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Implication of Mining Investment improvement as Effect of Increasing Government Expenditure in Development of Mineral Industry in Indonesia (2009-2016)

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***Abstract*—** *Increasing mining investment as an effect of government spending in the development of the mineral industry in Indonesia, aims to obtain mineral value added in the long run according to Law No. 4 of 2009 concerning Mineral and Coal Mining, can be realized with mineral industry clusters in a mining business area (WUP). The method used is Simultaneous Equation Model (SEM).*

The increase in mining investment has a significant effect on increasing mineral value added, which has positive implications for people's welfare which is manifested in the form of increasing contribution to the mining and quarrying business sector of the Regency GRDP, increasing employment opportunities and industrial CSR towards local communities.

The increase in mineral reserves that have a significant effect on increasing mineral value added as an effect of government spending and mining investment has positive implications for the longer duration of mineral production and industrial activities in a mining business area (WUP), so that economic and social transformation can be realized well.

Keywords*— *Mining investment, government expenditure and implications, value added, mineral industry cluster.

I. INTRODUCTION

The abundance of natural resources in a country, is a gift from Allah SWT, but does not always mean that its added value contributes significantly to a country's Gross Domestic Product (GDP), so that it can have positive implications for people's welfare. Africa and Pakistan are countries with abundant natural resources, but the contribution of their added value is not significant to African GDP (HLAVOVA, 2015) and Pakistan (Awolusi, 2016; Saadat, 2016).

The foregoing occurs because of the high export of raw minerals, followed by imports of concentrate and metal, which are also high to meet the needs of industrial raw materials, construction materials, energy, telecommunications and so on, so that mineral value added (value added of minerals) does not contribute significantly to GDP (Keyness, 1936).

The phenomenon as above, also occurred in Indonesia before the enactment of Law No. 4 of 2009 concerning Mineral and Coal Mining, where mineral exports in various commodities are very intensive, especially nickel, iron ore, copper and bauxite commodities, but mineral value added from the production side is not significant (Rodenno, 2004; Holler and Stolwy, 1995 ; Hayami, 1987; Smith, 1977).

In other parts, the need for industrial raw materials in the form of concentrate and in the form of metal to fulfill construction, telecommunications and energy needs, can only be fulfilled through imports. Iron steel imports (Prasetio, 2010), alumina imports (Agustinus, 2016), and copper cathodes (Ministry of Industry, 2017) are still quite high, causing mineral value added from the expenditure side to be low (Keynes, 1936).

The study conducted by Lei, Na Cui and Dongyan pan (2013) and Knivila (2007), found that the development of the mineral industry in China, Korea and Taiwan had a significant effect on increasing value added. This, among others, led to the issue of increasing value added of minerals in Indonesia, through industrial development (Pangestu, 1999 in Suyanto, 2011; Solow, 1956; Kuznets, 1956) to be important to study, so that it can have positive implications for welfare of the people.

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Transformation of the mineral industry policy from upstream to downstream according to Law No. 4 of 2009 aims to generate value added for economic growth in the long run (Adam, 2014), an appropriate step to increase mineral value added in Indonesia, among others through the implementation of a ban on raw mineral exports, prioritizing the use of minerals in the country before export, and the obligation for every mining business to process the processing and refining of minerals in the country before export.

Even though the purpose of the above policy transformation is correct, the policy up to now has not been able to be implemented maximally, partly due to the problem of the availability of feasible mineral reserves (Wellmer, et al, 2015) in relation to investment and its profitability (Alayi , 2005; Gylfason, 2004) and the need for government support (Wright and Czelusta, 2004).

The problem of the availability of reserves and investments above can actually be reflected by the development of industrial clusters (Bodley, 2013; Porter, 2001; 2000; 1998; Schmitz, 1992; Marsall, 1890), which is a collaboration between several mining business units in a mining business area (WUP) due to the similarity of geographical position, similarity to mineral traps, similarities in output and similarities in geological concentration. This will form a geographic and central corporate agglomeration (Schmitz, 1992), special industrial concentration in certain regions (Menzel and Pomahl, 2009; Marsall, 1890) and can only be realized with Government support (UNIDO, 2001; UNCTAD, 1998) , so that it can produce significant mineral value added to the Regency GDP and GRDP, which has positive implications for improving people's welfare.

