

# Macroeconomic indicators of raw material policy in Slovakia

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**Abstract.** This paper points to the development tendencies of selected macroeconomic indicators of raw material policy in Slovakia, which forms an integral part of the national economic policy of the state. It describes in detail selected macroeconomic indicators of exploitation of raw materials, which form the basic platform of functioning of all national economic sectors in Slovakia. It also points out the benefits for the Slovak economy in the form of revenues from mining activities to the state budget, municipal budget and environmental fund. At the end the article summarizes the partial findings from the development tendencies of macroeconomic indicators of raw material policy, which is currently an integral part of the industrial policy of the European Union.

## 1 Introduction

Raw materials are important strategic resources not only for individual sectors of the economy, for the EU as a whole, but also for individual states, because they bring considerable revenues to the state budget and at the same time support socio-economic development at a lower level - at regional level. But they are also a negative form of human perception, because mining is often associated with negative phenomena in the country. Not ignoring the political risk, associated not only with legislative parameters, but also with the dissatisfaction of citizens who are active participants in politics through elections [1]. This is the reason why should raw material (RM) policy also take their needs into account as well as sustainable economic growth, which is conditioned by providing of reliable RM supply and proper protection of living environment [34].

RM policy has become an integral part of the European Union's industrial policy. At the Member State level it requires connection with industrial policy, innovation policy, resource efficiency, environment and economic competition. This integrated perspective will enable industry to use the necessary RMs in a smart and sustainable way, what is contributing to the strategy "European Union 2020". For these reasons raw materials policies at EU Member State level should include the following partial activities:

- to promote resource efficiency, namely primary energy and RM resources, so as to divide economic growth from growth in resource consumption,

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- to strengthen research and development with regard to the possibility of replacing critical raw materials,
- to support existing or new RM extractions in Member States which are in-step with applicable environmental, social, health and safety legislation,
- to promote the supply of raw materials from domestic offer, these should be one of the pillars of all actions of RM policy,
- to maintain and increase employment in the European extractive sector by ensuring continuous education and training of the workforce, while the transition to more sustainable mining activities should be accompanied by social dialogue at all levels,
- to develop a coherent policy “urban mining” (extracting raw materials from municipal waste), which main goals is restoring and making available these resources of valuable raw materials,
- to promote the recycling of raw materials and the need to ensure the highest level of recycling where it is economically and technically feasible, including the exploitation of extractive wastes containing a significant amount and spectrum of different metals [2].

In addition to the above mentioned objectives of RM policy of EU in interaction with RM policy of Slovakia, we have analyzed guidelines, objectives, instruments, priorities, as well as national policies, plans, initiatives and measures with the impact and requirements for the efficient exploitation of raw materials as it is described in Table 1.

**Table 1.** Objectives of raw materials policy of Slovakia in the sense of the principles and principles of sustainable development.

<b>EU policies, directives, goals, tools, priorities with impact on raw material industry</b>
European raw material initiative
European innovation partnership and Knowledge innovation community KIC RM
Digital economy
European technological platform for sustainable raw material sources
EU policy in the area of raw materials: ERA-MIN
EU policy in the area of raw materials: Circular economy
EU tools: European Institute of Innovation and Technology (EIT)
EU tools: Horizon 2020 - SC5
Natura 2000
<b>National policies, initiatives, and tools with impact on raw material policy</b>
Government Program Statement SR
The strategy of permanent sustainable multispectral development and strengthening of competitive ability of Slovakia
Strategy for research and innovation for intelligent specialization SR
Slovakian economic policy
Energetic policy SR
Circular economy SR
Strategy Industry 4.0 SR
Digital economy – unified digital market
Environmental policy SR
Program for the waste economy in SR 2016-2020
The conception of geological research in Slovakia

As we mentioned above, raw materials can be considered as a basic platform of all production processes of industries of the Slovak Republic (SR), which determine the continuous development of its economy. The majority part of raw materials includes non-ore, construction and energy raw materials, while the production of larger part of non-ore and construction raw materials (limestone, dolomite, magnesite, gypsum, building stone, etc.) covers their domestic consumption in substantial rate.

