



Determinant Factors of Indonesia Pearls Export to 4 Main Countries: 2 Decades Study Case

Erdji Herlando *

Department of Economics, Universitas Padjadjaran, West Java, Indonesia

*Corresponding author: erdji20001@mail.unpad.ac.id

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ABSTRAK

Kontribusi nilai perdagangan internasional semakin bertumbuh dalam menyokong pertumbuhan ekonomi dalam kasus Indonesia. Komoditas mutiara alam (HS 71) Indonesia memiliki tren ekspor yang meningkat signifikan dengan tujuan utama ekspor Indonesia ialah Singapura, Jepang, Hong Kong, dan Swiss selama 10 tahun terakhir. Penelitian ini bertujuan untuk mengestimasi pengaruh faktor determinan yang diuji terhadap nilai ekspor HS 71 Indonesia selama periode 2003 hingga 2022. Analisis data panel dinamis dilakukan dalam memproyeksikan hubungan tersebut dengan metode First Difference Generalized Method of Moment (GMM). Hasil dari penelitian menunjukkan bahwa nilai ekspor pada periode sebelumnya, nilai tukar, dan permintaan masyarakat terhadap barang mewah memiliki pengaruh positif dan signifikan terhadap nilai ekspor komoditas HS 71 Indonesia. Di sisi lain, nilai daya beli masyarakat pada negara mitra dagang dan tarif memiliki pengaruh negatif yang tidak signifikan.

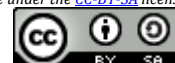
ABSTRACT

The contribution of international trade is increasing in supporting economic growth in the case of Indonesia. Indonesia's natural pearls commodity (HS 71) has a significantly increasing export trend with Indonesia's main export destinations being Singapore, Japan, Hong Kong and Switzerland over the last 10 years. This study aims to estimate the influence of the determinant factors on the value of Indonesia's HS 71 exports during the period 2003 to 2022. Dynamic panel data analysis was carried out to project this relationship using the First Difference Generalized Method of Moment (GMM) method. The results of the study show that the export value in the previous period, the exchange rate, and public demand for luxury goods had a positive and significant influence on the export value of Indonesia's HS 71 commodities. On the other hand, the value of people's purchasing power in trading partner countries and tariffs have an insignificant negative influence.

INTRODUCTION

International trade consisting of exports and imports is one component that according to the trend, its percentage value is increasing in contributing to Gross Domestic Product (GDP). This is in line with research by (Syeh Fajar, 2013) which explains that exports have an influence in driving GDP, as well as research conducted by (Larasati & Sulasmiyati, 2018) which shows that exports have a significant partial influence on economic growth in Indonesia, Malaysia, Singapore, and Thailand. The same research was conducted by (Muhammad Adnan Hye, 2012) in China, (Achchuthan, 2013) in Sri Lanka, (Babatunde, 2014) in Nigeria, (Sahoo et al., 2014) in India, (Saaed & Hussain, 2015) in Tunisia, (Albiman & Suleiman, 2016) in Malaysia, (Alkan et al., 2017) in Turkey, and a study by (Tessem, 2017) in Turkey. All these studies show that exports have a positive effect and imports have a negative effect on economic growth.

Research conducted by (Hamdan, 2016) which analyzed the influence of exports and imports on economic growth in Arab countries from 1995 to 2013 found that economic growth in Arab countries was assisted by exports and imports during the study period. 17 countries, namely Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt,



Djibouti, Mauritania, Morocco, Yemen, and Palestine were used as the subjects of the study. On the other hand, a case study by (Turan & Karamanaj, 2014) was done focusing on the relationship between exports, imports, and GDP in Albania using annual data from 1984 to 2012. This study also found that exports and imports have a significant relationship to GDP or economic growth with import variables having a negative impact on economic growth. In Indonesia itself, research by (Hodijah & Angelina, 2021) using the Error Correction Model (ECM) had similar results. In the short term, exports have a positive and significant impact on economic growth, while imports have a negative and significant impact on economic growth. If exports increase by 1%, it will increase economic growth by 4%, but if imports increase by 1%, it will reduce economic growth by 2%. Figure 1 illustrates the growth in the value of exports and imports in Indonesia and the percentage of net export value to Gross Domestic Product.

