Al-Iqtishad: Jurnal Ilmu Ekonomi Syariah (Journal of Islamic Economics)
Volume 9 (2), July 2017
P-ISSN: 2087-135X; E-ISSN: 2407-8654
Page 289 - 310

CURRENCY SYSTEM AND IT'S IMPACT ON ECONOMIC STABILITY

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Abstract. ***Currency System And It's Impact On Economic Stability.*** *A number of economic problems that occurred during the power of Mamluk (1250-1517 AD) was considered as a result of the change to currency system, namely from the system of commodity-based money (gold and silver) into paper-based money (fiat). Instability prices, decrease of trading activities, high of unemployment number were a number of economic indicators that occurred at that time. This issue of macro-economy was considered as a result of changes in the money system. This study analyzes the dynamic relationship between the price of gold as a representation of commodity money system and M2 as a representation of fiat money against the stability of economic indicators such as inflation, economic growth, stock prices, and unemployment and interest rates. This study found that both systems not vary significantly against each other in its influence on macroeconomic variables. It means that the two systems do not have contrast distinction. Indeed, it was found that the commodity-based money system is not free of inflation, as propagated by the supporters of the dinar and dirham (dinarist).*

Keywords*: currency system, economic stability, vector auto-regression*

Abstrak Sistem Nilai Tukar dan Dampaknya Terhadap Stabilitas Ekonomi. *Sejumlah persoalan ekonomi yang terjadi pada masa kekuasaan Mamluk (1250-1517 M) ditengarai sebagai akibat dari pergantian sistem mata uang, yaitu dari sistem uang berbasis komoditas (emas dan perak) menjadi uang berbasis fiat (fulus). Tingkat harga-harga cenderung tidak stabil, aktivitas perdagangan melambat, pengagguran semakin meningkat adalah sejumlah indikator perekonomian yang terjadi pada saat itu. Persoalan makro ekonomian ini ditengarai akibat perubahan sistem uang tersebut. Penelitian ini menganalisis hubungan dinamis antara harga emas sebagai representasi dari sistem uang komoditas dan M2 sebagai representasi uang fiat terhadap stabilitas indikator ekonomi seperti tingkat inflasi, pertumbuhan ekonomi, harga saham, tingkat pengangguran dan tingkat suku bunga. Penelitian ini menemukan bahwa kedua sistem tersebut tidak memiliki perbedaan yang mencolok satu sama lain dalam pengaruhnya terhadap variabel makro ekonomi. Artinya kedua sistem tersebut tidak memiliki distingsi yang saling kontras. Bahkan justru ditemukan bahwa sistem uang berbasis komoditas tidak bebas inflasi sebagaimana dipropagandakan oleh para pendukung dinar dan dirham (dinarist).*

Kata kunci*: sistem nilai tukar, stabilitas ekonomi, vector auto-regression*

Received: January 29, 2017; Revised: April 25, 2017; Accepted: May 5, 2017
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http://journal.uinjkt.ac.id/index.php/iqtishad
DOI: 10.15408/aiq.v9i2.4749

Introduction

The Mamluk dynasty, who ruled in Egypt, Syria, and *Hijaz* from 1250 to 1517 AD, kept a lot of historical records about currency system. The historical record on this subject appeared in al-Maqrizi various reviews (1366-1441 / 766-845) in his various books such as *Ighasah al-Ummah bi Kashfi al-Gummah, al-Suluk li Ma'rifati Duwal al-Muluk*, and *al -Mawa'iz wa al-I'tibar.* All of those various notes have become important references for the experts today. The fundamental problem in currency system during the Mamluk reign was the inflation in various sectors of economy. Inflation included the increase of prices of staple food, the increase of production costs, the increase of transportation costs, and so forth. This prices increase has resulted in hunger everywhere, even caused many people death (Al-Maqrizi, 1997). This situation showed that inflation in the era of Mamluk was very severe. The severity exceeded inflation in Asia in 1997-1998, wherein the public at that time faced the price increases that go beyond reasonable limits, but did not caused people death.

The problem of inflation in the era of Mamluk had gained enormous highlight from the experts due to this issue become a measure of the weakness of currency system at that time. Experts provide important notes that the inflation problem is characterized by the dominance of money currency, wherein the currency which made of copper has been overused. It supposed only to be used for small transactions afterwards the situation has changed drastically. Sanusi (2001) said that the sharia has placed gold and silver in a prominent position in its monetary system.

The excessive use of money currency has resulted in a shift in the use of currency of dinar and dirham currency to money currency. This situation illustrates that bad currency had controlled good currency, which specifically called as bad money drives out good money. Söderberg (2004) in a study entitled Prices in the Medieval Near East and Europe corroborate the existence of these events. He argued that the prices, which depend on dinar and dirham in medieval always flared up and often experience uncertainty. The uncertainty has made new power gap in money currency.

However, the fall of currency system in the reign of Mamluk was still questionable whether it simply because of intention in the system of administration, or because of natural changes in the availability of raw materials currencies. Allouche (1994) in a study entitled Mamluk Economics: A Study and Translation of Al-Maqrizi's Ighathah replied that the issue was a deliberate action that has been done in monetary administration during Mamluk reign. There were three forms of intentional actions which Allouche conclude interrelated, the first was the malignance in government administration (*al-khaththath al-sulthaniyyah* region) and bribery in the appointment of public office (*al-manashib bi al-risywah*), such as in ministerial position, judges

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DOI: 10.15408/aiq.v9i2.4749

position, governor position, *muhtasib* position, and others, in which is not possible for a person to get important position except with money. This bribery behavior resulted in corrupt mentality of the officials, which only utilizes the state affairs for private interests. And then arouse the policy forms that were not oriented to the interests of public and the development of broader economy. As a result, the state expenditures became overused and not balanced with the ability of state budgeting.

