УДК 33.018

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DOI:10.26726/1812-7096-2023-7-82-90

МИНЕРАЛЬНАЯ РЕНТА В АРМЕНИИ

Аннотация. *Авторами предложен метод расчета минеральной ренты на отраслевом уровне и рассчитана минеральная рента в отрасли добычи металлических руд в Армении на период 2018-2022 гг. Нами выявлено, что самая высокая величина минеральной ренты была зафиксирована в 2021 году, что связано с повышением цен основных сырьевых товаров, которые экспортирует Армения, несмотря на снижение физических объемов экспорта. Среднее значение отношения минеральной ренты к ВВП за тот же период варьировалось от 0.61% до 1.37%, причем это соотношение достигло своего максимального значения в 2021 году. Мы приходим к выводу, что минеральная рента в основном отражает глобальную волатильность цен на сырьевые товары, что влияет на величину минеральной ренты, а это означает, что Армения нуждается в прогрессивной системе расчета роялти для устранения волатильности цен и обеспечения дополнительных бюджетных поступлений. Мы также приходим к выводу, что новая гибридная система роялти, вступившая в силу 1 января 2023 года, может быть приемлемой для отрасли с точки зрения того, что она не будет считаться тяжелым бременем при росте цен на мировом рынке на основе рассчитанных нами коэффициентов.*

Ключевые слова: *Минеральная рента, система роялти, налоговое бремя, Армения.*

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MINERAL RENTS IN ARMENIA

Abstract. *The authors proposed a method for calculating mineral rents at the industry level and calculated mineral rents in the metal ore mining industry in Armenia for the period 2018-2022. We have revealed that the highest value of mineral rents was recorded in 2021, which is due to an increase in prices of the main raw materials that Armenia exports, despite a decrease in physical export volumes. The average value of the ratio of mineral rents to GDP for the same period ranged from 0.61% to 1.37%, and this ratio reached its maximum value in 2021. We come to the conclusion that mineral rents mainly reflect the global volatility of commodity prices, which affects the value of mineral rents, which means that Armenia needs a progressive royalty calcula-*

tion system to eliminate price volatility and ensure additional budget revenues. We also come to the conclusion that the new hybrid royalty system, which entered into force on January 1, 2023, may be acceptable for the industry in terms of the fact that it will not be considered a heavy burden when prices rise on the world market based on the coefficients calculated by us.
Keywords: *Mineral rent, royalty system, tax burden, Armenia.*

Introduction

The governments that receive revenues directly from the extractive industries in the form of direct and indirect taxes, royalty and other type of payments, etc. need to have a clear insight on how much could be produced by those industries and how much additional tax revenues could be generated (Löf et al., 2021:1-2) [7, pp. 1-2]. According to Otto (2017:21) mining fiscal regime could vary from country to country, that is constantly subject to amendments and changes due to three major factors: price volatility in commodity markets; investors' interest; and the objectives that the nations pursue and change over time [10, p.21]. Therefore, resource rents could be considered "an indicator which can contribute to understanding the total tax burden an industry can manage without jeopardizing the future of that industry" (Löf et al., 2021:2) [7, p.2]. The variation in resource rents can be explained by several characteristics: period over which they are analyzed (short run vs. long run); business cycles over which the prices rise and fall with relative high resource rents on the peak, and even negative rents when the prices of metals are rather low owing to global recession. (Löf et al., 2021: 4-5) [7, pp.4-5].

The first attempt to calculate the ratio of the production of the mining industry-to-mineral rents in Armenia was made by Markosyan and Mkrtchyan (2020:132-133) [8, pp. 132-133] based on the definition of the World Bank [21]. However, two serious inaccuracies have been identified in their calculations. First, the above-mentioned authors in their calculations relied on the gross value added of the mining and quarrying industry of Armenia, rather than taking the volumes of production reported by mining companies of Armenia, since the difference between two of them is significant. Second, the methodology elaborated by the World Bank includes commodities and/or metals extracted and produced by both mining and quarrying industry and manufacture of basic metals. Hence, calculating the difference of mineral rents as percentage of the gross domestic product (GDP) and the gross value added of mining and quarrying industry and as percentage of GDP is not appropriate. And consequently, the following statement of Markosyan and Mkrtchyan (2020:132-133) [8, pp. 132-133] that "based on 2018 data, the mineral rents comprised more than 210 billion Armenian drams of which the owner of those mineral resources, the Republic of Armenia, received nothing" could not be considered reliable in terms of the values of mineral rents calculated for the period 2014-2018. Moreover, the World Band revised the methodology of calculating mineral rents for the 2021 edition of their renowned Report (The Changing Wealth of Nations) [12] and new data were released with respect to Armenia and other nations.