## **2 Development of selected macroeconomic indicators of raw material policy in Slovakia**

The exploitation of raw materials directly and indirectly affects also to its socio - economic area of sustainable development, which can be understood in accordance with § 6 of Act No. 17/1992 Coll. about the environment as „ *development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs and also do not cut nature diverse and also save natural functions of ecosystems*”.

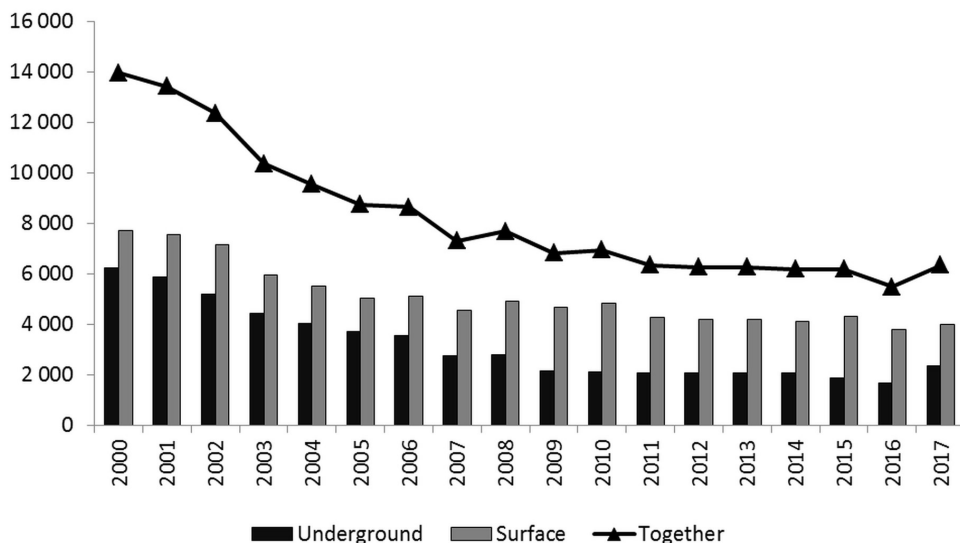
In view of the above, we decided to follow the development tendencies of selected macroeconomic indicators of socio-economic area of raw materials exploitation, among which we included:

- gross value added,
- foreign direct investments,
- Gross Domestic Product,
- development of state revenues from the raw materials exploitation.

### **2.1 Development of registered employment in the area of raw material policy of the SR**

Employment in mining organizations recorded more or less decreasing trend of development, which connected logically with development of RM mining and using of technical and technological equipment during RM mining in Slovakia. During whole analyzed period higher employment had been recorded for employees, working at surface mining, which is again logically connected with prevailing surface way of RM exploitation in Slovakia. The highest employment had been recorded in 2000, when employment achieved level 13 968 employees (6 231 at deep mining and 7 737 at surface mining) and on the other hand the lowest level was achieved in 2016, when employment decreased to 5 476 employment (from which 1 666 in underground and 3 180 at surface mining. In following period total employment decreased to 45.5% of employment in 2000 with average number of employees 8 273 employees.year<sup>-1</sup>.

In underground mining we recorded in analyzed period average employment - 3 169 employees.year<sup>-1</sup> with its decrease in 2017 against 2000 by 62.3% (which means 3 884 persons) from original employment. At the surface mining decrease of employment was rather smooth, when recording decrease by 48.2% (which means 3 731 persons) from original employment in 2000, while averagely at surface mining 5 105 employees.year<sup>-1</sup> had been employed (Fig. 1.).