The second was the excessive of tax increases (*ghala 'al-awthan*). This happened because the government aware that the income of the state was very small. This tax increase was extremely forced so that it troubled public which the majority was farmers. This fairly high increase in taxes caused the higher price of agricultural inputs, including the cost of land rental. Farmers were getting more suffered they refused to do the production. They chose to leave their homes, and did not want to growing crops anymore.The third was the increase of money currency circulation (*riwaj al-fulus*). The policy of money currency determination as the main currency was based on the will of officials who wanted to spend state money for personal and group interests. This is very possible to carry on due to the money currency was made of copper which very easy to made (Al-Maqrizi, 1956). This massive money printing has resulted in the fluctuation of inflation during Mamluk reign. Therefore, the amount of excess money in means that the exceed of production of goods and services has led to an increase in prices or usually referred as inflation.

Three points of Allouche (1994) reviews was based on the findings of testimonies written by al-Maqrizi (1366-1441/766-845). Based on these three reviews, Allouche (1994) concluded that the change in currency system in the era of Mamluk, from dinar and dirham to money currency, was caused by the government deliberately printing money excessively. However, in a variety of data seems that the change in the currency system was not solely caused by the intention of Mamluk government monetary administration, but also caused by the limited amount of supplies of gold and silver. The limited number of gold and silver is hampering the printing of dinar and dirham currency, so it cannot balance the need for transaction-based on dinar and dirham. Thus, the change of currency system during that era was caused by the factor of limitation or inability supply of dinar and dirham to balance the needs of transaction. This became the flawless of currency system based on commodity such as gold and silver for some people (Dipraja, 2011).

The indication of this matter may be seen in three things among others: First, the dinar is often not used as a benchmark measurement of the price. It is characterized by the low volume usage of dinar currency when compared to dirham. Even the use volume of dinar currency is much lower than dirham. Second, the content of dinar and dirham are always changing (Al-Maqrizi, 1997). From year

to year the content of gold and silver in the precious metal is always decreased. Third, the printing of money currency was often done by Mamluk government in order to accelerate the fulfillment of public transaction (Al-Maqrizi, 1997). This government's actions further strengthen the indication of limited amount of gold and silver at that time. Such Data may be seen in the writings of the thinkers and historian who lived in Egypt in the 13th century to 15 AD.

If the existence of indications proved is true, then it may change the position of theory which says that the change in the currency system in the era of Mamluk, namely from the dinar and dirham to money currency, was caused by the intention of monetary administration of Mamluk reign to fulfill the ambitions of political and economic elites ruling the empire. Then such theory became weaker and cannot be used as opinion suppport. At the same time it may also reconstruct a view of the change in currency system power Mamluk era to the conclusion that changes in the currency system in the era of Mamluk, the currency of dinar and dirham to money currency, due to the limited amount of gold and silver (Hasan, 1999). Copper currency as money was an option in the middle of such limitations. Thus, if these assumptions proved to be true, then the dominance of copper currency money became a reflection of Mamluk government compulsion, as a result of the impossibility of running an ideal currency system.

Based on the above reviews that described about the history of currency system changed at the time of Mamluk from dinar and dirham currency system to money currency system, the study clasified two currency syestems. The first type of currency in this study is referred to commodity-based currencies (gold and silver) and the second type of the currency is called fiat currency (currency printed and endorsed by the government). This study did not focus on the study of the change of currency system during that time but try to contextualize the concepts and assumptions in the present time, namely how the impact of the use of both currency system, whether the currency of commodity-based or cash-based fiat and how it impacts macroeconomic stability. Thus, this study will use a number of macroeconomic variables as the indicators of economy stability. Indonesia is presented as a case study in this research.

Literature Review

Monetary Theory: Commodity Money Vs Fiat Money

Money is a means of payment which currently use for all buying and selling transactions, either directly or indirectly. The existence of money provides an alternative transaction which is easier than barter which inefficient and not suitable to use in modern times as it is today due to a consideration that the exchange rate is not balanced. The efficiency gained by using money as a means of payment will ultimately

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DOI: 10.15408/aiq.v9i2.4749

boost the trade and the division of labor which would then increase the productivity and prosperity. Monetary theory relatively associated with money quantity theory of those who think that lots of factors which affect the value of money is money supply (quantity of money or the supply of money). The theory of money value discusses the financial issues related to money value. Value of money becomes the attention of the economists, due to the high or low of money value affects the economic activity. This is evidenced by there are many theories of money delivered by some experts.

According to the group of *Dinarist*, there is a causal relationship of money supply on the price level. This is similar to the monetarist argument that the inflation is a monetary phenomenon. The continuous increase in the money supply will lead to a decline in interest rates after the full-employment level of output is achieved. Furthermore during the interest rate remains positive, the money supply will continue to increase, in their environment, by default setting (Ibrahim, 2006).

The decline in interest rates will increase the bank lending activity. When bank loans increased, so did that happen to the money supply? The increase in money supply illustrates the decline in interest rates (Judisseno, 2005). Thus, this leads to a further expansion of the money supply. This clearly shows the reverse flow of causality of the interest rate on the money supply. Because the price of all items controlled, the increasing of money supply will lead to asset price bubbles as written in (c), which is the second source of instability (Insukindro, 1992).

Based on the above three causal relationships, Ibrahim (2006) then reiterated that the *Dinarist* group view that fluctuations in the money supply as the main cause fluctuations for other variables. Fluctuations in variables such as real output (mainly the decrease), the level of prices, interest rates and asset prices are taken into account in almost all parts of variation in the money supply, made the money supply into the core variables as a determinant of other variables change.