Calculating firm level mineral rent data from open sources is a burdensome process in the case of Armenia, since not all mining companies release their financial statements, balance sheets, etc. to be accessible from open sources, and frim level data exports data have been available only since 2020 [15]. Hence, we attempt to calculate the approximate values of industry level mineral rents, by proposing our approach.

Therefore, the main purpose is to calculate mineral rents of the mining of metal ores industry in Armenia based on measurement method proposed by us; and to figure out how heavy the total tax burden could be for the industry by considering the changes and amendments to the Tax code (dated: June 15, 2022) with respect to royalties paid.

Brief Literature Review

The economic rents arise from non-renewable, exhaustible production factors such as natural resources and according to Mintz (2016: 307) can be defined as "the surplus value of revenues net of all economic costs, including opportunity costs, which are subtracted from revenues arising from the sale of goods" [9, p.307]. The other definitions of the rents are provided in table 1.

Based on the data of 18 Sub-Saharan African countries covering the period from 1995 to 2013,

Raheem et al. (2016:44) find that effective allocation of resource rents can positively affect inclusive

Authors	Definitions
Otto (2017:1) [10, p.21]	Economic Rent: "*a surplus of income that can theoretically be taken away from an investor without altering its economic behavior.*"
Crowson (1998:22) [3, p.22]	Economic rent plays a pivotal role in explaining how the mineral industry could contribute to the economic development and how sustainable those contributions could be and the following definition of an economic rent is provided: "*portion of value added which exceeds the costs of all the factors of production, and it will form part of profit.*"
Land (2010:241) [5, p.241]	Resource rent: *"the surplus value generated by such exploitation over all necessary costs of production, including rewards to capital."*
Lilford, E., & Guj, P. (2021:57) [6, p.57]	Economic rent: *"the surplus after subtracting from the revenue generated by a project all cash costs of production including recurrent and capital costs, but excluding loan interest expenses"*
The World Bank [21]	Mineral Rent: "*the difference between the value of production for a stock of minerals at world prices and their total costs of production*". The Bank includes the following metals in calculating mineral rents with respect to various countries: gold, copper, zinc, iron, nickel, lead, silver, and etc.

Based on the annual data of 10 mineral-rich countries (such as Australia, Brazil, Canada, China, Congo, Democratic Republic, India, Saudi Arabia, the United States, and Venezuela) expanding from 1981 to 2017, Ampofo et al. (2020:8-9) find that non-linear unidirectional Granger causality relationships (from natural resource rents to economic growth) could be reported in the case of only a few nations [1, pp.8-9]. In all dimensions, a unidirectional Granger causality is found (at a 10% level of significance), running from natural resource rent to economic growth in the case of Brazil, while in the case of India a weak relation is found that runs from natural resource rent to economic growth [1, pp.8-9]. Ampofo et al. (2020:9) confirm that nonlinear cointegration among variables could be reported in the case of Australia, Brazil, Canada, Congo, the Democratic Republic, India, India, Saudi Arabia, the United States, and Venezuela, and report long-run coefficients that are associated with changes of total natural resource rent (positive and negative shocks) only for Australia, Brazil, Canada, DRC, India, and Saudi Arabia [1, p.9]. Moreover, Ampofo et al. (2020:9) find that a positive shock to natural resource rents in the cases of Australia, Congo, the Democratic Republic, and India could cause a statistically significant negative effect on the economic growth in those counties [1, pp.9-11]. In the case of Brazil and Canada a positive shock to natural resource rents could cause a statistically significant positive effect on the economic growth, while in the case of Saudi Arabia insignificant effect is found [1, pp.9-11].

Ben-Salha et al. (2021:7) based on the data of resource-abundant countries (Australia, Brazil, Canada, China, Iran, Saudi Arabia, United States and Venezuela) expanding from 1970 to 2013, and the PMG estimator, find that bidirectional long-run causality between resource rents and economic growth exists [2, p.7].

Methodology and Measurements

Löf et al., (2021:5, 10) proposed the below stated equations to be applied in calculating economic rents [7, p.5; p.10]:

Economic rent = total income - total costs (1),

Total income = total production * average price (2),

Total costs= operating costs + cost of capital+ exploration cost+ overhead costs + closure costs (3).