Table.1: Value Added Mining and Excavation Business Fields against Regency GRDP in Indonesia

No.	Mining Business Area in Indonesia	commodity	Regency GRDP (Million Rupiah)		
			2011	2013	2015
1	Kolaka	Nickel	5,101,045.19	7,261,880.40	7,357,716.
2	South Konawe	Nickel	980,751.37	1,285,068.99	1,545,704.18
3	East Luwu	Iron	7,029,085.57	7,706,179.57	8,831,737.22
4	Solok	Iron	360,217.30	416,374.68	452,713.80
5	Toli-Toli	Copper	58,511.40	71,180.40	91,089.30
6	Pacitan	Copper	746,654.40	497,298.50	536,233.40
7	Ketapang	Bauksit	1,765,134.40	1,707,475.53	1,569,210.94
8	East Kotawaringin	Bauksit	501,523.46	898,691.92	719,109.19

Source: Central Statistics Agency , 2010, 2014, 2016

II. THEORETICAL REVIEW

Industry is an economic activity that can create an added value (Hasibuan, 2004), and value added itself can be interpreted as a value added from a combination of production factors and raw materials in the production process, and formulated as production value (output) deducted between fees (Central Statistics Agency). In fact, Gross Domestic Product (GDP) can be interpreted as the amount of added value produced by all business units in a particular country, and is the sum of the value of final goods and services produced by all economic units.

Smith (1977), also states that added value is the difference between the final product and the sacrifice that has been made. And, as the growth of the value of a product (commodity) with processing in a production, so that it is a function of production capacity, the amount of raw materials, the number of labor, labor wages, output prices, raw material prices and other inputs (Hayami , et al, 1987).

However, Rudenno (2004) actually states that the economic value of minerals will vary depending on the type of mineral. Nickel in 1 ton is only 2%, but through the metallurgical process nickel in ferronickel can reach 10% - 30%. This, in line with article 1 paragraph 20 of Law No. 4 of 2009), where mineral processing and refining activities are activities to improve the quality of minerals and / or coal and to utilize and obtain associated minerals.

In fact, the Ministry of Industry (2010) also defines industrial clusters as core industries that are concentrated regionally and globally, dynamically interact with each other, both related industries, supporting industries and supporting services, economic infrastructure and related institutions in increasing efficiency, creating assets collectively and encourage the creation of competitive advantage.

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Furthermore, for the development of the mineral industry with industrial clusters, one of them is by applying the Porter's Diamond Model which consists of the availability of natural resources, availability of capital, availability of human resources and availability of infrastructure, which are interrelated with company strategy and competition, demand conditions , factor conditions and related industries and supporters. In addition, there are two additional factors that have an influence, namely chance and government factors, so that the six factors together form a system that is different from one location to another (Potter, 2000). Even so, some industries can succeed in a location because not all factors must be optimal in ensuring the success of an industry.

Furthermore, in order to realize the increase in mineral value above and its implications for improving people's welfare, the increase in government expenditure (government advenditure) that affects investment increases (Keynes, 1935) and increasing mineral reserves is one of the alternative pathways for developing the mineral industry in Indonesia.

a. Availability of Mining Investment

Availability of capital or investment is very important for the operation of a mineral industry cluster. Jogianto (2008), states that investment is an investment in certain assets to obtain more value in the future. Mobilizing resources for income in the future (Makmum, 2000).

Investment is considered as a capital formation, which means that the function of profit in the economy, where the government is not an important investor or participant, and foreign investment can be considered as the formation of capital by a company to a foreign country (Smith, 1776), no only important for the development of the mineral industry, but also can encourage economic growth (Napier, 1981; Sollow, 1956).

However, Keynes (1936) also states that demand for investment is inversely proportional to the interest rate. If the interest rate is high, people will save money in the bank rather than investing it, because the expected return that will be obtained from bank interest is greater than the investment, consequently the demand for investment will decrease. The high interest rate reflects the high cost of credit, thus reducing the desire for investment among entrepreneurs. Keynes (1936), also stated that government expenditure has a positive effect on investment, and investment has a positive impact on economic growth (Tambunan, 2003).