On the other hand, many empirical studies have been done to show how the money supply affects macroeconomic variables. In Rama' research (2013), he argued that the West African Monetary Agency WAMA (2009) on its research by using basic statistical analysis of historical data for period 2002 to 2009 showed that the percentage increase in money supply is higher than the GDP growth rate. Moreover, in these studies it appears that the velocity of circulation of money declined in most countries during the study period. Relatively high rates of growth of liquidity and declining turnover showed an excess of liquidity in most economies, especially, in Gambia, Ghana, Guinea, Nigeria, Sierra Leone and Liberia. In addition, the growth in money supply has the effect of inflation in most countries, especially in Gambia and Guinea where the impact is so significant and moderate effect in Benin, Guinea Bissau, Mali, Ghana, Cape Verde and Liberia.

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DOI: 10.15408/aiq.v9i2.4749

Other studies on the relationship between money supply and macroeconomic variables were conducted by Ibrahim (2006). He examines the dynamics of Malaysia monetary in applied vector autoregressive (VAR) approach which preceded by a unit root and Co integration Test. He found that it clearly there is an important causal role of the money supply to other macro-economic variables. Money supply plays a causal role that is significant for other variables, including fluctuations in real output, the level of prices, interest rates and stock prices. While the test impulse response functions provide some evidence that monetary expansion is the cause of inflation. Finally he concluded that the concern of dinaris group about instability effects in the money supply is empirically proven. Viewed from the impact it was so great for the economy and other macro-economic variables, as a description of the failure of paper money (fiat money) which is very fragile because it did not propped up or supported on value commodities such as gold and silver. Paper money only supported by the laws that made by the government of a country. If the political and economic situation of the country is not stable, then the level of confidence in the currency will also decrease. The owners of money will be hilarious switch to another currency or commodities which considered more valued that makes the value of the currency slumped. It is the time we shall get back to the money syste, which has a standard or support of the value such as gold and silver. The use of money which supported on a commodity value of money will make it more valuable and not easily affected by inflation because it has a fixed standard of value. It means that by the resistance of commodity currencies (commodity money) against the inflation is expected to make the economy grow better and provide a positive effect on other macroeconomic variables.

This study analyzes the dynamic relationship between the price of gold as a proxy of the currency system based on commodities and M2 (amount of money supply) as a proxy of the system of fiat currencies with a number of macroeconomic indicators, such as inflation rate, economic growth, stock prices, unemployment and level of interest rate. This dynamic relationship will indicate whether the currency system has a dynamic effect on a number of macroeconomic variables. Thus, it can be concluded that the system of particular currency may affect macroeconomic stability.

Method

This study analyzes the dynamic relationship between gold price (Ln gold) and M2 (Ln Fiat) against the level of inflation, the level of production, stock prices, unemployment rates and interest rates. Details of the research methodology used in this study are as follows:

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DOI: 10.15408/aiq.v9i2.4749

This research is a quantitative research using a dynamic model, i.e. VAR to see the dynamic relationship between variables in the system. Type of data used is secondary data obtained from periodical publications of related institutions. This type of data is *time series* with monthly data from 2006 to 2014.

Types of data that are used to achieve the objectives of this research are gold price (Ln gold), M2 (Ln Fiat), the level of inflation (inflation), stock prices (Ln Shares), unemployment rates (unemployment) and interest rates (interest). Variable of stock prices is used as a proxy of commodity-based currency system. It is used because data of gold-based money cannot be found specifically the amount of gold used as a transaction in the economy. This variable data is obtained from the publication of gold price that is published in official in real time on the website of Antam. While M2 or the money supply in the economy is used as a proxy of the fiat money system (*fulus*). This variable data is obtained from the official website published by Bank of Indonesia periodically.

Furthermore, variables of inflation rate, production, stock prices, unemployment rates and interest rate become a representation of macroeconomic conditions. The dynamics of a number of macroeconomic variables are correlated with the gold price and the money supply. Variable of the inflation rate is obtained from official publication on the website of Bank of Indonesia periodically. While variable of the production is represented by industrial production index which data is taken from the website of Central Bureau of Statistics (BPS).Furthermore, the stock price as a representation of the company performance is obtained from publication data of yahoo finance.co.id. The data of unemployment rate as a proxy of social issues is taken from a monthly report issued by the Central Bureau of statistics (BPS) on its official website. Furthermore, the interest rate is the average of loan interest with 3 months tenor taken from publications issued by Bank of Indonesia on its official website.

This research uses vector auto regression (VAR) to see the dynamic relationships between the variables in the system. In addition, the study also uses the correlation analysis and Granger Causality to see the relationships between variables in the system. The main requirement in the analysis of VAR is to pass the stationarity data test to see whether there is a problem of *unit root*. Then, the co-integration test is done to see the long-term relationships between variables. Therefore, unit root test and co-integration test are conducted first in this data.

Result and Discussion

This study wants to see how the dynamic relationship between gold prices as a representation of the assumption of commodity-based money with a number of macroeconomic variables such as economic growth, inflation, stock prices, interest

DOI: 10.15408/aiq.v9i2.4749

rates and unemployment rates. Dynamic relationship patterns will show how variation of gold prices has an impact on the stability of macroeconomic variables. On the other hand, the study also compares the results of the dynamic relationship between the money supply (M2) as a representation of the fiat money (*fulus* money in Mamluk era) against a number of macroeconomic variables. This comparison gives pictures between two systems of these currencies, whether commodity-based money (gold) or fiat money (M2) gives effect to the dynamics of macroeconomic variables, such as economic growth, inflation, unemployment rates, interest rates, and stock prices. This study uses secondary data with monthly time series from 2006 - 2014.