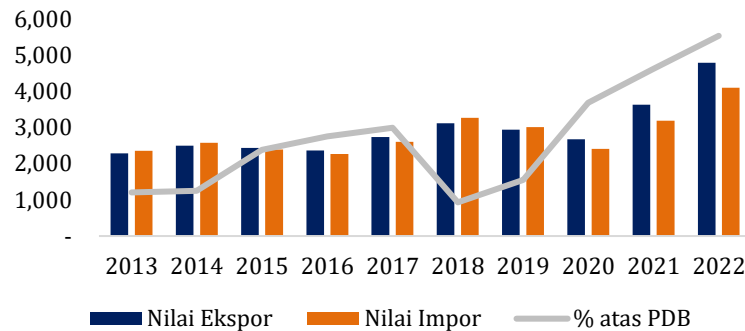


Figure 1. International trade value and its percentage to Indonesia's GDP (in Trillion Rupiah)
(Source: Indonesia Bureau Statistics, processed)

International trade itself, especially exports, can be influenced by several things. Geographical conditions and sectoral spillover effects have an impact on export decisions in a case study of a Colombian factory (Bernard & Jensen, 2004). On the other hand, the presence of multinational exporters in a particular industry in the same country can also increase the likelihood of export growth in a case study of Mexican companies (Aitken et al., 1997), this is thought to occur due to the stimulation provided by the multinational exporter. On the other hand, a case study of the Republic of Fiji, an archipelago with more than 300 islands in the South Pacific, shows that trade promotion policies, changes in trading partner income, and relative price movements are known to affect export performance. The dynamics of the MSME market in the Republic of Fiji as a market player are highly unpredictable and uncontrollable. Therefore, it is important to identify the main determinants of aggregate exports and their main components. This will help develop sector-based export promotion policies (Chand et al., 2022). Reflecting on the case study of the Republic of Fiji, this study was conducted to see the main determinants of exports, especially commodities with HS code 71 or precious metal commodities and natural jewelry/gems, which according to the latest data from the Indonesia Bureau Statistics, in November 2023, were ranked in the top 5 (2-digit HS category) as the largest contributor to Indonesia's net export value, contributing 25.84 percent. Globally, this commodity is indeed traded massively with a trade value of 881 billion US dollars per year in 2022 as shown in Figure 2 below.

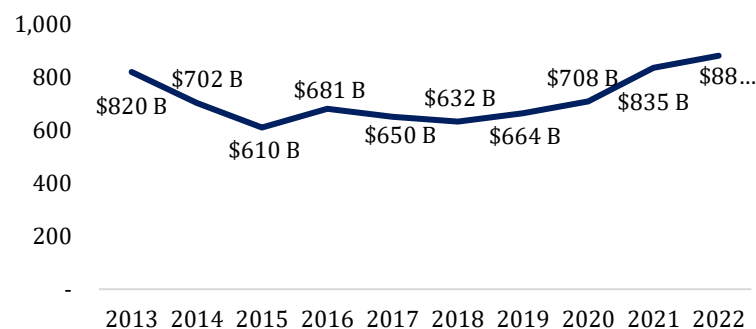


Figure 2. Global HS 71 commodity trade value (in Billion USD)
(Source: BACI, retrieved from OEC World, processed)

The objects in this study are commodities with two-digit HS codes, or are included in commodities in the main classification chapter. Commodities with HS code 71 that are the objects of the study are natural or cultivated jewelry, precious or semi-precious stones, precious metals and metals coated with precious metals and goods made of these metals, and imitation coin jewelry. The countries that are the objects of the study are Singapore, Japan, Hong Kong, and Switzerland. Based on data from BACI, on average, from 2018 to 2022, Singapore, Japan, Hong Kong, and Switzerland contributed more than 78 percent of the export market share of natural pearls and precious metals as Indonesia's international trade partners. Figure 3 below illustrates the trend of Indonesia's five largest export market shares for natural pearls and precious metals (HS 71) over the past decade based on data availability. Referring to the data depicted in the graph, it is evident that Singapore, Japan, Hong Kong, and Switzerland are the four largest contributors to importing these commodities from Indonesia -- this can be seen from the modes of appearance of the four countries in the data trend of the five largest market shares over the past decade. Although there are other countries such as the United States (USA), Taipei, and the United Arab Emirates (UAE), the four countries that are the objects of the study, on average, still dominate the export market share of natural pearls and precious metals in Indonesia.

