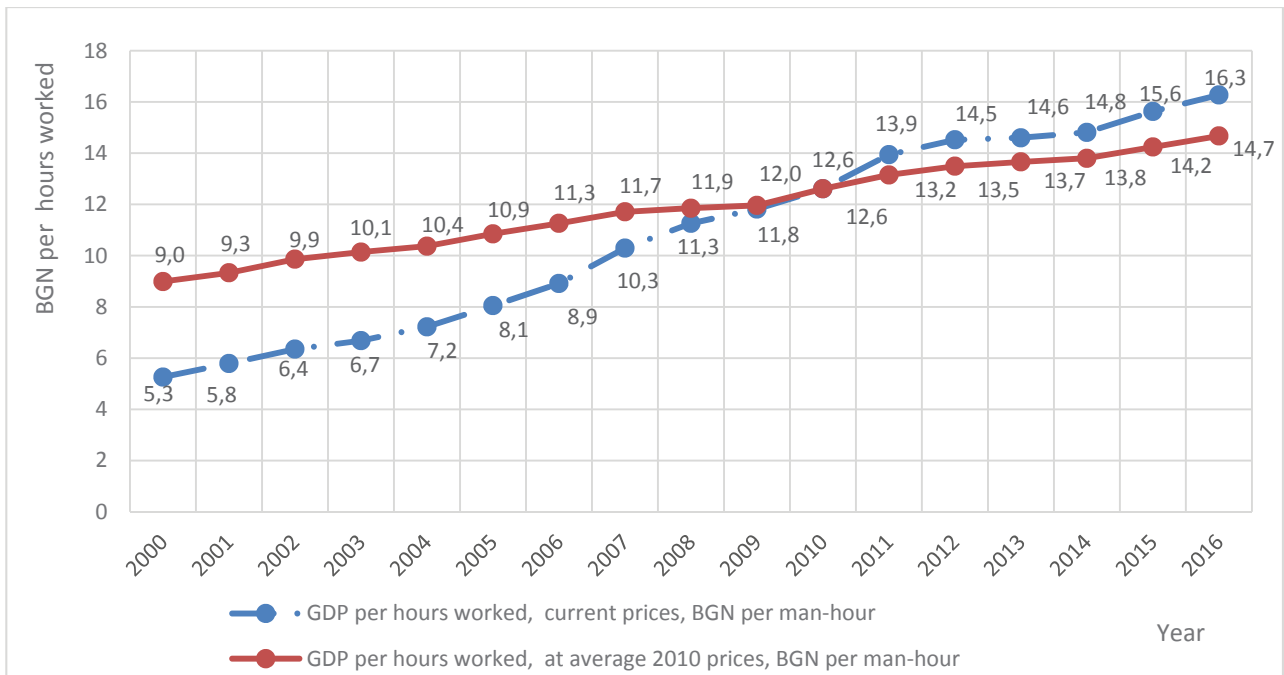


Fig. 3. Labour productivity in Bulgaria (GDP per hours worked)
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

The data in Fig. 3, it can be seen that the achieved labour productivity per hour worked at current prices and at constant

prices as of 2010 for the period 2000 ÷ 2016 shows moderate growth, with periods of faster and slower growth. Here, again,

the exception is the year 2009 when the constant price indicator as of 2010 decreased by BGN 0.1 per man-hour, or by 5.26%. Within the period 2000 ÷ 2016, the indicator achieved a growth at current prices of BGN 11.0 per man-hour, or by 207.55%, whereas the growth at constant prices was of BGN 5.7 per man-hour, or by 63.33%.

In 2013 and 2014, the achieved labour productivity slowed down, but 2015 and 2016 saw again a faster growth of the indicator. In 2016, the growth of labour productivity at constant prices was BGN 0.5 per man-hour or by 2.93%, and at current prices it was BGN 1,046 per employee, or by 3.52%.

In the period of rapid growth in labour productivity, work pay increased by 7% (double the labour productivity). Despite the disproportion observed, the low pay levels in the country are not a motivating factor for increasing labour productivity.