A number of econometric analysis tool used to find the dynamic relationships between variables in the system. The root units and co-integration test will be performed first to notice any problems of the unit root and long-term relationships between the variables in the system. The first step in the formation of VAR model is doing a stationarity data test. According to Widarjono (2009), if data is stationary at the level, then it will use usual VAR models (unrestricted VAR). Conversely, if the data is not stationary at level but stationary at the level of differentiation, then it must test whether the data has a long term relationship or not by using a co-integration test. When there is co-integration on the model, the model used is Vector Error Correction Models (VECM). Stationarity data test uses unit root of Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP).

Table 1. The Result of Unit Root Test

Variables	Level		Fist Difference	
	ADF	PP	ADF	PP
LnGold	-0.02152	-0.07356	-9.22734*	-9.22708*
LnFiat	-5.08950*	-5.13186*	-10.21611*	-16.55801*
Inflation	-2.88655	-2.33487	-8.09380*	-8.09380*
LnOutput	-2.99188	-2.99188	-11.70400*	-11.92543*
LnStock	-2.41752	-2.28963	-7.32170*	-7.32397*
Interest	-2.64452	-1.85607	-4.58954*	-4.59258*
Unemployment	-0.41274	-0.32399	-6.82508*	-7.08505*

Note: *, **, ** significant at each critical value of MacKinnon 1%, 5% and 10%. ADF and PP test are based on *trend* and *intercept*.

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The VAR method requires all variables in the systems for stationary. Therefore, the stationarity test should be done in advance on each variable. Unit root test is conducted to determine *time series* of stationarity data. Time series data is said to be stationer if average, variant and co-variant at every *lag* is the same in any time. If the time series data does not meet these criteria then the data is not stationary (Widarjono, 2009). If the time series data has a unit root then the data moves randomly (random walk) and data that is random walk is said to be not stationary.

To know time series of stationarity data there is used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test against all variables, i.e. gold price (Ln Gold), fiat money (Ln Fiat), Inflation, economic growth (Ln Output), stock prices (Ln Shares), unemployment rates (Unemployment) and interest rates (Interest).

Table 1 presents the results of ADF and PP test on the level and first difference over each variable in the system. Based on the ADF and PP unit root test, it shows that there is 1 variable that is stationary on the level while other variables are not stationary at level. Therefore, all variables are generally not stationary at level. Hence, all variables have a unit root at the level. However, all variables or series of stationary after been differentiated on the first order, I (1) mean all series integrates on first order. This indicates a possibility of long-term relationships between the variables in the system. If all series are stationary on the same order then co-integration test is conducted to see the long-term relationships between variables.

The regression using time series that are not stationary would most likely produce spurious regression (Granger and Newbold, 1974). Spurious regression occurs if coefficient of determination is high but the relationship between independent and dependent variable has no meaning, or statistically significant but do not have a logical theoretical framework. The relationship occurs between variables is only trend relationship, not an actual (Rama, 2013). To know whether the regression result is not spurious then it needs to run co-integration test as developed by Johansen and Julious.

Based on the unit root test results in Table 1, it is found out that all variables are stationary on the first order I (1). This condition allows doing co-integration test to find whether there is or no long term relationships of variables in the system. This research uses co-integration test, the procedure of Johansen, between variables. To know whether there is co-integration in the system, it is by calculating the maximum eigen value and trace statistics. If there is at least one *vector* of co-integration in system characterized by the value of maximum egen value and trace statistic is greater than the value of its statistics, then there is co-integration.

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DOI: 10.15408/aiq.v9i2.4749

Table 2. Result of Johansen Co-integration Test

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.437262	165.1525	150.5585	0.0057
At most 1	0.333566	111.6829	117.7082	0.1131
At most 2	0.223787	73.94221	88.80380	0.3599
At most 3	0.182154	50.38274	63.87610	0.3970
At most 4	0.163123	31.68215	42.91525	0.4058
At most 5	0.089833	15.12083	25.87211	0.5645
At most 6	0.066171	6.366989	12.51798	0.4152

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.437262	53.46956	50.59985	0.0245
At most 1	0.333566	37.74072	44.49720	0.2249
At most 2	0.223787	23.55948	38.33101	0.7696
At most 3	0.182154	18.70058	32.11832	0.7514
At most 4	0.163123	16.56132	25.82321	0.4952
At most 5	0.089833	8.753842	19.38704	0.7495
At most 6	0.066171	6.366989	12.51798	0.4152

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 2 presents the result of Johansen co-integration test. This test uses lag 2 based on Akaike Information Criteria (AIC), residual on every VAR equation that is free from the problem of normality and autocorrelation. Based on the value of the Trace Statistics and Max-Statistics it is found out that there is 1 co-integration vector in the system. These findings indicate that all data of the variables used in this study, namely: gold price (Ln Gold), money supply (Ln Fiat), Inflation, economic growth

(Ln Output), stock prices (Ln Shares), unemployment rates (Unemployment) and interest rates (Interest) integrated to each other, i.e. the entire variables tend to move towards the equilibrium in the long term. In other words, in every short-term period, all variables will mutually adapt to achieve long-term balance (equilibrium). This means that result of the estimation of the regression is not spurious, but it has long-term relationships between variables.

Based on the results of unit root test and Johansen co-integration test then it can do further testing to see the dynamic relationships among variables of gold as a proxy of commodity-based money system and M2 as proxy of fiat money system with a number of macroeconomic indicators, such as inflation, output, stock prices, unemployment, and interest.