According to Mintz (2016: 307) the rent can be calculated as the following [9, p.307]:

Rent = Output * (unit price – unit cost) (4)

Where:

Unit cost is the per unit "cost of discovery, extraction and production, including a rate of return on capital" (Mintz, 2016: 307) [9, p.307].

Although the State Revenue Committee of Armenia has started posting export data of all major exporters of metal ores and concentrates since 2020 [15], the identification and calculation of total

cost of individual companies is a very burdensome process. Not all exporting companies (royalty payers: Zangezur Copper and Molybdenum Combine (ZCMC), Teghout, Chaarat Kapan, Agarak Copper and Molybdenum Combine, Akhtala Mining and Processing Enterprise, Megradzor Gold, and Lichvaz) previously posted and are currently posting their financial statements or other documents online. Therefore, it is virtually impossible to identify the total costs of individual companies to calculate mineral rents of a single company.

Hence, we proposed an alternative approach to calculating the total costs by doing the following exercise and coming up with approximate amounts of mineral rents of the mining of metal ores industry, instead of calculating mineral rents of companies and summing up the calculated amounts.

First, we relied on the data of the companies representing the mning of metal ores industry [19]. Second, we made the following assumptions. The sum of total costs of all companies of the mining of metal ores industry comprised a fixed portion of the production volume of the Industry of interest and that did not change over the period 2018-2022, in the case of commodities sold during the same calendar year. Then, we applied the following rates: 75%, 80%, to calculate total costs of the Industry. The application of the rates can be substantiated by the following assumptions and/or arguments:

– Sales Turnover-to-Production volume ratio varied from 89.21% to 94.35% in the given period 2018-2022. This mean that not everything produces was sold (see Table 2); the produced items were added into the stockpile of the concentrates of the companies of interest. Therefore, the company in the given calendar year not only sells the items produces during the same years, but also adds into a stockpile, and even could sell concentrates produced during previous calendar year.

– It is hard, or virtually impossible to identify the exact volumes of commodities sold during the given calendar year were the concentrates and/or ores extracted and/or produced during the given or previous calendar year. Therefore, we make an assumption that in the case of items produced during previous year and sold during the given calendar year, and the items produced and sold during the given calendar year per unit costs do not vary much, or any variation in per unit costs is close to zero.

– Only data on loans extended by commercial banks, and credit organizations operating in Armenia to companies representing mining of metal ores industry are available [14], and data on commercial loans provided by foreign financial institutions and intermediaries are not available to calculate the amount of loan interest expenses repaid by companies of interest. Based on our own calculations [13; 14] the loan interest payments by the companies in 2018 for the loans extended in Armenia during the same year could comprise about 5.02 billion AMD (without interest payments on loans extended prior to 2018) and accounting for 1.75% of the production volume of 2018. Hence, the actual interest payments could have been even higher than 5.02 billion AMD, or more than 1.75 % of the production volume. Based on our own calculations, we estimated that in 2022, the actual interest payments for the loans extended could have amounted to 1.07 billion AMD, and comprising 0.22% of the production volume [13; 14].

– In the case of all the items sold by the industry both on the domestic and foreign markets during the given calendar year, the total costs of production of those items could comprise approximately about 75-80% of production volume of the given year.

Based on the estimates calculated by applying those rates for a single year, we calculated the average values as well, as a good proxy of real amounts.

Third, we rely on the sales turnover during the given calendar year and do not take exports of commodities because domestic sales have been on the rise since 2020 and comprised 3.74% of total turnover in 2022 (see Table 2). Therefore, it could be virtually impossible to calculate the costs associated with items sold solemnly on the domestic market, and total sales turnover could be a good proxy of export receipts.

Finally, we subtracted total costs (calculated at various rates) from the industry total sales turnover from 2018 to 2022 to calculate mineral rents, and calculated average values as well. Then we figure out whether the tax burden is manageable in terms of impeding the future growth of the industry, by considering the changes and amendments to the Tax Code dates June 15, 2022.

We also compared the mineral rents-to-GDP ratios calculated based on the methodology presented above with the values of ratios that World Bank calculated and with respect to other nations as well [19]. The choice of the countries was based on several criteria. First, the sum of exports of Group 26: Ores, slag and ash needs to exceed 2 billion USD [18] from 2018 to 2022. Second, the

ratios calculated by the World Bank need to be non-zero, and at least available for the period: 2018-2021. We deliberately excluded some countries as well from the list, and left only those countries that were of interest to us.