Labour Productivity in the "Industry" Sector of Bulgaria

Fig. 4 shows the dynamics of the labour productivity indicator in the "Industry" sector of the national economy of Bulgaria, determined on the basis of gross value added (GVA) per employee at current prices and at prices as of 2010 for the period between 2000 and 2016. The graph is made using *Infostat* data.

From the information in Fig. 4 it is evident that during the period 2000 ÷ 2016, the "Industry" sector maintained a steady growth of labour productivity at constant prices as of 2010. There was one exception, in 2008, when the indicator dropped by BGN 19 per employee, or by 0, 11%. Within the period analysed, the labour productivity of industrial production at constant prices rose by BGN 9959 per employee, or by 76.74%. The prominent dynamics of the current price indicator is due to the presence of periods with higher and lower inflation, as well as those of higher and lower employment in the sector.



Fig. 4. Labour productivity in sector Industry at Bulgaria (GVA per employed)
 Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

The Industry sector differs from other sectors in terms of an increase in investment and innovation in manufacturing. The orientation towards technologically new production results in a new outlook on the knowledge, skills and competences of the

employees, and the improvement of those brings about an increase in labour productivity.

Labour productivity in the “Mining and Quarrying” sub-sector in Bulgaria

Table 1 focuses on labour productivity in the “Mining and Quarrying” sub-sector for the period between 2008 and 2015. Two variants are calculated that are based on information concerning revenue produced by activity and by added value (VA). The latter is provided by *Infostat* sources and also by information as given by NSI concerning factor expenditures relating to the number of employees in the sub-sector.

Fig. 5 shows the change in labour productivity of the enterprises from the “Mining and Quarrying” sub-sector in Bulgaria for the period between 2008 and 2015. The graphs are made taking into consideration the data from Table 1.

Fig. 5 clearly shows the differences between the two variants of the labour productivity indicator based on operating income

and value added in terms of factor expenditures for the period (2008 ÷ 2015). The most obvious variations in the change in indicators are found in 2008, 2009, and 2015. These can be attributed to the variations in realised market volumes and in the realisation prices. The operating income in the “Mining and Quarrying” sub-sector per employee during the period 2008 ÷ 2015 came down and were most obvious in 2009 when the indicator for 2009 dropped by BGN 54,247 thousand per employee, or by 40.28%.

Within the period 2008 ÷ 2015, the indicator decreased by BGN 20,112 thousand per employee, or by 14.93%. In 2010, 2011, and 2012, the indicator achieved sustained significant growth, followed by a decline in 2013 and 2014. In 2015, labour productivity rose by BGN 3,987 thousand per employee or by 3,61%.

Table 1
Labour productivity in the “Mining and Quarrying” sub-sector

Indicator	Year							
	2008	2009	2010	2011	2012	2013	2014	2015
Production value, thousand BGN	4 020 688	2 122 084	2 502 713	3 108 505	3 177 390	2 745 745	2 648 808	2 848 348
Number of persons employed	29 854	26 384	24 788	24 932	24 916	24 498	23 954	24 862
Value added at factor cost, thousand BGN	918 262	904 969	1 205 737	1 584 789	1 659 949	1 299 009	1 151 675	1 155 233
Labour productivity (Production value per employed), thousand BGN per worker	134,678	80,431	100,965	124,679	127,524	112,080	110,579	114,566
Labour productivity (Value added at factor cost), thousand BGN per worker	30,708	34,039	48,316	63,227	66,318	52,730	47,855	46,267