Table 3. The Result of Granger Causality Test for Gold

Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
Ln_Fiat does not Granger Cause Ln_Gold	94	0.39132	0.6773
Ln_Gold does not Granger Cause Ln_Fiat		0.52268	0.5947
Ln_Output does not Granger Cause Ln_Gold	94	3.64476	0.0301
Ln_Gold does not Granger Cause Ln_Output		3.0509	0.0523
Ln_Stock does not Granger Cause Ln_Gold	94	3.74812	0.0274
Ln_Gold does not Granger Cause Ln_Stock		1.60792	0.2061
Unemployment does not Granger Cause Ln_Gold	94	1.68838	0.1907
Ln_Gold does not Granger Cause Unemployment		0.30135	0.7406
Interest does not Granger Cause Ln_Gold	94	0.85044	0.4307
Ln_Gold does not Granger Cause Interest		5.21108	0.0072

Note: significant if the value of the probability is less than 0.01.

Granger postulated that a variable X is said to affect another variable Y, i.e. if the current Y can be predicted even better by using past values of X. This test examines if a free variable (the independent variable) has a comparison of non-free variable (the dependent variable) that is reciprocal. Granger Causality Test is a test performed to figure out the causal relationships between variables that are being analyzed. Related to this research, Granger Causality Test allows making comparison of the existence of the relationship of one or both directions of the variables used in the study. Quality Granger test result is displayed on Table 3 and Table 4. This

research found out that there is a two-way relationship between economic growth (Ln Output) and gold price (Ln Gold). This shows that gold price has a reciprocity relation with the level of industrial production. It thus can be interpreted that the use of commodity-based money system (gold) can affect a country's economic growth rate, and vice versa.

Other interesting finding is that the gold price has a significant influence in one direction with the level of interest rates (interest). This means the gold-based money system can affect the variation that occurs at the level of interest rates. But instead, in commodity-based money system, interest rates do not have one-way causality in the currency system. This shows that gold-based currency system is relatively independent from the interest rate.

Table 3 also shows that stock prices have one-way causality with the gold price. This indicates that the stock price movements can have the significant effect against commodity-based money. But instead, the gold price has no effect against the same price. While the others variables are found to have no causal relationship with the gold price. This shows that commodity-based money does not have too much effect toward a number of specified variables.

Table 4. The Result of Granger Causality Test for Fiat

Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
Inflation does not Granger Cause Ln_Fiat	94	0.0412	0.9597
Ln_Fiat does not Granger Cause Inflation		0.06014	0.9417
Ln_Output does not Granger Cause Ln_Fiat	94	0.72407	0.4876
Ln_Fiat does not Granger Cause Ln_Output		1.30586	0.2761
Ln_Stock does not Granger Cause Ln_Fiat	94	1.34606	0.2655
Ln_Fiat does not Granger Cause Ln_Stock		1.79749	0.1717
Unemployment does not Granger Cause Ln_Fiat	94	1.0515	0.3537
Ln_Fiat does not Granger Cause Unemployment		1.75755	0.1784
Interest does not Granger Cause Ln_Fiat	94	0.22123	0.802
Ln_Fiat does not Granger Cause Interest		1.22131	0.2997

Note: significant if the value of the probability is less than 0.05.

Table 4 presents the causal relationship between M2 or money supply and a number of economic variables in the system. The study found out that M2 did not

DOI: 10.15408/aiq.v9i2.4749

have a causal relationship with all the variables used in this study, namely: inflation, economic growth, stock prices, unemployment rates and interest rates. This shows that the system of fiat money has no causality with macro economy variable and vice versa. Table 5 presents the summary of relationship patterns between the variables in the system.

This study also runs the correlation test between the variables used. The purpose of this test is to find out to what extent the relationship between the variables. The information is mainly to find out to what extent the gold price and M2 (money supply) have a relationship with macroeconomic variables, such as inflation, economic growth, stock prices, unemployment rates and interest rates. Surely this is to provide information on whether the money system (a commodity or fiat) has a correlation towards macroeconomic variables.

Table 5: Summary of the Relationship

Gold	Fiat
LnFiat ======= LnGold	Inflation ======= LnFiat
LnOutput <======> LnGold	LnOutput ======= LnFiat
LnStock =======> LnGold	LnStock ======= LnFiat
Unemployment ======= LnGold	Unemployment ======= LnFiat
Interest =======> LnGold	Interest ======= LnFiat

Table 6 presents the result of correlation test between the variables in the system. The gold price and inflation have a fairly high correlation (61%) with the value of negative influence. It means that the gold price has a reciprocal relationship with the level of inflation. Thus, in respect of a commodity-based money system, if gold prices increase then it will lower the rate of inflation. Of course this finding contrasts with the prevailing monetary theory in general that the system of fiat money (M2) is very vulnerable against the inflation. If the amount of money circulating in the economy is growing then potentially creates inflation or raises prices in general. Significant negative relationship is also seen between the gold price and the level of interest rates. Thus, in the gold-based money system, the gold price will have a negative relationship with the level of inflation. Other interesting finding is that the gold price has a significant negative correlation relationship with the unemployment rate. This means, in the gold-based money system, if the money is increasingly strengthened then it will reduce the unemployment rate. But in contrast, outcome of the correlation relationship between gold prices with economic growth is not

DOI: 10.15408/aiq.v9i2.4749

significant. This indicates that the gold-based money is less able to maintain the economic growth.