**Fig. 1.** Development of employment in mining organization of Slovakia [own processing according HBÚ].

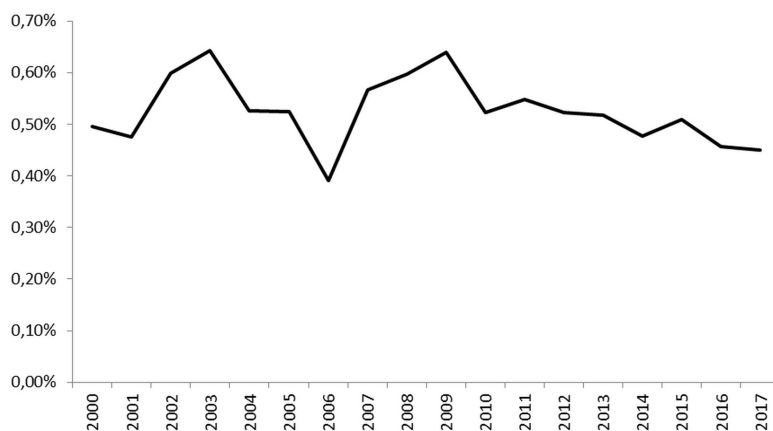
## 2.2 Development of gross value added in the field of raw material policy

Exploitation of RM base contributes similarly to the creation of value added, which can be characterized as difference between production of commodities in basic prices and intermediate consumption of production factors in purchase prices. Production consists of products, produced in common accounting period and intermediate consumption consists of value of products and services, consumed in production process as inputs, excluding investment property, which consumption is reflecting in consumption of fixed capital. Also gross value added recorded in analyzed period fluctuating character of development with average value - 56 616 mil. Eur.year<sup>-1</sup>, while the highest value was recorded in 2017, when this macroeconomic index achieved 73 602 mil. Eur, on the other hand the lowest value was in 2000, when value added recorded 37 698 mil. Eur (Table 2.). Similarly as employment development, also in the frame of gross value added creation in mining sector we recorded fluctuating tendency in analyzed period (Fig. 2.), while mining recorded average value added at level 295.81 mil. Eur.year<sup>-1</sup>, which means 0.53% average rate. Generally we can state that the highest value added in mining had been recorded in 2009 with level 372.83 mil. Eur, on the other hand the lowest value was recorded in 2000, when mining recorded value added at level 186.65 mil. Eur. Comparing 2000 and 2017 we found gross value added, produced by mining, decreased in 2017 against 2000 by 144.56 mil. Eur. The highest rate of mining on value added was recorded in 2003 with level 0.64%. On the other hand the lowest rate of mining on value added decreased in 2017 against 2000 by 0.05% (Fig. 2.).

**Table 2.** Development of gross value added in Slovakia

Year	SR [mil. Eur]	Mining [mil. Eur]
2000	37 698,76	186,65
2001	39 486,60	187,48

2002	41 118,53	246,22
2003	42 973,05	275,94
2004	44 973,02	236,28
2005	47 492,91	249,22
2006	52 266,60	204,73
2007	58 021,92	328,49
2008	61 691,94	368,03
2009	58 314,00	372,83
2010	61 368,25	320,89
2011	62 898,59	344,24
2012	64 433,97	336,65
2013	65 167,74	337,71
2014	66 708,76	318,14
2015	69 295,49	352,96
2016	71 585,46	326,86
2017	73 602,75	331,21



**Fig. 2.** Development of rate of mining on gross value added in Slovakia [own processing according SO SR]

### 2.3 Development of foreign direct investments in the field of raw material policy of the SR

Development of mining and connected single exploitation of RM base is determined also by domestic and foreign investments that support increasing of economic effectiveness. Mainly foreign direct investment (FDI) in Slovakia influences positively sustainable development, since they increase employment by creation of new working posts, GDP creation; they contribute to the implementation of innovative technologies or increasing of qualification of domestic human capital. FDI can be generally characterized as investment of money or other monetary values or rights with aim to base, obtain or

extend permanent economic relations of domestic investor to business in abroad, resp. foreign investor investing to business in Slovakia. Mainly due to the mentioned FDI and rate of mining on FDI is considered as direct indicator of dynamic development of Slovakia in interaction with investment attractiveness of Slovakia for foreign investors. FDI development in Slovakia is characterizes more or less by increasing trend with slight decrease against 2013 by 2.62%. According available data we can state that average FDI level in analyzed periods was approximately 27 140 447 tis. Eur.year<sup>-1</sup>, while exploitation of RM base recorded average FDI level 232 371 tis. Eur.year<sup>-1</sup> (Table 3.), with average rate on total FDI in analyzed period at level 0.88%.