An empirical study conducted by Jorgenson, et al (1987), states that the United States economy in the period 1948-1979, 46% of economic growth was caused by capital formation, 31% due to the growth of labor and human capital and 24 % by technological advancements. Then, Lubis et al (2015) also stated that the mining sector investment is generally dominated by foreign investment, which has a positive and significant effect on GDP, particularly in the mining and quarrying business (Salebu, 2014).Furthermore, in order to realize the increase in mineral value above and its implications for improving people's welfare, the increase in government expenditure that affects investment increases (Keynes, 1936), and increasing mineral reserves is one of the alternative pathways for developing the mineral industry in Indonesia.

b. Availability of Mineral Reserves

Reserve of minerals is mineral deposits that have been known for their size, shape, distribution, quantity and quality, and economically, technically, legally, environmentally and socially can be mined when calculating (BSN, 1998). And, is a raw material that is ready to be produced and mined economically (Bankes, 2014; BP Statistical Review of World Energy, 2008).

Reserves consist of probable reserves and proven reserves, where proven reserves are measurable mineral resources based on a feasibility study that all related factors have been fulfilled, so that mining can be carried out economically. Conceptually, reserves consist of the ultimate reserve, which is the amount of reserves in an area of unknown size, and identified reserve whose magnitude can be estimated by the technology that is available at that time, which can increase in size through exploration activities and reduced due to production.

Availability of natural resources is the availability of mineral resource inputs, as natural resources that cannot be renewed (Djojohadikusumo, 1994), whose formation takes thousands of years, such as minerals and rocks (Barlow in Suparmoko, 2006), which decreases (depletion) in the presence production activities, so that one day they will become goods that step, will increase with a new finding from exploration activities (Suparmoko, 2006; Arsegianto, 2000; Vogely, 1981), and become very urgent in the development of the mineral industry, because it determines technical feasibility and feasibility its economy (Stermole, 2000).

c. Government Expenditures

Guritno (1999), states that government expenditure is a government policy, where the theory of government expenditure by economists divides into Wagner's legal model and the model of Peacock and Wiseman's theory. Wagner (19th century), even stated that in an economy, if per capita income increases, then government spending will relatively increase, mainly because the government must regulate relations that arise between society,

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industry, externalities and market failures.

Bird (1971) in Guritno (1999), states that during the occurrence of social disturbances, there is a diversion of government activities from expenditure before disruption to expenditures related to the disorder. This will be followed by an increase in the percentage of government spending on GDP. And, after the disruption, the percentage of government expenditure on GDP will gradually decrease back to its original state. The transfer effect is a symptom in the short term, but does not occur in the long term.

Rostow and Musgrave (1999), state the development model of government expenditure with three stages of economic development. The initial stage is an important and strategic stage for the government, where large government investment is due to the provision of infrastructure, such as to build mining infrastructure. These government expenditures intend to encourage economic growth with the support of private financing, which is even greater at a later stage.

Musgrave (1999) also states that in a development process, private investment in the percentage of GDP is getting bigger, and the percentage of government investment in the percentage of GNP will be smaller. At a further economic level, Rostow stated that economic development, where government activities shifted from providing infrastructure to spending on social activities, included education and public health services.

Furthermore, the development theory of the role of government is a view that arises from observing economic development by many countries, but is not based on a particular theory (Musgrave and Rostow, 1999). In fact, Sukirno (2000) states that government spending is a government action that regulates the economy in order to create economic stability, expand employment opportunities, enhance economic growth and justice in income distribution. Therefore, an increase in government spending affects the increase in investment and mineral reserves and added value.

Furthermore, Nangarumba (2016) stated that fiscal policy is one of the macro policies whose main authority is in the hands of the government, and represented by the Ministry of Finance, according to Law No. 17 of 2003 concerning State Finance. Fiscal policies generally present the government's choices in determining the amount of expenditure and the amount of income that is explicitly used to influence the economy.

