

Explore the Influencing Factors of Gold Price-Empirical Analysis Based on Eviews

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Abstract: In order to study the influencing factors of gold price at the present stage, this paper selects the relevant data from 2001 to 2020 in the United States, and uses Excel, SPSS and Eviews to conduct an empirical analysis on the influencing factors of gold price. The study found that the gold price in this period at the 95% significance level was significantly affected by CPI and Dow Jones industrial average index, dollar index and the federal funds rate did not significantly affect the gold price. Finally, according to the results of empirical analysis, some policy suggestions are put forward.

1. Introduction

After the collapse of the Bretton Woods system in 1973, the international gold price was no longer directly related to the US dollar. The main factors affecting international gold were more complex day by day, and the gold price gradually became market-oriented. The fluctuation factors affecting the gold price have been one of the topics of concern in the industry.

2. Literature review

Yang and Shi [1] made an empirical study on the long-term determinants of gold price and came to the conclusion that The Dow Jones Price Index, the US inflation rate, the nominal effective exchange rate of the US dollar, and the US federal funds rate are the long-term determinants of gold price. Zhou and Zhong [2] analyzed a series of variables that directly affect the gold price based on the VAR model and the dollar index may have more advantages to judge the gold price. In an empirical study on influencing factors of international gold price based on the VEC model by Maddot [3]. The results show that both the federal funds rate and the dollar index have a negative impact on the international gold price.

Levin and Wright [5] used the co-integration test to study the determinants of the gold price from the perspective of long-term and short-term respectively. The weighted average nominal index and real interest rate of us dollar against other major currencies in the world have a negative effect on the gold price. Graham Smith [6] selected monthly data from 1991 to 2001 for analysis, and the study showed that there was an obvious substitution relationship between stocks and gold, and the price trend of the two was opposite, while the price trend of other financial assets was mostly opposite to that of gold.

3. Empirical analysis

3.1 Variable selection

In this paper, the us dollar Index, US consumer price index, Dow Jones industrial index, and US federal funds rate are selected as explanatory variables, and the explanatory variable is the gold price.

3.2 The data show

This paper selects the relevant data of the United States from 2001 to 2020 for empirical analysis. Import the data summary into Eviews. The results are shown in Table 1.

Table 1: Raw data

Year	P	USD	CPI	DJ	RATE
2001	5.6	4.76	5.18	9.22	3.88
2002	5.74	4.62	5.19	9.12	1.67
2003	5.9	4.46	5.21	9.11	1.13
2004	6.01	4.39	5.24	9.24	1.35
2005	6.1	4.51	5.27	9.26	3.22
2006	6.4	4.43	5.31	9.35	4.97
2007	6.54	4.34	5.33	9.49	5.02
2008	6.77	4.4	5.37	9.33	1.92
2009	6.88	4.35	5.37	9.09	0.16
2010	7.11	4.37	5.38	9.27	0.18
2011	7.36	4.38	5.42	9.4	0.1
2012	7.42	4.38	5.44	9.47	0.16
2013	7.25	4.38	5.45	9.62	0.09
2014	7.14	4.5	5.47	9.73	0.12
2015	7.06	4.59	5.47	9.77	0.5
2016	7.13	4.63	5.48	9.8	0.75
2017	7.14	4.52	5.5	10	1.5
2018	7.15	4.57	5.53	10.13	2.5
2019	7.24	4.57	5.54	10.19	1.75
2020	7.48	4.5	5.56	10.19	0.25

3.3 Modeling

In Eviews, the relationship between explanatory variables and explained variables is preliminarily predicted by drawing a scatter diagram. As can be seen from the figure, each explanatory variable has a roughly linear relationship with the explained variable. Therefore, this paper adopts a multiple linear regression model. Thus, the initial model is established as follows:

$$P = \beta_0 + \beta_1 * USD + \beta_2 * CPI + \beta_3 * DJ + \beta_4 * RATE + \mu$$

Where P represents the natural logarithm of the gold price, USD represents the natural logarithm of the US dollar index, CPI represents the natural logarithm of the US consumer price Index, DJ represents the natural logarithm of Dow Jones Industrial Index, and RATE represents the US federal funds RATE.

3.4 Model estimation

The least-square method (OLS) is used in Eviews for parameter estimation, and the results of multiple linear regression obtained are shown in Table 2.

Table 2: Multiple linear regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19.12870	2.877388	-6.647938	0.0000
USD	-0.532039	0.299161	-1.778439	0.0956
CPI	6.550798	0.708425	9.246994	0.0000
DJ	-0.731077	0.221649	-3.298360	0.0049
RATE	-0.013462	0.021065	-0.639077	0.5324
R-squared	0.974598	F-statistic	143.8761	
Adjusted R-squared	0.967824	Prob(F-statistic)	0.000000	

4. Test of model

4.1 Test of economic significance

The results in Table 2 show that the USD coefficient is -0.5320, which is negative. CPI coefficient is 6.5508, which is positive; The coefficient of DJ is -0.7311, which is negative. The RATE coefficient is -0.0135, which is negative. These four indicators are consistent with economic theory.