Analysis, Results and Discussion

Armenian major mining companies-taxpayers mainly export copper, zinc molybdenum, and precious metal ores and concentrates; and ferromolybdenum (predominantly by the ZCMC) as well (see Table 2). Copper ores and concentrates dominated the exports in the period 2018-2022 amounting to 662.91 million USD, with exports of molybdenum ores and concentrates and ferromolybdenum reporting a tremendous growth, along with precious metal ores and concentrates and reaching the highest export values over the 5-year period in 2022 (see Table 2). Interesting to note, that decline in the physical volumes of exported copper ores and concentrates was accompanies with the increase in the physical volumes of especially precious metal ores and concentrates, containing gold, along with the

Codes	Exports (F.O.B. values; million USD)					Exports (tons)				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
260300: Copper ores and concentrates	525.47	626.67	559.87	769.26	662.91	424,816	562,016	470,467	429,483	410,686
260800: Zinc ores and concentrates	20.49	16.48	10.40	16.17	18.91	12,473	12,158	10,481	11,998	11,752
261310: Molybdenum ores and concentrates; roasted	1.10	0.94	1.62	0.92	30.68	73	62	145	61	1,363
261390: Molybdenum ores and concentrates; other than roasted	6.54	16.96	93.73	121.40	124.40	568	2,030	15,089	10,172	8,937
261690: Precious metal ores and concentrates; (excluding silver)	3.27	3.09	11.64	15.47	85.40	3,100	3,306	5,977	6,054	20,640
720270: Ferro-alloys; ferro-molybdenum	125.88	142.43	85.55	188.74	251.93	7,111	8,870	6,750	8,159	8,886
Total	682.75	806.56	762.80	1,111.94	1,174.23					

Source: [18]

Upon a decline in 2018, the mining of metal ores industry in Armenia reported a solid growth of 24.9% (y./y.) in 2019 that continued in 2020 (see Table 3). The solid industry performance of 2019 and 2020 was reversed in the period 2021-2022 (see Table 3), that was mainly associated with the decline in the physical volumes exported, namely in the case of copper ores and concentrates over the same period (see Table 2). Armenia mainly exported to third countries outside the Eurasian Economic Union (the EAEU) member-states (see Table 3). The industry predominantly exports, and sales of commodities on the domestic market comprises only a tiny percentage of the industry total sales turnover (see Table 3), thus making the industry vulnerable to external shocks: price volatility of the commodities in the global market and exchange rate volatility.

	2018	2019	2020	2021	2022
Production Volume (billion AMD)	287.27	342.42	386.90	568.60	486.42
Production Volume, real growth rate (%)	-15.80	24.90	11.50	-1.50	-4.70
Sales Turnover (billion AMD)	265.64	305.48	353.71	536.47	456.68
Exports (billion AMD)	261.34	304.96	350.51	522.91	439.61
to the EAEU member states (billion AMD)	0.00	0.00	0.00	0.00	0.02
to third countries (billion AMD)	261.34	304.96	350.51	522.91	439.59
Domestic market sales (billion AMD)	4.30	0.52	3.20	13.56	17.07
Exports-to-sales turnover ratio (%)	98.38%	99.83%	99.10%	97.47%	96.26%
Domestic market sales-to total sales turnover ratio (%)	1.62%	0.17%	0.90%	2.53%	3.74%
Sales Turnover-to-Production Volume (%)	92.47%	89.21%	91.42%	94.35%	93.89%

Source: *[17]. Note: Authors' own calculations*

Mineral rents varied from year to year over the given period calculated at different costs rates (see Table 4). The highest value of mineral rents (calculated at various costs rates) was reported in 2021 due to the price hikes of major commodities exported by Armenia [20], despite the decline in the physical quantities exported in 2021 compared to the volume of 2020 with respect to copper ores and concentrates, just reflecting the effect of price volatility. The lowest value was reported in 2019 and was associated with the price decline with regard to the copper prices in the global market [20] while compared to prices of 2018. In response to the price decline [20], supplying more ores and concentrates (see table 2), however, did not translate into higher mineral rents, calculated at various costs rates in 2019 (see table 4). Overall, mineral rents mainly reflected price volatility of the commodities sold on the global market over the given period. The average mineral rents-to-GDP ratios (calculated at various costs rates) varied from 0.61% to 1.37%, with the ratio reporting the lowest value in 2019, and the highest value in 2021 (see table 4). In the case of ratios calculated based on the 75% costs ratio the values are pretty higher, comprising 1.58% in 2021, and 0.74% in 2019 (see Table 4).