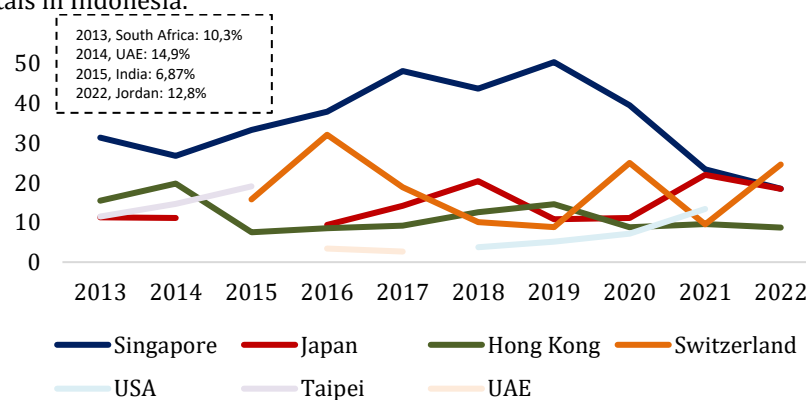


Figure 3. Trend of the 5 biggest market share contributor of Indonesia's pearls export (in %) (Source: BACI, retrieved from OEC World, processed)

According to several studies, there are several factors underlying the large market share in the four countries. The comparative advantage of Indonesian aquaculture products, including pearls, in the ASEAN and ASEAN-China markets shows a competitive advantage (Sumiyati, 2019). In addition, the economic growth of trading partner countries such as Singapore and Japan has a positive impact on Indonesian exports in the long term, with Singapore showing a greater effect on Indonesian exports compared to Japan (Ford & Lyons, 2012). In the case of Hong Kong, there are specific regulations and policies in place to protect the health of Indonesian migrant workers during the COVID-19 pandemic, including provisions on health care and vaccination, this can indirectly affect trade relations between Indonesia and Hong Kong (Oxford Analytica, 2022). On the other hand, in the case of Switzerland, the country has a foreign economic policy that supports economic players in entering the global market, reflected in its active contribution to associations such as The European Free Trade Association Convention (EFTA), bilateral relations with the European Union (EU), and outside the European Union (Greater Geneva Bern area, n.d.). In addition, the Mutual Legal Assistance (MLA) Agreement between Indonesia and Switzerland plays an important role in combating transnational crimes, including those related to tax crimes and tracking the assets of corrupt individuals, thus encouraging cooperation between the two countries (Febrianti et al., 2023; Lutfi et al., 2020; Yuwono et al., 2021). The combination of these factors has contributed to the significant growth of Indonesian natural pearl and precious metal exports to these countries.

In addition to those explained by the empirical studies, several factors that are also believed to be able to influence the massive export of natural pearls and precious metals from Indonesia to the four countries are: 1) market demand, as these countries have a cultural affinity for pearls as luxury accessories and gifts for special occasions; and 2) the quality of natural pearls from Indonesia, as Indonesian pearl cultivation uses special techniques that are able to produce pearls that are valued by the market for their color and size regardless of the variety of pearl types that can be produced,

such as South Sea Pearls and others. These things are the basis for the Author's interest in examining Indonesia's determination to conduct multilateral trade with these countries. The period 2003 to 2022 was chosen as the research period as the period of the last two decades due to data availability.

METHODS

This research is conducted using a robust dynamic panel data analysis with First Difference Generalized Method of Moment method. The export value as a dependent variable represents the value of Indonesia's exports of pearls to trading partner countries, namely Singapore, Japan, Hong Kong and Switzerland. 5 independent variables are used, which are the first lag of export value as an instrument variable, trading partners' GDP per capita, exchange rate, tariff, and global luxury goods market value. The export value variable which observations were retrieved from UN Comtrade and GDP per capita which data obtained from the World Bank—manually calculated by dividing countries' GDP and population – are in the form of USD. On the other hand, exchange rate data was collected from Central Bank of Indonesia using middle rate calculation in the form of Rupiah whereas tariff was in the form of percentage, obtained from World Trade Organization. Global luxury goods market value data which represents the high level of public interest and preference for luxury goods, including jewelry made from natural pearls and/or precious metals was retrieved from Statista in the form of billion Euro. STATA and Microsoft Excel were utilized to analyze and process the data, and all of the variables excluding tariff were transformed into natural logarithmic form in order to reduce skewness in data distribution and the impact of potential outliers in observations (Huntington-Klein, 2023).