Table 6. The Result of Correlation Test between Variables

Variabel	Gold	Fiat	Inflation	Output	Share	Unemployment	Interest
Gold	1.00	0.92	-0.61	0.06	0.89	-0.96	-0.84
Fiat	0.92	1.00	-0.53	-0.09	0.88	-0.97	-0.79
Inflation	-0.61	-0.53	1.00	-0.19	-0.61	0.64	0.81
Output	0.06	-0.09	-0.19	1.00	-0.02	-0.05	0.06
Stock Prices	0.89	0.88	-0.61	-0.02	1.00	-0.89	-0.90
Unemployment	-0.96	-0.97	0.64	-0.05	-0.89	1.00	0.84
Interest	-0.84	-0.79	0.81	0.06	-0.90	0.84	1.00

Table 6 also presents the correlation of the money supply (M2) with a number of variables in the system. Directions and numbers of correlation between macroeconomic variables with M2 are not much different to the previous gold price correlation results. This shows that money system (commodity-based money or fiat money) have correlation character with a number of macroeconomic variables. Meanwhile, the result of the correlation between gold prices with M2 has a correlation of over 90% with positive direction. This shows that both variables have a close relationship. It means that the changes of gold prices are highly influenced by the amount of money in circulation, and vice versa.

Analysis of variance decomposition (VDC) presents the change in value of a particular variable in a period, which is caused by the changes in the same variables and other variables during the previous period. In this study, analysis VDC used to quantify the contribution of the price of gold (gold Ln) as a representation of commodity-based currency system and money supply (Ln Fiat) as a representation of fiat money system of a number of macroeconomic variables as the indicators of economic stability. Analysis VDC used based on the method of Chlesky decomposition.

Based on the analysis in Table 7 VDC it found that the variation of commodity money (gold Ln) affected by the variation itself by 100% in the first period and decreased consistently in the next period, which amounted to 65.3% in the 20th period. While the influence of other variables in the innovation system is contributed only 17% in the 15th period and increased to 35% in the 20th period.

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Table 7: The Result of Variance Decomposition Test

Variance Decomposition	Period	Innovation in						
		LnE	LnF	LnInf	LnOut	LnS	LnP	LnInt
Money Commodities	1	100.00	0.00	0.00	0.00	0.00	0.00	0.00
(LnGold)	5	86.45	0.43	2.11	0.89	9.53	0.36	0.23
	10	82.53	1.89	2.09	1.77	9.04	2.35	0.33
	15	74.78	4.22	2.51	3.82	7.77	5.98	0.91
	20	65.30	7.12	2.68	6.32	6.70	9.60	2.27
Fiat money	1	0.60	99.40	0.00	0.00	0.00	0.00	0.00
(LnFiat)	5	4.82	91.44	1.26	0.25	0.58	0.21	1.44
	10	7.76	83.71	3.05	0.16	2.68	0.83	1.83
	15	7.66	78.93	2.73	0.14	5.71	1.22	3.61
	20	6.62	76.43	2.22	0.22	7.21	1.53	5.77
Inflation	1	0.02	0.86	99.13	0.00	0.00	0.00	0.00
(Inflation)	5	0.31	1.12	87.14	2.33	0.71	1.08	7.32
	10	0.57	1.83	78.25	3.10	7.32	1.64	7.29
	15	2.97	1.66	66.09	3.14	12.07	3.05	11.02
	20	6.19	2.18	59.41	3.17	11.18	3.88	13.99
Economic growth	1	1.16	1.34	3.01	94.48	0.00	0.00	0.00
(LnOutput)	5	1.54	2.20	1.61	86.90	3.27	0.94	3.55
	10	3.36	5.21	2.23	77.53	3.84	2.37	5.46
	15	3.62	7.06	2.16	74.27	4.73	2.82	5.35
	20	3.56	7.72	2.67	73.01	4.90	2.88	5.26
Stock price	1	0.14	0.19	0.15	2.21	97.31	0.00	0.00
(LnShare)	5	4.54	0.34	3.49	6.24	70.21	0.38	14.81
	10	11.86	2.03	9.59	4.53	46.16	0.74	25.09
	15	13.48	3.51	11.92	4.14	41.99	0.75	24.21
	20	13.09	3.56	11.58	4.05	41.66	1.46	24.61
Unemployment Rate	1	0.18	1.24	0.00	3.73	0.39	94.45	0.00
(Unemployment)	5	0.23	1.06	3.66	2.96	1.62	90.32	0.15

	10	0.35	1.10	9.27	13.10	3.26	72.62	0.30
	15	0.26	0.78	9.76	20.25	3.34	64.90	0.72
	20	0.24	0.61	9.02	24.33	3.22	61.09	1.48
Interest rate	1	0.49	1.77	7.78	1.87	17.54	1.35	69.20
(Interest)	5	14.81	0.67	26.87	0.92	11.50	0.27	44.95
	10	19.42	2.20	34.05	0.54	8.46	0.22	35.12
	15	17.76	2.22	31.60	0.59	13.95	1.30	32.58
	20	16.82	2.64	28.49	0.85	13.81	3.02	34.36

This shows that the shock that occurs on other variables has increased contribution to the variation of the price of gold (gold Ln). Thus, in a long period, the variation in the price of gold is influenced by the innovations that occur in other variables, such as output, inflation rate, stock prices and unemployment. VDC Results for M2 is not much different from the results of Ln Gold. In fiat money system, a variation that occurs in M2 is strongly influenced by itself. This is reflected in the value of VDC at the beginning of period amounted to 99.4% and decreased slightly in subsequent periods became 76.4% in the 20th period. The influence of other variables in the system such as interest rates, stocks and inflation is contributed only 5.77%, 7.21% and 2.22 % respectively in the period of the 20th. These results indicate that other variables did not significantly affect the variations that occur in M2 (Ln Fiat).