Variables and Measurements		2018	2019	2020	2021	2022
Sales Turnover	(billion AMD)	265.64	305.48	353.71	536.47	456.68
Production volume	(billion AMD)	287.27	342.42	386.90	568.60	486.42
Total costs (billion AMD) at various rates	75%	215.45	256.82	290.18	426.45	364.82
	80%	229.82	273.94	309.52	454.88	389.14
Rents (billion AMD) at various costs' rates	75%	50.18	48.66	63.54	110.02	91.87
	80%	35.82	31.54	44.19	81.59	67.55
Rents, average	(billion AMD)	43.00	40.10	53.87	95.81	79.71
Rents-to-GDP ratio at various costs' rates (%)	75%	0.83%	0.74%	1.03%	1.58%	1.08%
	80%	0.60%	0.48%	0.71%	1.17%	0.79%
Rents-to-GDP ratio (%), average		0.71%	0.61%	0.87%	1.37%	0.94%
GDP	(billion AMD)	6,017.0	6,543.3	6,181.9	6,983.0	8,496.8

Sources: *[16]; [17]. Note: Authors' own calculations*

As Löf et al. (2021: 2) [7, p.2] state that mineral rents can be considered as a good indicator of total tax burden on companies and the industry of interest to substantiate how the industry could manage additional burden or not, we could conclude that price volatility affects the values of mineral rents in Armenia. This means that Armenia needs a progressive royalty assessment scheme to be in place to reflect price volatility and to be translated into higher fiscal revenues generated for the government. Armenia introduced a hybrid system: value based and/or ad-valorem royalty (with constant rate) along with profit-based royalty assessment with two bases and royalty rates via changes and amendments to the Tax code (dated: June 15, 2022). This system introduced in 2022 became effective on January 1, 2023. Dokholyan et al. (2023:94) addressed the impact of these changes and amendments to the Tax code and suggested that. "by replacing export duties with the new royalty assessment method, the price increase would be the key factor in determining how much the Government would generate tax revenue." [4, p.94]. This means that the progressivity could curb the excessive profits gained by the mining companies when prices hike due to new royalty assessment method. Overall, mineral rents-to-GDP ratios calculated by the methodology we proposed (see table 4) can be an indicator that the progressivity of royalty system could be manageable when prices increase in the global market.

If we compare mineral rents-to-GDP ratios calculated by the methodology, we proposed (see Table 4) with ratios the World Bank calculated (see Table 5) we could broadly identify the same trend pattern that was observed in the case of values calculated by the methodology we applied. Although the values of ratios in the case of Armenia reported an upward trend from 2018 to 2021 (see Table 5), the difference among the ratios calculated by the World Bank (see Table 5) and us (see Table 4) was due to methodology and commodities included in the calculation. However, when we compare our

data (see Table 4) with the ratios of other exporters (see Table 5) we could identify the trend pattern we encountered in the case of Armenia (see Table 4). In the case of various countries the mineral rents-to-GDP ratios declined in 2019 compared to 2018, then increased from 2020 to 2021, with the ratios reporting the highest values in 2021 (although in the case of several countries this trend pattern was not valid). Overall, we could conclude, just in the case of various nations and Armenia as well, increase in mineral rents-to-GDP ratios mainly reflected price volatility of the commodities that are exported and were sold on the global market over the given period.