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ExpValue	80	6.457e+08	7.391e+08	358429	3.234e+09
ExchangeRate	80	5392.597	5144.066	75.795	16967.985
GDPpcpt	80	51625.348	19606.945	23730.384	93446.434
Tariff	80	2.617	4.166	0	10
LGMV	80	207.2	61.132	120	353

RESULT AND DISCUSSION

Result

Sargan Test Estimation

In the estimation of dynamic panel data GMM models, the Sargan Test is used to identify overidentifying restrictions. This test is performed by testing the combination of model specification and instrument validity – whether the moments are me (Dahlberg et al., 2002). Based on the test results listed in Table 2 below, the value of the chi-square probability is greater than the 5 percent significance level. This indicates that the instrument variables in the regression model of this study are valid, not correlated with the error term.

Table 2. Sargan Test Estimation

	Coef.
chi2(64)	60.11618
Prob > chi2	.6146

Arellano Bond Test Estimation

The Arellano-Bond test detects the presence of autocorrelation in the GMM regression model, including when using the OLS and 2SLS (2-stage least square) models, both for time series data and panel data (Roodman, 2017). This test is important to be carried out to ensure the consistency of the GMM model estimator because the presence of autocorrelation problems can cause parameter estimates to be biased and inconsistent. Based on the results listed in Table 3 below, the value of the probability produced in each order is greater than the 5 percent significance level. This indicates that there is no first-order or second-order autocorrelation problem, indicating that the parameter estimates are consistent.

Table 3. Arellano-Bond Estimation

Order	z	Prob > z
1	-1.2705	.2039

2	-1.1923	.2331
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Model Unbiasedness Test

In checking whether the dynamic panel data regression model First Difference GMM has bias, a comparison of model parameters with the lagged Pooled Least Square (PLS), lagged Fixed Effect (FE), and System GMM regression models is carried out. (Wooldridge, 2010) emphasized the importance of using the right method to handle the problems of unobserved heterogeneity and endogeneity by comparing different estimators. The PLS model assumes that there are no individual-specific effects in the model and all cross-sectional units are homogeneous so that it does not take into account the potential bias due to unobserved heterogeneity or endogeneity. On the other hand, the FE model only assumes that there are individual-specific effects in the model that are correlated with the independent variables so that it effectively overcomes the problem of unobserved heterogeneity but does not overcome the problem of endogeneity. The GMM method (such as First Difference GMM and System GMM) uses instrument variables to overcome the problem of endogeneity by utilizing the lagged values of the dependent variable and other instruments. Comparing the parameter estimates of the instrument variables can help assess whether the instruments are valid and robust. Robust instrument variables, in turn, produce consistent and unbiased parameter estimates. This method aims to provide unbiased and consistent parameter estimates by taking into account unobserved heterogeneity and endogeneity.

Table 4. Parameter Estimation of 4 Models

Variable	FD-GMM	Sys-GMM	FE	PLS
lnExpValue	.52349333**	.48456595**	.5156657**	.56366237**
L1.				
lnExchangeRate	2.2471317*	0.377	2.360	0.126
lnGDPpcpt	-2.330	-2.605	-2.4887141*	-1.543795*
Tariff	-0.012	0.009	-0.012	0.057
lnLGMV	2.265427**	4.0012535*	2.319818*	3.0248971**
_cons	5.300	13.913	6.015	7.933