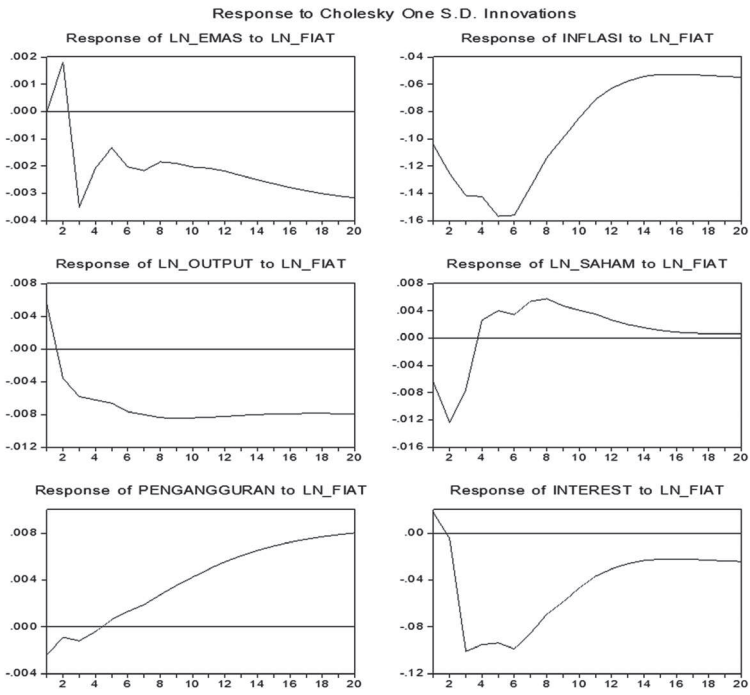
The variations, which occur in inflation is not too large and significantly contributed by the innovation that happen on the price of gold (Ln gold) and M2 (Ln Fiat), the contribution of each is equal to 6:19 and 2:18 in the period of the 20th. It shows that inflation is not unduly influenced by the currency system used by a country. As for the variation of economic growth (Ln Output), only contributed at 3.56% by the price of gold and 7.72% by M2. These findings suggest that the contribution-based on fiat money system is greater in the variation that occurs in output, but its contribution is not significant.

Contributions innovation price of gold (Ln gold) is relatively higher in the stock price variations. Its contributions have increased at the beginning of the period (0.14%) to the period of the 15th (13.48%) and then decreased to 13.08 at the end of the period of 20th. It means that gold prices contribution to the variations in prices did not experience the same consistency even tend to go up and down in line with the increase in the period. Meanwhile M2 innovation

contribution to the variations in stock prices is very small and insignificant, only 3.56% in the period of 20th.

VDC results also show that innovation that happened neither in the gold price nor with M2 do not significantly contribute to the variation or shock that occurs in the unemployment rate. Means that, the currency system used, whether based on commodity or fiat not contributes to the forecast error at the level of inflation. An interesting finding from Table 7 there is about 19% in the 10th period of price of gold innovation contributions (Ln gold) to the variations that occur in interest rates (Interest). However, the contribution has decreased gradually in the next period. While M2 innovation (Ln Fiat) is not much significantly contribute to variations in interest. This shows that the system of commodity-based money will only have a relatively large impact on the variation of interest rates in the economy. Based on the VDC test results can be concluded that the system of currency (or commodity-based money or fiat) is not much contribute to the variation that occurs in macroeconomic variables. Thus, both systems have a dynamic relationship with macroeconomic variables.

Figure 1: The Result of IRF Test against Shock in Ln Fiat



DOI: 10.15408/aiq.v9i2.4749

To present a more in-depth analysis of the dynamic relationship between the currency system (commodity-based currency and fiat money) and a number of macroeconomic variables as indicators of economic stability, this study adopts the analysis of response function (IRF). IRF analysis confirmed the dynamic response of all variables to the shock of one standard deviation in the variables in the system. In this study, only discussed impulse response which associated with the shock (shock) that derived from the price of gold (Ln Gold) and M2 (Ln Fiat) to the level of inflation rate (inflation), economic growth (Ln Output), the stock price (Ln Shares), the unemployment rate (unemployment), and the rate of interest (interest).

IRF analysis results show how a variable response on the shock, which occurs on other variables in a system served throughout 20 periods of time (time horizon). Figure 1 shows the dynamic response of macroeconomic variables (inflation rate, output, stock prices, unemployment and interest rates against the deviation shock standard to the variable price of gold (Ln gold) and M2 (Ln Fiat).

The response of inflation at the beginning of the period is negatively increasing until the 6th period. Furthermore, the response experienced a decrease trend until the period of the 14th and experiencing stable up to the period of the 20th. The response of inflation to shocks that occurred on M2 is negative and decreasing, and tends to be stable in the long-term shows that M2 has a negative impact on inflation and stable in the long term. Surely this is different with the monetary theory, which says that the fiat money system has the potential to create inflation if M2 has increased.

Response Ln Output (economic growth) against shock M2 (Ln Fiat) is not much different from the previous Inflation response. In period 1, the Ln Output response was positive but gradually becomes negative in the 2nd period and onward; it has increased through the period 8th. After that period, Ln Output response against M2 innovation relatively stable until the 20th period. These results indicate that the shock that occurs in M2 responded negatively by economic growth and tend to be stable at a longer period. Thus, money system based on fiat will impact negatively and significantly to variations in economic growth in the short term. Similar response relatively is shown by the interest rates (Interest) against the shock, which occur in M2 (Ln Fiat). Innovation happens at M2 responded negatively by the interest which tends to strengthen (negative) at the beginning of the period and experienced a stable negative after the 14th.