**Table 3.** FDI development in Slovakia and mining

<b>Year</b>	<b>SR [tis. Eur]</b>	<b>Mining [tis. Eur]</b>
2000	4 097 365,44	43 508,43
2001	5 376 306,25	65 094,73
2002	7 270 627,89	63 859,35
2003	12 490 727,63	71 948,77
2004	15 141 732,45	86 089,53
2005	19 700 181,02	102 308,47
2006	23 338 906,57	312 402,28
2007	29 075 292,32	300 263,44
2008	35 846 869,24	350 298,28
2009	36 469 023,00	396 317,98
2010	37 665 095,00	426 960,00
2011	40 173 448,00	476 802,00
2012	42 304 005,00	497 996,00
2013	42 071 874,94	211 726,00
2014	40 969 239,26	209 928,00
2015	42 256 452,00	102 437,00

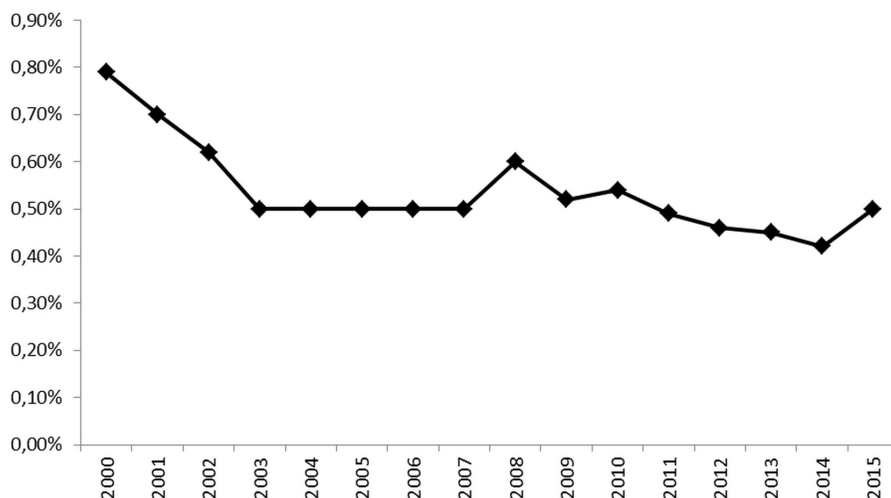
## **2.4 Development of Gross Domestic Product in the field of raw material policy of the SR**

Exploitation of RM base participates similarly as mentioned indexes of social and economic development also on the GDP development, which can be generally according Lisý et al., 2007 defined as “*summary of final goods and services, produced and provided during certain time period by production factors in Slovakia, without regard to their state correspondence*” [17]. GDP development had been ranked among basic indicators of economic effectiveness of Slovakia. Also this index, similarly as higher mentioned, recorded fluctuating trend. According available data we can state that in analyzed period 2000-2017 GDP recorded averagely 58 313.5 mil. Eur.year<sup>-1</sup>, while the highest value had been recorded in 2015 at level 78 896.44 mil. Eur and on the other hand the lowest value was recorded in 2000 at level 31 601.29 mil. Eur. Exploitation of RM base in Slovakia participated at the GDP creation in analyzed period averagely by 58 313.5 mil. Eur.year<sup>-1</sup>, while the highest level of RM base using on GDP in Slovakia had been recorded in 2008

(371.3 mil. Eur) and the lowest value was in 2002 (154.3 mil. Eur) (**Ошибка! Источник ссылки не найден.**). At evaluation of rate of RM base on GDP creation we can state that this was directly determined by development of single GDP in interaction with development of mining sector that in analyzed period recorded average rate on single GDP creation in Slovakia 0.54% year<sup>-1</sup>. Also rate of RM base using on GDP creation, similarly as higher mentioned analyzed indexes, recorded fluctuating trend, determined by GDP development in Slovakia, as well as by demand and offer development of single RM base. The highest rate of mining, which means using of RM base in Slovakia, was recorded in 2000, when the rate of mining on GDP creation in Slovakia achieved 0.79% and the lowest rate was in 2014, when the rate achieved only 0.42% (Fig. 3.).