legend: * $p < 0.05$; ** $p < 0.001$

Based on the results of the parameter comparison between the models above, it can be seen that the parameter values of the instrument variables estimated by the First Difference GMM (FD-GMM) model are between the parameter values estimated by the Fixed Effect (FE) and Pooled Least Square (PLS), while the parameter values of the instrument variables estimated by the System GMM method have the lowest values below the Fixed Effect. This shows that the First Difference GMM model is able to make appropriate adjustments to both the bias associated with PLS estimates that do not take into account individual-specific effects and adjustments, to bias associated with FE estimates by addressing endogeneity problems. This consistency indicates that the instruments used in the First Difference GMM model are valid and effective in providing estimates that are not too biased upward (such as PLS model estimates) or downward (as might occur in FE estimates if there are endogeneity problems). The System GMM model uses a weighted sum of the lagged value of differenced equation and lagged differences of level equation of the dependent variable to estimate the instrument, which can sometimes cause the instrument variable to be weak in the model (Hayakawa & Qi, 2020). This can result in biased parameter estimates, so the First Difference GMM model is a better model to use in this case.

Discussion

Based on the regression results with the research model, in general, there are four independent variables that significantly affect the dependent variable and one variable does not significantly. The value of Indonesia's HS 71 commodity exports in the previous period (lagged value), the exchange rate, and public demand for luxury goods have a positive and significant effect on the value of Indonesia's HS 71 commodity exports. On the other hand, GDP per capita of trading partners and tariffs are estimated to have a negative and insignificant effect.

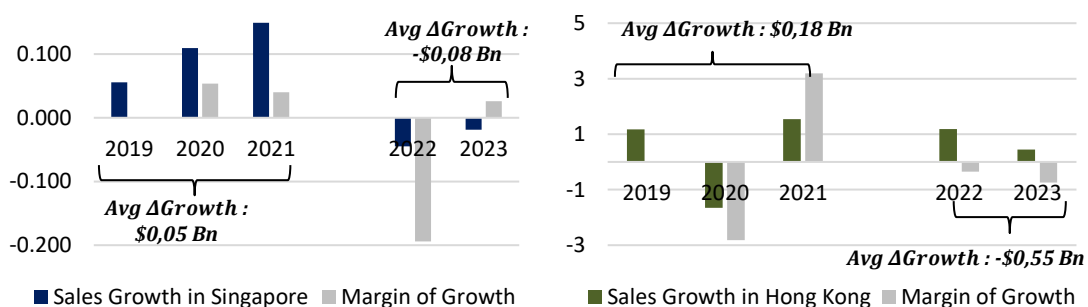
Elaboratively, the results of the analysis show that the export value of natural pearls and precious metals in Indonesia in the previous period had a positive and significant effect on the export value of natural pearls and precious metals in this period with a coefficient value of 0.52. This implies that assuming other factors are held constant, an increase in the export value of natural pearls and

precious metals last year by 1 percent is estimated to increase the export value of these commodities this year by 0.52 percent. This study is in line with a study conducted by (Eshetu & Mehare, 2020) which examined 37 types of agricultural commodities in Ethiopia in 1998 – 2018. Other than that, the estimation of exchange rate is also in line with the research conducted by (Tirfi, 2023).

In terms of effect, it is estimated that when the Rupiah depreciates by 1 percent, the export value of pearls will increase by 2.25 percent, *ceteris paribus*. The justification for the positive correlation between variables is that the exchange rate can affect the condition of the trade balance in a country. When a country's currency depreciates relative to the currency of a trading partner country, it will stimulate exporters to export more goods which will ultimately increase the country's export value. Market demand for luxury goods is also estimated to have a positive and significant effect on the export value of Indonesian pearls and, in line with research initiated by (Torrey & Sheung, 2008), (Mahatamnuchok & Banjongprasert, 2020), dan (Condello, 2021). Assuming other factors are held constant, an increase in market demand for luxury goods by 1 percent is estimated to increase the export value of natural pearls and precious metals by 2.27 percent. With conditions where pearls have become one of the main materials in making luxury jewelry, this supports the positive correlation between the demand for luxury goods and the condition of pearl exports.