Government interference is still very much needed if the economy is fully regulated in free market activities, not only does the economy not always reach the level of full employment, but also the stability of economic activities cannot be realized. In fact, Keynes in Sukirno (2000) states that wide fluctuations in economic activity from one period to another have serious implications for employment opportunities, unemployment and price levels, where government spending and increased investment can increase economic growth.

Furthermore, Freebairn (2012) states that government spending in Australia to support infrastructure for transportation expansion, physical infrastructure, social infrastructure in remote mining areas during the mining boom has provided an increase in government revenues of 6%. This means that government spending on infrastructure improvements indirectly affects the increase in added value.

Ismail (2011), an analysis of economic development and fiscal policy with Wagner's theory and Keynesian law using the econometric model, and found that Indonesia's economic growth is influenced by government spending, in the form of work expenditure. Then, Uchenna And Osabuchien (2012) states that macroeconomic policies in Nigeria, with instruments of Government expenditure policies, have responded to fiscal decentralization policies, political instability and economic growth. This, shows the effect of government spending in encouraging added value.

An empirical study of fiscal policy in several developing countries, the impact of distribution is the analysis of certain components of government expenditure such as basic, secondary, tertiary education programs, expenditures to support agricultural infrastructure to be able to produce, the government has obtained from tax revenues distributed (Siddiqui and Malik, 2011).

Then, the copper mining empirical study in Chile which has contributed to the development of the State as a consequence of the Chilean Government which has allocated government expenditure for the development of export-oriented domestic transportation infrastructure, encouraging mining to become more modern, efficient and competitive (Arellano, 2012) . This means that government spending on improving infrastructure has an effect on the efficiency of mining, so that it will benefit from efficiency and generate added value for district-level mining and quarrying businesses.

Furthermore, empirical studies of the effects of extraction of natural resources both locally and regionally, where government spending has encouraged the management of natural resources for welfare, the community (Cust and Poelhekke, 2015), and the operation of government fiscal policies significantly affect the direction of economic resource work (Keyness, 1936).

d. Linkage of Government Expenditures to Investment, Mineral Reserves and Value Added of Mineral

Government expenditures through increasing aggregate

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expenditure for the purchase of goods and services and increasing investment (Keynes, 1936), and followed by an increase in private investment (Musgrave, 1999), so that government spending is positively related to the increase in private investment in a business area mining (WUP).

Then, Keynes in Sukirno (2000), also states that fluctuations in economic activity that are wide from one period to another have serious implications for employment opportunities, unemployment and price levels, where government spending and increased investment can influence economic growth, including increasing mining infrastructure (Freebairn, 2012), which can provide increased value added (Uchenna and Osabuchien, 2012).

Furthermore, the effects of local and regional extraction of natural resources, where government spending has encouraged natural resource management for welfare, the community (Cust and Poelhekke, 2015), and the operation of government fiscal policies significantly influence the direction of economic resource work (Keyness, 1936).

Furthermore, Partowidagdo (1999) in Wiriosudarmo (2000) states that government spending for the construction of mining infrastructure and industry has an effect on the development of the mineral industry, gaining significant added value for Regency GRDP and has positive implications for improving people's welfare.

III. RESEARCH METHODOLOGY

Research on the effect of government expenditure in the development of the mineral industry (mineral industry cluster pattern) to increase mineral value added in Indonesia, using quantitative methods with structural equational modeling analysis tools (Kusnadi, 2008) with reference to the relationship between dependent variables (y_3), interpening variables (y_1 and y_2) which is an endogenous variable and an independent variable (x) which is an exogenous variable (graphically shown in figure 1).

