Key Influence Factors of the Gold Price in Vietnam over 2011-2015

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Abstract— This study aims to evaluate the key influence factors of gold price in Vietnam from 2011 till June 2015. Based on analyses of the determinants, this paper renders quantitative results for the influence to assist investors reduce the risk and gain return when investing in the Vietnamese gold market. Variables which are "consumer price index in Vietnam", "inflation rate in Vietnam", "USD/VND exchange rate" and "nominal interest rate in Vietnam" are employed to construct a model of the gold price in Vietnam. The model learns from monthly observations pertained to the last day of the month spanning the period from January 2011 to June 2015. The results show that there is a positive relationship between the Vietnam gold price and the USD/VND exchange rate. We conclude that the inflation and the nominal interest rate in Vietnam have no statistical significance upon the gold price. Moreover, when realizing the movements of USD/VND exchange rate and the CPI, the investors could forecast the gold price in Vietnamese market. Finally, the research results advise the Vietnamese government key factors for managing the domestic gold price more effectively.

Index Terms— Affecting factor, Gold price in Vietnam, Gold market, CPI, Interest rate, Exchange rate, Inflation rate

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1 INTRODUCTION

Gold has been used widely throughout the world. It has a variety of applications such as mean of exchange, jewelry, medicine, food and drink, electronics and, especially, investment. Government, institutional and private investors invest in gold for a number of reasons, one of which is to hedge against inflation [28]. Gold appears to act as safe-haven in times of political or financial turmoil (Baur & McDermott, 2010) [3]. Gold is often seen as an alternative to the stock market. Buying shares can give investors higher return because they receive dividends and possible growth in share capital. In times of economic turmoil or recession, the value of shares tends to go down. Then, investors may sell shares and buy gold. Thus, fear over a recession tends to increase the value of gold as people move from more risky stock market to the safer one.

Sharma & Mahendru (2010) pointed that the movement of gold price is highly sensitive to the changes in fundamentals of any economy and future prospect "expectations" which are influenced by both micro and macro bases, formed either rationally or adaptively on economic fundamentals, as well as by subjective factors which are sometimes unpredictable and also non-quantifiable [25]. The price of gold is determined by several factors, among which are oil prices, USA exchange rate, interest rate, and inflation rate considered as the most common macroeconomic factors (Toraman, 2011) [27].

In Vietnam, gold is used as not only a mean of reserve but also a mean of payment in many transactions. However, the economy in Vietnam has recently been in downturn where the real estate is frozen and stock market is still sensitive and has high risk; consequently, the gold market is one of the alternative channels for investors to concern. Dang (2008) and Phan (2012) claimed that the gold market in Vietnam is still young and quite complicated though the Government has attempted

to stabilize and develop it by improving its policy system [14]. It is complicated because several affecting factors have failed to be fully identified. Thus, thorough understanding of the gold market in Vietnam as well as its key factors affecting the gold prices is necessary for not only investors but also the Government for an effective policy and implementation.

According to Central institute for economic management (CIEM, 2011), from 2001, gold price has continuously increased, especially, from April 2006, the price gold in Vietnam has increased dramatically (from 0.98 million to 1.5 million VND per unit) [6]. Although it was then stabilized at 1.3 million, the gold price all over the world and in Vietnam increased sharply that broke the record in 1980. Until now, the price of gold still fluctuated. It sometimes went up to 47.4 million per tael. Comparing December 2015 and December 2001, the gold price rose about 8.6 times. This period of time can be called "the century of gold". After rising dramatically and continuously in a long time, the price had the trend of reducing (from October 2011 to July 2012). However, this trend could not remain any longer as from the end of August 2012, gold price started to rise sharply. The enormous rise in gold price causes an unhealthy psychological effect on people: when the price goes up, they try to buy as much as they can, but when it falls, people tend to sell gold as quickly as possible. This is one of the reasons for the expectation of increasing price level of gold, beside the main factors brought by the fluctuations in the international gold prices.

Moreover, most of existing researches just focus on gold market in developed countries such as England (Mahdavi & Zhou, 1997) and Indonesia (Clarine & Dewi, 2012) [22]. Whereas an ample number of studies have attempted to explain gold price movements in the context of Vietnam, to the best of

knowledge, surprisingly there have been a few studies carried out so far to understand the determinants of gold prices in Vietnamese market with quantitative method. This study aims to fulfill these gaps.