**Table 4.** GDP development in Slovakia and mining

Year	SR [mil. Eur]	Mining [mil. Eur]
2000	31 601,286	161,2
2001	34 310,622	158,0
2002	37 279,842	154,3
2003	41 404,346	207,0
2004	46 101,527	160,7
2005	50 415,092	177,7
2006	56 272,653	204,2
2007	63 053,882	263,6
2008	68 491,623	371,3
2009	64 023,061	329,6
2010	67 577,288	358,1
2011	70 627,205	337,9
2012	72 703,513	330,3
2013	74 169,873	334,6
2014	76 087,789	319,8
2015	78 896,443	354,8

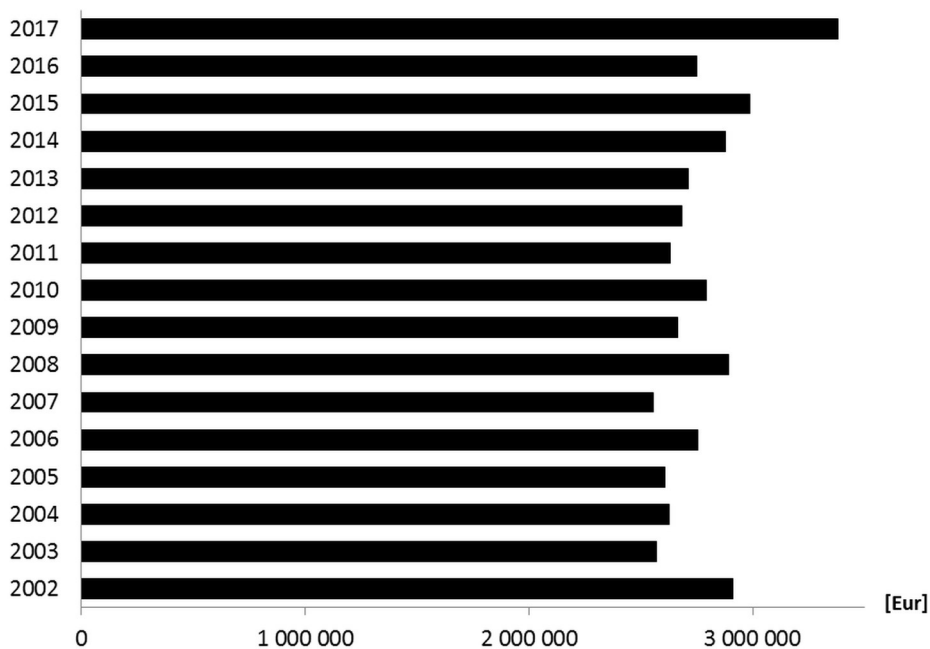


**Fig. 3.** Rate of mining on GDP in Slovakia [own processing according SGIDŠ]

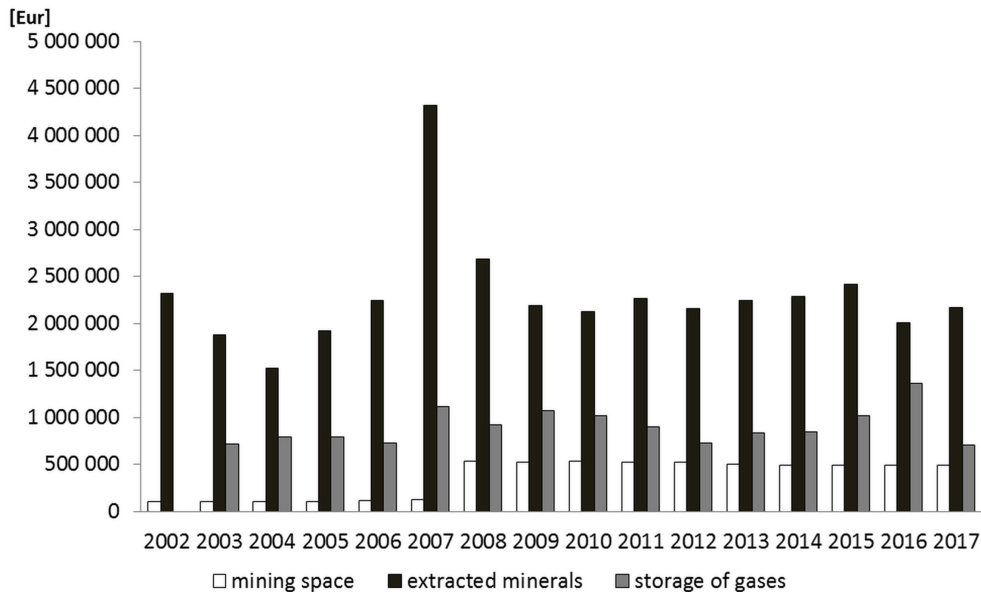
## 2.5 Development of revenues from mining activities into the state budget

At higher mentioned development of employment in mining organization and development of average wage in SR we can state that income of state from payment from employees and employer by social security contributions presented averagely 2.78 mil. Eur.year<sup>-1</sup>, when the highest incomes were in 2007, presenting approximately 2.56 mil. Eur, which connected logically with development of average wage and number of employees, since in 2007 average annual wage in SR was 718.91 Eur and number of employees was 7 312 and in 2017 average annual wage achieved 1095 Eur and number of employees in mining organizations was 6 353 (Fig. 4.). Income of state budget, budget of administrations and environmental fund presented also payment for mining area, mined minerals and stocking gases. In analyzed period the highest incomes was created in 2007, achieving approximately 5.56 mil. Eur, from which only 2.3% presented payment for mining area (approximately 126.55 tis. Eur), 20.0% payment for stocking gases (approximately 1.12 mil. Eur) and yet 77.8% (approximately 4.32 mil. Eur) presented payment for mined minerals (Fig. 5.). During analyzed period the highest rate of state budget income and administrations incomes presented payment for mined minerals, when its level is quantified according conditions amended by Government Decree No 50/2002 Coll. about payment for mining area, mined minerals and stocking of gases or liquids, as amended lately. Payment for mining area that presented lowest incomes of state and administrations is paid at the level 80% to administration, on which cadastral area the mining space is situated and 20% to state budget.