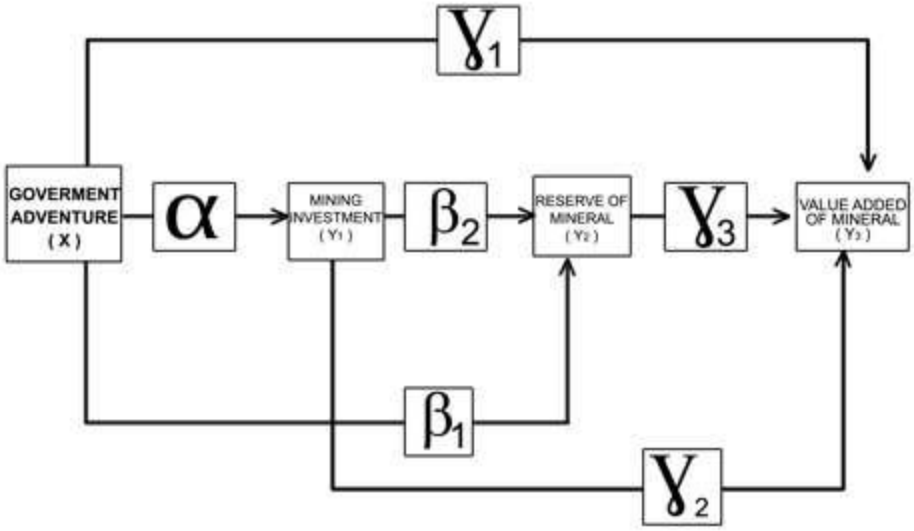

Fig.3.1: The research model influences government spending in developing the mineral industry and value added of mineral in Indonesia

The conceptual framework of the study as an explanation of the relationship between the above variables, can be expressed in the simultaneous equation for estimation of linear regression with the following functions:

$y_1 = f(x, u_1)$ (1)

$y_2 = f(y_1; x, u_2)$ (2)

$y_3 = f(y_1, y_2; x, u_3)$ (3)

Where :

Y_3: District-level mining and quarrying business value added, measured in millions of Rupiah

y_2: Mineral reserves, measured in tons

y_1: Mining investment, measured in millions of rupiah

Then, from equation 1 - 3 above, for non linear equation formulations (CobbDouglass) can be expressed by the equation as follows:

$$Y_1 = e^{\alpha_0} X^{\alpha_1} e^{U_1} \quad (4)$$

$$Y_2 = e^{\beta_0} X^{\beta_1} y1^{\beta_2} e^{U_2} \quad (5)$$

$$Y_3 = e^{\gamma_0} X^{\gamma_1} Y_1^{\gamma_2} Y_2^{\gamma_3} e^{U_3} \quad (6)$$

Where α_0, β_0, γ_0 are constants, α, β_1, γ_1 - γ_3 each is a parameter which will be estimated and U_1 - U_3 is an error term. The functional equations for reduced form in the simultaneous equation model (SEM) are as follows:

$$Y_1 = \alpha_0 + \alpha_1 X + \mu_1 \quad (7)$$

$$Y_2 = (\beta_0 + \beta_2\alpha_0) + (\beta_1 + \beta_2\alpha_1)X + (\mu_{2+\beta_2 U1}) \quad (8)$$

$$Y_3 = (\lambda_0 + \lambda_0\alpha_0) + \lambda_3(\beta_0 + \beta_2\alpha_0) + (\lambda_1 + \lambda_2\alpha_1 + \beta_1 + \beta_2\alpha_1)X + (\mu_3 + \lambda_2\mu_1 + \mu_2 + \beta_2\mu_1) \quad (9)$$

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$Y_1 = \alpha_{10} + \alpha_{11} X + \mu_{11}$
$Y_2 = \beta_0 + \beta_1 X + \mu_{12}$
$Y_3 = \lambda_0 + \lambda_0 X + \mu_{13}$
Where:

$\alpha_0 = \alpha_0; \alpha_1 = \alpha_1; \ \mu_{11} = U_1$
$\beta_0 = \beta_0 + \beta_2 \alpha_0; \beta_{11} = \beta_1 + \beta_2 \alpha_1 \quad \mu_{12} = U_2 + \mu_1$
$\lambda_{10} = (\lambda_0 + \lambda_2 \alpha_0) + \lambda_3 (\beta_0 + \beta_2 \alpha_0)$
$\lambda_{11} = \lambda_1 + \lambda_2 \alpha_1 + \beta_1 + \beta_{2\alpha_1}$
$\mu_{13} = (U_3 + \lambda_1 U_1) + (U_2 + \beta_2 U_1)$

IV. RESULTS AND DISCUSSION

To analyze the effect of government spending in the form of capital expenditure in the development of the mineral industry and mineral value added in Indonesia, a linear regression analysis was carried out simultaneously, which estimated the magnitude of direct and indirect effects.