2 LITERATURE REVIEW

Lampinen (2007) claimed that numerous studies have attempted to empirically model the gold price and these can be categorized into three approaches [21], including: (1) models variation in the gold price in terms of variation in main macroeconomic variables, for example, exchange rates, interest rates, world income and political shocks by Ariovich (1983)[1]; (2) speculation or the rationality of gold price movements by Baker & Van-Tassel (1985) [2]; and (3) gold is an inflation hedge with particular focus on short-run and long-run relationships between gold price and the general price level by Chappell & Dowd (1997), Laurent (1994) [7].

Macroeconomic approach

Dooley et al. (1995) conducted a study to test the short and long term influences of gold prices on exchange rates conditional on the other monetary and real macroeconomic variables[11]. The empirical tests, focusing on exchange rates between the U.S dollar and four other major currencies (the Pound sterling, the Japanese yen, the Deutsche mark, and the French franc) and on the mark/yen also with data from 1976-1990, showed that gold price movements have explanatory power with respect to exchange rate movements, over and above the effects of monetary fundamentals and other variables that enter standard exchange rate models. In this research, they viewed gold as "an asset without a country".

Speculation approach

To confirm the empirical data analysis that short run movements are influenced by the gold lease rate, the convenience yield and the LIBOR suggested by Ghosh et al. (2004) [14]. They drew on the convenience yield model and used commodity dividends to derive gold's fundamental value. It proved that once the commodity dividend increases by 1%, the gold price goes up by 0.61% (0.76%). They approximated the commodity dividends with the help of future contracts, and used them to explain the gold price, establishing a stable long-run relationship. The empirical evidence was favorable for a fundamentally justified price level even during the current period of a drastically rising gold price.

Inflation hedge approach

Kolluri (1981) studied the role of gold for inflation hedging by proposing two approaches, including [19]. Specifically, the first one modeled the relationship between the return on gold investments and the anticipated inflation or its variants which were estimated through the iterative procedure of Cochrane-Orcuttby using monthly gold prices from 1968 to1980. The second one modeled the return of shares and bonds between1926-1978 to use it as minimum required return for gold investments. The study concluded that gold well hedged against inflation in the period 1968-1980.
From the literature review, the following factors are investigated in this paper: Price of gold in Vietnam (PGV), Interest rate in Vietnam (INR), USD/VND exchange rate (REX), CPI of Vietnam (CPI), Inflation rate of Vietnam (IRV).

3 METHODS

Data Collection

After specifying all the dimensions above, the next step is to select a type of data and its sources. There are three categories of literature sources available: primary, secondary and tertiary (Saunders et al., 2009) [24]. The current research requires utilizing of secondary data, such as books, journals, newspapers and databases. The data used in the modeling are monthly observations from the last day of the month covering the period from January 2011 to June 2015. Monthly samples are chosen because many studies did the same with the short period of time, for example, studies of Pindyck (1993), Gosh et al. (2002), Kolluri (1981), etc. In addition, the data related to interest rate, consumer price index, exchange rate are not observed daily or weekly [23].

Price of gold in Vietnam (PGV)

PGV is the monthly average selling price of SJC gold per bar denominated in Vietnam Dong (1,000VND/tael). The reason we choose JSC gold price as proxy for gold price in Vietnam is that The Saigon Jewelry Company (SJC) is the most well-known manufacturer who dominates the monopoly on gold bars manufactured within Vietnam. The SJC gold is the purest gold available on the market, and is used for bank to bank transfers, real estate transactions and by private collectors. The data of PGV variable are obtained from is website (www.sjc.com.vn).

Interest rate of Vietnam (IRV)

When interest rate rises, people tend to keep money on deposit better than gold which does not earn interest (non-interest-bearing). This will cause pressure on the price of gold. Conversely, when interest rate falls down, the price of gold will likely rise. In theory, if the short-term interest rate rises, the gold price falls. In Vietnam, interest rates decisions are taken by The State Bank of Vietnam. The official interest rate is the Refinancing Rate. The data of IRV (%) are collected from the official site of the State Bank of Vietnam (www.sbv.gov.vn).

USD/VND exchange rate (REX)

Increase in USD/VND exchange rate means that domestic currency would be weaker and people would be more favor for using gold as safe haven. In addition, the majority of gold in Vietnam is imported while the gold prices in world trade are quoted mainly by USD. Thus, when USD/VND exchange rate rises, the gold price in Vietnam rises. USD/VND exchange rate historical data for REX can be found on Ministry of Finance website (www.mof.gov.vn).

CPI of Vietnam (CPI)

The general price level in Vietnam (Vietnamese consumer price index) is included as an explanatory variable to test whether the gold price moves together with the general price level so that gold can be considered as a long run hedge against inflation. The monthly CPIs used in this paper are compared to the base year 2011 and the data are collected from the official website of the Ministry of Finance (www.mof.gov.vn).