	Exports of Group 26: Ores, slag and ash (billion USD)					Mineral rents (% of GDP)			
Country	2018	2019	2020	2021	2022	2018	2019	2020	2021
Armenia	0.557	0.665	0.677	0.923	0.922	0.826	1.948	2.152	6.787
Australia	60.280	79.657	90.150	130.894	100.496	2.861	3.317	4.088	10.466
Bolivia	2.353	2.056	1.482	2.573	2.855	1.166	0.563	0.454	5.910
Brazil	23.670	25.837	28.893	48.723	32.419	0.840	0.799	1.145	4.489
Bulgaria	0.692	0.901	1.016	1.277	0.940	0.270	0.249	0.348	0.594
Canada	7.871	8.836	10.051	13.284		0.125	0.189	0.233	1.184
Chile	20.540	19.643	24.895	34.124	26.370	4.992	1.753	4.602	16.227
China	1.164	1.747	1.942	4.544	3.938	0.179	0.272	0.168	0.510
Congo, Dem. Rep.	1.929	1.287	1.070	2.044		8.093	3.635	5.635	28.813
Finland	0.579	0.536	0.578	1.027	0.970	0.111	0.017	0.014	0.109
Georgia	0.514	0.667	0.824	0.861	1.117	0.334	0.492	0.822	1.278
India	1.656	3.029	4.206	4.520	1.945	0.432	0.649	0.687	1.315
Indonesia	5.255	3.127	3.235	6.351		0.665	0.528	0.472	1.910
Mauritania	0.734	1.093	1.190	2.047		0.375	0.605	0.609	9.585
Mexico	5.527	5.386	6.718	8.377	8.387	0.424	0.274	0.464	1.365
Mongolia	2.670	2.686	2.818	4.310		9.611	6.587	8.257	26.573
Namibia	0.825	0.843	0.741	0.913	1.171	0.773	0.815	1.037	3.168
Peru	17.843	17.053	13.204	21.514		5.217	1.790	3.560	12.096
Philippines	1.224	1.400	1.788	1.984	2.048	0.452	0.374	0.401	1.523
Serbia	0.077	0.066	0.166	0.946	1.880	0.345	0.160	0.187	0.659
South Africa	11.656	13.060	12.783	18.072	16.043	0.510	1.386	1.427	3.832
Spain	3.092	2.310	1.510	2.225	2.267	0.030	0.016	0.018	0.096
Sweden	3.119	3.240	3.615	5.452	4.538	0.782	0.172	0.177	1.001
Türkiye	1.328	1.229	1.384	2.167	2.246	0.280	0.147	0.199	0.634
Ukraine	3.035	3.590	4.423	7.027	3.084	0.421	0.085	0.121	5.323
Europe & Central Asia (excluding high income)						0.850	0.745	1.025	2.307
Europe & Central Asia (IDA & IBRD countries)						0.976	0.613	0.809	1.857
Lower middle income						0.539	0.483	0.550	1.441
Upper middle income						0.373	0.387	0.387	1.133
World						0.253	0.232	0.260	0.771

Sources: *[18]; [19].*

If we compare mineral rents-to-GDP ratios calculated by the methodology, we proposed (see Table 4) with ratios the World Bank calculated (see Table 5) we could broadly identify the same trend pattern that was observed in the case of values calculated by the methodology we applied. Although the values of ratios in the case of Armenia reported an upward trend from 2018 to 2021 (see Table 5), the difference among the ratios calculated by the World Bank (see Table 5) and us (see Table 4) was

due to methodology and commodities included in the calculation. However, when we compare our data (see Table 4) with the ratios of other exporters (see Table 5) we could identify the trend pattern we encountered in the case of Armenia (see Table 4). In the case of various countries the mineral rents-to-GDP ratios declined in 2019 compared to 2018, then increased from 2020 to 2021, with the ratios reporting the highest values in 2021 (although in the case of several countries this trend pattern was not valid). Overall, we could conclude, just in the case of various nations and Armenia as well, increase in mineral rents-to-GDP ratios mainly reflected price volatility of the commodities that are exported and sold on the global market over the given period.

Conclusion

The measurements on the frim level mineral rents are still addressed and discussed by many scholars. Various attempts have been made to calculate mineral rents in various countries and for various industries. We proposed our industry-level mineral rent measurement method and attempted to calculate mineral rents of the mining of metal ores industry in Armenia for the period 2018-2022, and to substantiate how heavy the total tax burden could be for the industry in lieu of the changes and amendments to the Tax code (dated: June 15, 2022) with respect to royalty payments.

The highest value of mineral rents was reported in 2021, associated worth the price hikes of major commodities that Armenia exports, despite the decline in the physical quantities exported compared to the volumes of 2020. The average mineral rents-to-GDP ratios varied from 0.61% to 1.37% from 2018 to 2022, with the ratio reporting the highest value in 2021. We conclude that mineral rents mainly reflected the price volatility of commodities sold on the global market from 2018 to 2022, thus affecting the values of mineral rents in Armenia. This means that Armenia needs a progressive royalty assessment scheme to address the price volatility and to generate higher fiscal revenues for the government.

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