The results of the study with linear regression analysis simultaneously, showed a model match test with p> 0.05, meaning that the model was suitable in the analysis, so there was no difference between theoretical models and empirical data, where an increase in government expenditure (x) directly had a positive effect on improvement mineral value added (y_3) with an estimated value of 0.0966.

Then, indirectly an increase in government spending has a significant effect on increasing mining investment (y_1) of ***, and has a positive effect on increasing mineral reserves (y_2) by 0.1039. However, an increase in mining investment (y_1) has a positive and significant effect on increasing mineral value added by ***. And, an increase in mining investment (y_1) has a positive effect on increasing mineral reserves (y_2) with an estimate of 0.735. Furthermore, an increase in mineral reserves (y_2) has a significant effect on increasing mineral value added (y_3) of 0.0026 (shown in Fig.2). The findings above indicate that an increase in government spending directly does not have significant implications related to its effect on increasing mineral value added.

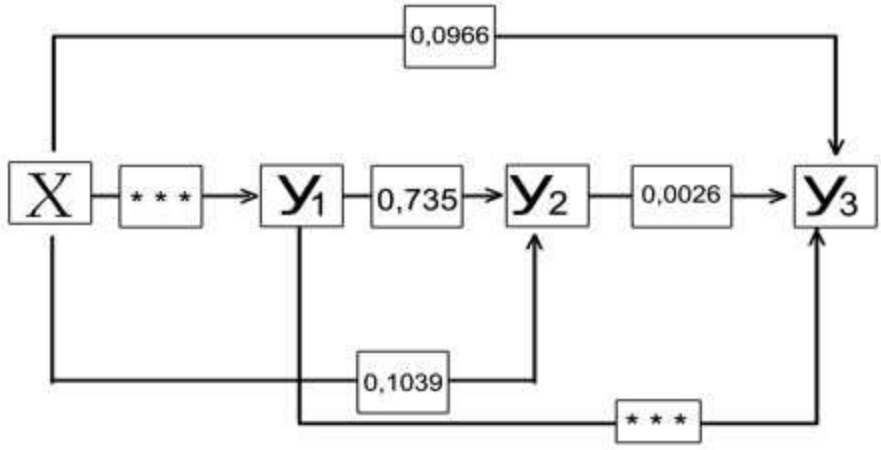

Fig.2: Showing a result of estimate simultaneous of equations model analysis

However, an increase in mining investment as an effect of increased government spending, indirectly has a significant effect on increasing mineral value added. This, has implications for the increase in employment opportunities, both in mining companies that supply the needs of the mineral minerals (input) of the mineral industry as well as the mineral industry itself.

The increase in investment will require a rapid return of investment and profit for industrial clusters in a region, positively implicating in improving corporate social responsibility (CSR), so that the guidance and assistance of companies to move the people's economy, improve public facilities and infrastructure and improve local community education

In addition, an increase in mining investment that has a significant effect on increasing mineral value added has positive implications for increasing Regency GRDP, so that regional economies and people's welfare where the industrial clusters are located will also increase.

Furthermore, an increase in government spending and an increase in mining investment have a positive and not significant effect on increasing mineral reserves. However, increasing mineral reserves has a positive and significant effect on increasing mineral value added. This has implications for the longer lifespan of mine production in an industrial cluster and the longer period of mineral industry production, which produces concentrate and metal, so that it has further implications for achieving the objectives of economic and social transformation of communities around the mining business area (WUP).

V. CONCLUSION

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The development of the mineral industry in a mining business area (WUP) aims to obtain mineral value added, and has implications for increasing the contribution of the mining business and excavation of the Regency GRDP in Indonesia in the long run.

Increasing government expenditure in the form of capital expenditure directly has no significant effect on increasing mineral value added, so that it cannot produce significant implications for people's welfare. Increased mining investment which is influenced by increased government spending has positive implications for increasing employment opportunities, increasing corporate social responsibility (CSR), improving regional economies and people's welfare.

Increased mineral reserves that have a positive and significant effect on increasing mineral value added have positive implications for the longer lifespan of mine production, mineral industrial production, and the achievement of the objectives of economic and social transformation of communities around the mining business area (WUP).

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