Inflation rate of Vietnam (IRV)

Gold is a hedge against inflation. In dollar terms, gold has consistently proven to hold up to inflation. So as price inflation heats up expect more people to jump on the gold band wagon. This demand will create higher and higher highs in the price of gold. Inflation rate is calculated by the following equation:

$$\pi_t = \frac{CPI_t}{CPI_{t-12}} - 1$$

Analytical Method

This paper employs an econometric model and cointegration regression technique for the data analysis because econometric models are generally algebraic models that are stochastic in including random variables. The random variables that are included, typically as additive stochastic disturbance terms, account in part for the omission of relevant variables, incorrect specification of the model, errors in measuring variables, etc. (Michael, 1983) [35]. Moreover, the concept of cointegration gains importance from the fact that the statistical properties of the composite variable are so dramatically different from the properties of the component series. Cointegration captures the notion of long-run relationships in economics and allows for possibly extensive divergences in the short-run. If a stationary linear combination does exits, the regression is the co-integrating regression [27].

So far, there were many researchers use different modeling methods for analyzing gold price. Widely used models used for modeling heteroskedasticity are Engle (1982)'s ARCH (Autoregressive conditional heteroskedasticity) model and Bollerslev (1986)'s GARCH (Generalized Autoregressive Conditional heteroskedasticity) model [12]. ARCH and GARCH models have been used in several studies (Yuchen, 2012) examined various macro-economic factors that influence gold by using the asymmetric power GARCH model for spot and future price over a 20 year period [29].

On the other hand, the co-integration regression method is also commonly used for modeling. It was claimed that as the statistical methods were developed for stationary series, its applications on non-stationary series may result in spurious conclusion. And cointegration analysis allows non-stationary data to be used so that spurious results are avoided. This method also provides applied econometricians an effective formal framework for testing and estimating long-run models from actual time-series data. Therefore, in order to take advantage of the cointegration regression technique, many analyses use this method for more accurate results (Claire et al., 2009; Dipak et al., 2000) [10]. Similarly, Bernard (2012) applied the cointegration regression technique to analyze the determinants of the gold price [4]. Therefore, due to the robustness of this approach, this paper uses the cointegration regression method to analyze the factors that affect the gold price in Vietnam.

The multiple regression models are used as follow:

$$PGV = \beta_1 + \beta_2 CPI + \beta_3 INR + \beta_4 REX + \beta_5 IRV + \varepsilon$$

where PGV is called dependent variable; INR, REX, CPI, and IRV are called independent variables; β_2, β_3, β_4, β_5 are called "Regression coefficients"; and ε is model error.

Moreover the multiple regression models have to satisfy best linear unbiased estimators (BLUE). The full ideal conditions consist of a collection of assumptions about the true regression model and the data generating process and can be thought of as a description of an ideal data set. Ideal conditions have to be met in order for ordinary least squared (OLS) to be a good estimate BLUE. If all assumptions are met than the OLS estimators beta are BLUE.

4 EMPIRICAL RESULTS

Dependent Variable: PGV
Method: Least Squares
Sample: 2011M01 2015M06
Included observations: 54
White heteroskedasticity-consistent std. errors & covariance
PGV=C(1)+C(2)*CPI+C(3)*INR+C(4)*REX+C(5)*IRV

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-47290.62	8701.898	-5.434518	0.000
C(2)	270.58	66.205	4.087037	0.000
C(3)	91285.14	52997.710	1.722435	0.091
C(4)	2.28	0.919	2.596392	0.014
C(5)	373.16	196.494	1.899107	0.071

R-squared	0.937912	Mean dependent var	35087.41
Adjusted R2	0.932844	S.D. dependent var	9404.797
S.E. of regress	2437.208	Akaike info criterion	18.52312
Sum sq. resid	2.91E+08	Schwarz criterion	18.70728
Log likeliho.	-495.1241	Hannan-Quinn criter.	18.59414
F-statistic	185.0511	Durbin-Watson stat	0.638190
Prob(F-statistic)	0.000000		

In this paper, we take the significant level of 5%. The p-values for C(3) and C(5) greater than 5% indicate that INR and IRV are insignificant in the model; thus, they are omitted from the model. Therefore, its updated model is obtained as the following:

Dependent Variable: PGV
Method: Least Squares
Sample: 2011M01 2015M06
Included observations: 54
PGV=C(1)+C(2)*CPI+C(3)*REX

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-64515.86	7772.769	-8.300241	0.000
C(2)	147.3778	63.54143	2.319398	0.024
C(3)	4.189320	0.768912	5.448371	0.000