**Fig. 4.** State incomes from payment to social security of employees [own processing according HBÚ]



**Fig. 5.** Development of payment from RM exploitation in SR [own processing according HBÚ]

Due to the higher mentioned we can state that RM using is characterized by positive impacts to social and economic area of sustainable development in Slovakia, which is different from the negative impacts to the environmental area of sustainability.

### 3 Conclusion

Based on a detailed quantitative analysis of the above monitored macroeconomic indicators, namely registered employment in the surface and underground mining of raw materials, gross value added, foreign direct investments, Gross Domestic Product, we could conclude that in the time horizon 2000-2015 they showed fluctuating trends, which was logically related to the development of industrial sectors of the economy, in which the raw materials form the basic platform of all production processes.

The same character of the development was recorded also in the case of the state revenues from employee and employer contributions by social security contributions, which was logically related to the character of registered employment development in the case of raw materials exploitation. The revenues of the state budget, municipal budget and the environmental fund, which consisted of payments for mining space, extracted minerals and gas storage, also showed fluctuating trends in the years 2002-2017.

During the period under review, the largest part of the state budget and municipal budgets was paid as a fee of the extracted mineral, which amount is quantified on the basis of the conditions regulated by the Decree of the Government of the Slovak Republic No. 50/2002 Coll. about the reimbursement of the mining area, the reimbursement of the extracted minerals and the reimbursement for the storage of gases or liquids, as amended. Reimbursement for the mining area, which constituted the lowest revenues of the state and municipalities, is paid in the amount of 80% to the municipality in whose cadastral territory the mining area is situated and in the amount of 20% to the state budget.

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