Regarding tariffs, the estimation shows that tariffs set by Indonesia's trading partner countries, especially Singapore, Japan, Hong Kong, and Switzerland on HS 71 commodities have a negative effect on the export value of Indonesia's HS 71 commodities. This effect aligns with the results of empirical research conducted by (Gutiérrez Chacón & Machuca, 2021) dan (Narayanan G & Khorana, 2011) – although in this study, the influence of these variables was insignificant – and in economic theory. Existing economic theory explains that additional costs imposed in the form of tariffs can reduce the welfare of both producers and consumers (welfare effect) in the form of deadweight loss (Amiti et al., 2019) so that it can reduce the value of Indonesia's exports on HS 71 commodities. In terms of the relationship effect, based on regression estimates, a 1 percent increase in tariffs can reduce the export value of natural pearls by 1.2 percent with other factors assumed to remain constant.

Lastly, the result shows that GDP per capita of Indonesia's trading partner countries have a negative and insignificant effect at the 5 percent significance level. With a coefficient of -2.3, this shows that an increase in the purchasing power of the people of Indonesia's trading partners by 1 percent is estimated to have an effect on the decline in the export value of natural pearls and precious metals of Indonesia by 2.3 percent, *ceteris paribus*. This negative influence is not in line with previous empirical studies, such as research by (Prastio et al., 2016) and (Rosyidi et al., 2021). There are several explanations that can explain the discrepancy in these results, such as a saturated market, low income elasticity of demand, and the possibility of substitution of goods for other luxury goods or a shift in people's preferences. A saturated market occurs when the volume of a commodity in a market has reached its maximum. This occurs when the supply of a commodity is greater than demand or in economic theory is called excess supply. Market saturation occurs because aggregate demand has been met and new demand is not created (Hargrave, 2024). This is supported by data on luxury goods sales trends in Singapore, Hong Kong, and Switzerland as research objects that experienced decreasing marginal growth as in Figure 3.



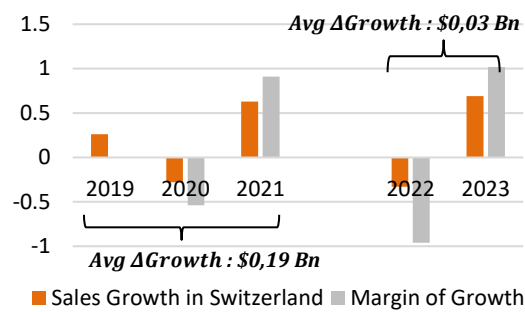


Figure 3. Trend of luxury goods sales in trading partner countries (in Billion USD)
(Source: Statista, processed)

In addition to the saturated market conditions, the low income elasticity of demand for natural pearls and precious metals is also a factor causing the negative correlation between the purchasing power of people in trading countries and the export value of Indonesia's HS 71 commodities. Income elasticity of demand measures the sensitivity of the amount of demand for a particular good to changes in the real income of the people who buy the goods. Referring to this study, natural pearls or precious metals and their derivatives are estimated to have a relatively lower income elasticity of demand compared to other types of luxury goods. As people get wealthier and their purchasing power increases, they tend to spend less money on buying pearls and more on other types of luxury goods, causing a decrease in the export value of natural pearls. Other than those, another factor that has the potential to influence the negative relationship between the two variables is the shift in people's preferences towards other types of luxury goods other than those produced from natural pearls. Moreover, a study conducted by (Hart et al., 2017) showed a decline in the natural pearl export industry due to the emergence of alternative types of natural pearls that are cheaper or of lower quality such as freshwater pearls and plastic pearls which are imitation or artificial pearls, a case study in Western Australia. Indonesia is a producer and one of the largest exporters of high-quality type of Southsea pearls, so that the presence of freshwater pearls can have an impact on Indonesia's natural pearl exports. In addition, artificial pearls are also not included in the HS 71 commodity category. The development of imitation pearls is estimated to be able to affect the demand for pure natural pearls.

CONCLUSION

This study aims to analyze the determinant factors of Indonesia's pearl exports to 4 major trading partner countries, namely Singapore, Japan, Hong Kong, and Switzerland, especially in the period of the latest 2 decades. The combination of the growth in net export contributions to economic growth, the potential for the development of natural pearl and precious metal exports, to the concentration of the market share of Indonesia's pearl exports in four countries over the past decade prompted the Author to further examine these determinant factors. By using the robust dynamic panel data regression method First Difference Generalized Method of Moment to identify the relationship between the determinant variables studied and the value of Indonesia's HS 71 commodity exports to four major trading partner countries over the past two decades, the above results can be drawn.

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