4.2 Test of statistical significance

In terms of goodness of fit, the revised determination coefficient of the above model is 0.9678, indicating that the goodness of fit of the model is good. In terms of a significance test, when the significance level is 5%, the P-value of the F-test of the whole model is 0.0000, less than 0.05, which passes the F-test, indicating that the overall linear relationship of the model is significant. For each explanatory variable, the p values of the regression coefficients of CPI and DJ are 0.0000 and 0.0049 respectively, both less than 0.05, indicating that the T-test has been passed. However, the p values of the regression coefficients of USD and RATE are 0.0956 and 0.5324 respectively, both greater than 0.05, indicating that the T-test has not been passed, indicating that the model may have multicollinearity.

4.3 Test of econometric significance

It mainly tests multicollinearity, autocorrelation, and heteroscedasticity problems.

1) Multicollinearity Test

Table 3: Correlation coefficient matrix

Correlation	P	USD	CPI	DJ	RATE
P	1.000000	-0.291014	0.937356	0.673240	-0.556872
USD	-0.291014	1.000000	-0.044334	0.280482	0.181702
CPI	0.937356	-0.044334	1.000000	0.874148	-0.434291
DJ	0.673240	0.280482	0.874148	1.000000	-0.146533
RATE	-0.556872	0.181702	-0.434291	-0.146533	1.000000

The correlation coefficient of explanatory variables is tested in EViews and a correlation

coefficient matrix is obtained. The results are shown in Table 3: The correlation coefficients between CPI and DJ and between CPI and RATE are relatively high, which are 0.8741 and -0.4343 respectively, proving the existence of multiple collinearities.

At the same time, the least square estimation of parameters is carried out by SPSS, and a collinearity test can also be carried out. Where VIF values of CPI and DJ are both greater than 10, 12.425 and 11.377 respectively, indicating the existence of multicollinearity. The results are shown in Table 4.

Table 4: Collinearity test

Model		Coefficient						
		Unstandardized Coefficients		Standardized Coefficients	t	Significance	Collinearity Statistics	
		B	Standard Error	β			Tolerance	VIF
1	Constant	-16380.264	4735.595		-3.459	0.004		
	USD	-327.211	484.984	-0.078	-0.675	0.510	0.503	1.990
	CPI	3937.458	1155.716	0.979	3.407	0.004	0.080	12.425
	DJ	-236.755	358.668	-0.181	-0.660	0.519	0.088	11.377
	RATE (%)	-58.209	33.452	-0.194	-1.740	0.102	0.533	1.876
Dependent Variable: P(dollar per ounce)								

2) Correction of Multicollinearity

In Eviews, the least square parameter estimation method is used to carry out stepwise regression of explanatory variables. According to the principle of maximum determination coefficient after modification, the explanatory variable CPI is first introduced into the regression model, and the variable DJ is introduced into the regression model as the second explanatory variable. CPI and DJ are retained, and progressive regression is carried out on this basis. The regression results show that after the addition of USD or RATE, the corresponding P values are greater than the significance level of 5%, indicating that the influence of explanatory variable USD and RATE on the explained variable P is not significant, and these two variables should be removed from the regression equation.

Therefore, the final retained variables are CPI and DJ, and the corresponding regression result is

$$P = -23.732 + 7.464 * CPI - 1.016 * DJ$$

3) Heteroscedasticity Test

The white test is used in Eviews, and the results show that the p-value corresponding to Obs*R-squared is 0.1681, greater than the significance level of 5%, so there is no heteroscedasticity in this regression model. The result is shown in Table5.

Table 5: Heteroscedasticity test results

F-statistic	6.246314	Prob. F(14,5)	0.0268
Obs*R-squared	18.91832	Prob. Chi-Square(14)	0.1681
Scaled explained SS	10.01881	Prob. Chi-Square(14)	0.7608

4) Autocorrelation Test

LM test is used in Eviews, and the results show that the p-value corresponding to Obs*R-squared is 0.0790, greater than 0.05, so there is no autocorrelation in the model. The result is shown in Table 6.

Table 6: Autocorrelation tes resultst

F-statistic	1.978014	Prob. F(4,11)	0.1676
Obs*R-squared	8.367208	Prob. Chi-Square(4)	0.0790

5. Conclusions and policy recommendations

5.1 Conclusion

According to the final results of the model, the following conclusions are drawn: there is a significant correlation between the change of gold price and the Dow Jones industrial index and the US consumer price index CPI, while the impact of the US dollar index and the US federal funds rate on the gold price is not significant. The price of gold is positively correlated with the U.S. consumer price index (CPI), so gold can be used as a tool to avoid risks and hedge. The price of gold has a negative correlation with the Dow Jones industrial average, so as an investment vehicle, gold is less risky than other investment vehicles such as stocks.

5.2 Proposal

The price of gold is sensitive to changes in the price of the U.S. dollar, and gold is a good investment tool against the dollar's decline in both the long and short term. More efforts should be made to open the gold market and introduce more gold investment products so as to fully realize the role gold should play in the financial market.

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