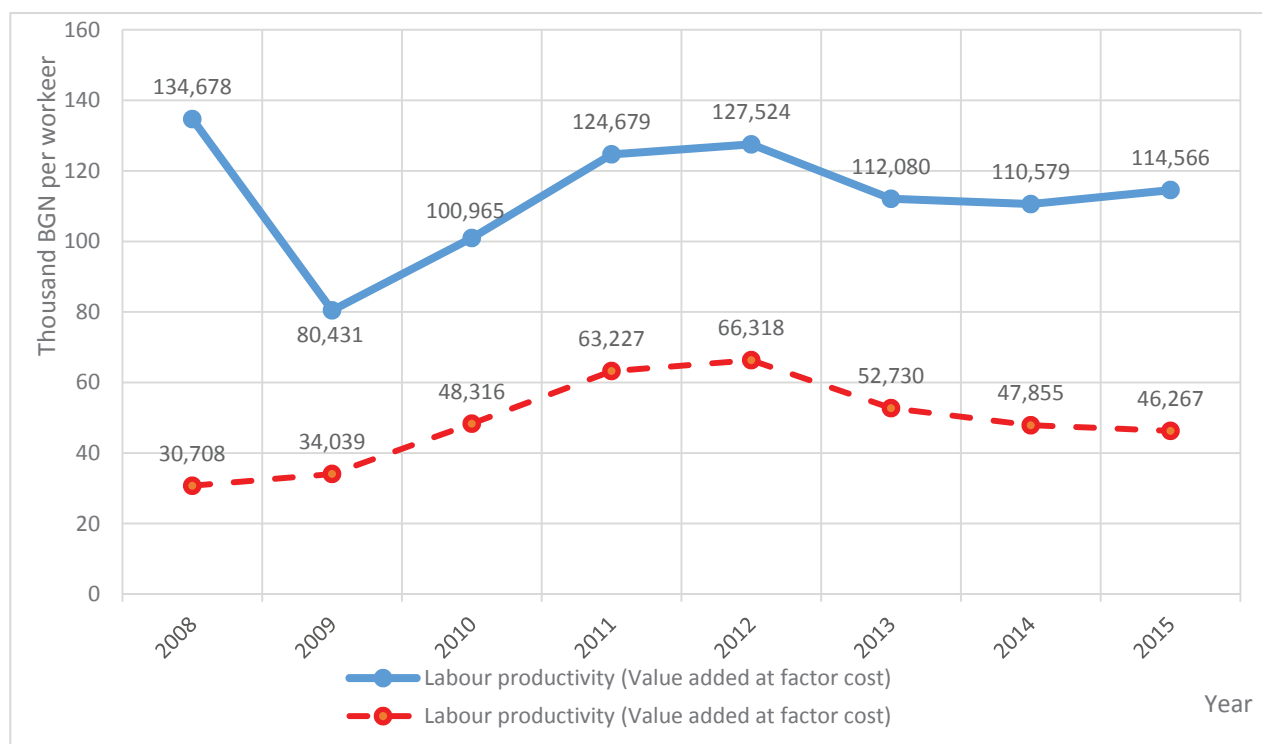


Fig. 5. Labour productivity in subsector Mining and Quarrying in Bulgaria, thousand BGN per worker
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=250.

The variation in the magnitudes involved during the different periods exerts impact on the change of the labour productivity indices determined either on the basis of operating income or on VA according to factor expenditures. In order to determine the individual factor impact of this variation, a determinate factor analysis can be carried out using the chain substitution method or the integrated method (Mitev, 2008), or, likewise, the index method (Donchev, 2004).

Conclusion

The world, American, European and Bulgarian economies have constantly been on the rise in terms of labour productivity for the period 2000 ÷ 2016. The ILO forecast until 2021 is for a continuous sustainable increase in the indicator. The provisional average annual growth rate for Bulgaria up until 2021 is 3.21% per year. Labour productivity in the Bulgarian economy as a whole and in the "Industry" sector in particular, for the period 2000 ÷ 2016 have achieved a steady growth per employee and per hour worked. This accounts for the favourable trends for the indicators within a medium-term range.

Within the period between 2008 and 2015, labour productivity in the Bulgarian "Mining and Quarrying" sector, determined on the basis of sales earnings per employee, was characterised by high dynamics, namely a sharp decline in

2009, a rise from 2010 to 2012, a slowdown in 2013 and 2014, and a low growth rate in 2015. Currently, we witness an increase of investment in this sub-sector, especially with relation to human capital. The increase in the qualification of the human resources brings about an increase of the overall labour productivity. Hence, our expectations are for a long-term growth of the economy.

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