R-squared	0.927914	Mean dependent var	35087.41
Adjusted R2	0.925087	S.D. dependent var	9404.797
S.E. of regress	2574.113	Akaike info criter.	18.59835
Sum sq. resid	3.38E+08	Schwarz criterion	18.70885
Log likeliho.	-499.1555	Hannan-Quinn criter.	18.84097

F-statistic   328.2445   Durbin-Watson stat   0.615878
Prob(F-statistic)   0.000000

The p-values for CPI and REX are all less than 5%; thus, they are all significant. Besides, P-value of F-statistic of the model is very small compared to the given significance level of 5%, hence, the model is considered well fit the actual dat for Vietnamese gold price. Moreover, the adjusted R2 of 0.925 indicates that CPI and REX explain 92.5% of the changes in Vietnamese gold price. The goodness-of-fit of the model is rather good. Importantly, the correlation between CPI and REX is found at 0.674 with the significant level of 0.002; thus, multicollinearity doesn't exist in this model. Besides, the test the assumption of normality shown in Figure 1 and Table 1, the value of JB test of 2.06 with p-value of 0.3569 shows that the model is normal distributed.
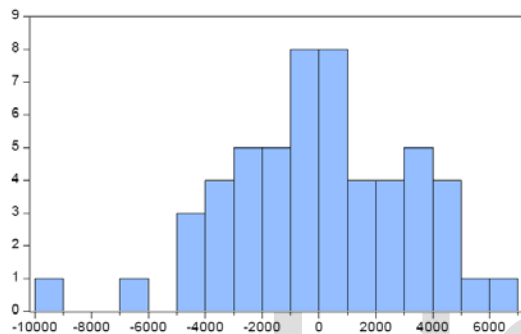

Fig. 1: Test for normality of residuals

Table 1: Test for normality of residuals

Series: Residuals	
Sample: 2011M01 2015M06	
Observations: 54	
Mean	-5.02e-12
Median	103.7340
Maximum	6877.368
Minimum	-9870.128
Std. Dev.	3176.035
Skewness	-0.401901
Kurtosis	3.519319
Jacque-Bera	2.060527
Probability	0.356913

In short, the econometric model for the price of gold in Vietnam and its affecting factors found in this study is presented as:

$$PGV = -64515.86 + 147.3778CPI + 4.189320REX + \varepsilon$$

According to the model, both CPI and REX have positive relationships with Vietnamese gold price, indicating that the changes in CPI and/or REX would obviously result in the change of the USD/VND exchange rate; specifically, every increase in 1 point of CPI would lead to an average increase of 147,378 VND/tael of gold, and every increase in 1 VND per USD would lead to an average increase of 4,189 VND/tael of gold.

The results in this paper further support those of Mahdavi & Zhou (1997), Tulley & Lucey (2007) [22-28]. Some others also show that inflation in countries other than the US does not accurately predict the gold price (Chua & Woodward, 1982) and proved that gold cannot hedge against inflation in many countries [8]. Studies using data including the post-1999 period of gold price hikes also failed to prove the relationship between inflation and the gold price. Similar with the findings of Siregar & Nguyen (2013), this paper demonstrates that inflation does not significantly cause the movement of gold price in Vietnam [26].

However, our findings are in contradiction to those of Godsell & Tran (2011) and Koutsoyiannis (1983) who concluded that the gold price was influenced significantly by interest rate [20]. It is because from May, 2012 the Vietnamese gold price and the nominal interest rate have the dramatically different movements, leading to the release of the Decree No.24 which was first valid on 25th May, 2012, so the gold price market has been strongly affected and did not move with the nominal interest rate.

Especially, this paper further confirms the empirical results of Sharma & Mahendru (2010), Toraman (2011) who claimed that the gold price is driven by USD exchange rate [27]. As mentioned, the Vietnamese gold market is the price taker as gold is mainly imported from other countries and quoted in US dollars. Thus, the domestic gold price converting to VND has been subjected to a duplicate effect. On the one hand, it follows after the increase of the world gold price in terms of USD. On the other side, it is affected by the increase of USD/VND exchange rate. This duplicate effect is significant because the shortage of foreign currency reserve has been a hot issue in Vietnam since the beginning of 2010 that the USD/VND exchange rate keeps rising strongly

5   CONCLUSION

As a result of model by testing different macroeconomic variables that affects to gold price in Vietnam, a positive relationship is found between Vietnam gold price and the USD/VND exchange rate. The findings of this study suggest that the USD/VND exchange rate and CPI are the two key variables that have significantly positive effect on Vietnamese gold price.

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