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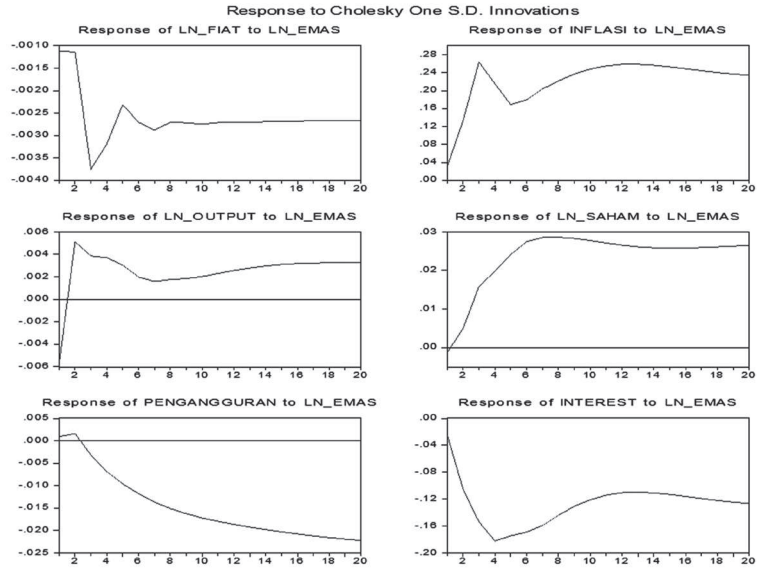
DOI: 10.15408/aiq.v9i2.4749

Figure 2: The Result of IRF Test against Shock in Ln Gold



Different responses relatively show by the unemployment rate variable (unemployment) and stock prices (Ln Shares). Both of these variables showed a positive response in the long term if there is any shock in the money supply (Ln Fiat). In detail, from the period of the 1st to 4th period, the shock on M2 responded negatively and then turned negative after period of 4 to the 20th. Unemployment rate response is relatively increased consistently in the long term. These findings indicate that the shock in fiat currency may stimulate positively on the unemployment rate. It likewise happens to the stock prices, the shock on M2 responded negatively at the beginning of the period and changed the direction to be positive after the 4th period and tend to be stable in the long term.

Figure 2 presents the response of inflation rate, output, stock prices, unemployment and interest rates to the shock that occurred in the price of gold (Ln gold) as a representation of commodity-based currency as developed in this study. IRF test results showed that inflation respond positively to the shock that occurs at the Ln Gold. In detail, in period 1, the response was relatively small and furthermore increased the response to stabilize after a period of 10th. These results certainly confirm that the system of commodity-based money has inflation nature, not much different from the system based on fiat money as defined in monetary theory. Means that, the use of system on commodity-based money does not mean free of inflation

DOI: 10.15408/aiq.v9i2.4749

Response Ln Output towards Ln Gold shock is positive and tends to be stable after the fourth period. This result indicates that the system of commodity-based money (gold) can have positive influence on economic growth. However, the pattern dynamics of these two variables lasted only dynamic in the first period to fourth period and after that tend to be stable. Shock Ln Gold is also significant positively response by the price of the shares (Ln Shares). Therefore gold price movement significantly affects the forecast error of variations in stock prices. Mean that, the gold price movement is quite has impact on the stability of share prices.

Instead, the result of IRF in Figure 2 shows that the unemployment rate (unemployment) and interest rates (interest) respond significantly negative towards Gold Ln shock. This means that the system of commodity-based money may adversely affect the level of interest rates and unemployment. Thus, the system of gold-based money may be relied upon to solve the social problems such as unemployment and may lower interest rates in the economy.

Hasan (2008) conclude: first, return to gold standard at the international level is not considered either desirable or practicable for some reasons. Second, there is no point in having domestic gold standard. Third, having gold dinar as money is not a sharia requirement. Fourth, the issue in monetary economics is to keep the supply of money under control, not of its being made of something valuable as a commodity. Palalic and Bajram (2012) show the stability and security of the trends by using gold dinar. Because there is no negatively affected by fluctuations if merchandise were exchange in a particular currency. Dali and Razak (2013) also said that gold dinar is a perfect value keeper. It can be kept for future use, un-creatable indestructible and does not cause inflation. Yusuf et.al (2002) said that the implementation of Gold Dinar would stop the speculators menace.

Santoso and Ahmad (2016) showed that Acehnes support, are aware, and involved in the implementation of the gold dinar. The economic factor is the most influential factor for public acceptance of the gold dinar, followed by investment and Islamic value, political factor, and social factor. Besides that, this study reveals that people seek economic stability to enhance economic welfare and assurance of investment based on money with intrinsic value. Yaacob and Ahmad (2014) found that the rate of inflation and the value of world gold are much lower and more stable during the gold standard phases than the fiat money. This indicates that the move to return to gold currency is more apt in the bid to ensure global economic stability.

DOI: 10.15408/aiq.v9i2.4749

Conclusion

This study analyzes empirically how the dynamic relationship between the prices of gold as a representation of a system based on money commodity to the money supply (M2) as a representation of money system based on fiat against a number of macroeconomic variables such as inflation rate, production (output), price stocks, the level of unemployment and interest rates. Whether the systems have dynamic effect on a number of macroeconomic issues?

This study found that in general the two systems of money (commodity and fiat) have a dynamic relationship that is likely to be similar to each other. It means that the two systems do not have contrast distinction. Indeed, it was found that the system of commodity-based money is not free of inflation, as propagated by the supporters of the dinar and dirham (*dinaris*t). Therefore, the system on commodity-based money can be the source of the increases of prices in the economy. These findings are certainly different from historical studies mentioned that the source of the increases price issue in Mamluk era due to the displacement of gold money system to money system. Even the fiat money system actually has negatively impact on inflation. Thus, blaming the fiat system as a source of inflation is not fully accurate because the gold prices actually responded positively by the rate of inflation. However, the system of commodity money is effective in the dynamic economic growth and unemployment and on the contrary in the fiat money system. Therefore, the system of gold-based money is reliable neither in creating high economic growth nor in reducing the unemployment rate.

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DOI: 10.15408/aiq.v9i2.4749