

THE RELEVANCY INTER-MARKET THEORY TO EXPLAIN GLOBAL FINANCIAL CRISIS

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Abstract

This research will examine the relevancy of the inter-market theory to describe the relationship among financial market variables in the inflationary stage, where the global crisis happens. From the empirical finding, the relationship between stock and commodities prices is relevant with the inter-market theory. Furthermore, inter-market theory is similar with the empirical relationship between exchange rates and commodities. However, empirical relationship between commodities and bonds prices is not relevant with the relationship in the inter-market theory. This irrelevant relationship respectively occurs in the relationship between bonds and stocks prices. A quantitative method by using secondary data is used to explain correlation among these markets. Therefore, inter-market theory needs to be complement with other theories to explain such irrelevant relationship between financial market variables.

Keywords: global crisis, inter-market theory, relationship, quantitative method

Abstrak

Studi ini akan meneliti tentang relevansi teori *inter-market* dalam menggambarkan hubungan antara beberapa variabel pasar finansial dalam periode inflasi, di mana krisis global terjadi. Dari temuan yang didapatkan, hubungan antara harga pasar saham dan komoditas ternyata relevan dengan teori tersebut. Selain itu, hubungan antara nilai tukar dan harga komoditas juga sama dengan yang ada pada teori *inter-market* tersebut. Namun, hubungan antara harga komoditas dan surat utang tidak relevan dengan teori tersebut. Hal yang sama juga terjadi pada hubungan antara harga surat utang dan saham. Metode kuantitatif dengan mempergunakan data sekunder digunakan untuk menjelaskan korelasi antar pasar. Oleh karena itu, teori ini perlu didukung oleh tambahan teori lain untuk menjelaskan hubungan yang tidak relevan tersebut.

Kata Kunci: krisis global, teori antar-pasar, hubungan, metode kuantitatif

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1. Introduction

Global financial crisis began in July 2007 with the credit crunch, when most US investors lost their confidence to the value of sub-prime mortgage that, in turn led to a liquidity crisis. The Fed responded the situation by injecting a lot of a capital into financial markets. Nevertheless, the Fed policy to overcome crisis was criticized. The policy made by the Fed is blamed to spur excessive speculations, housing price for bailing out financial firms (Labonte 2012).

The crisis economic from US in mid-2008 had rapidly growing into global economic crisis, thus spread all over the worlds, including Europe and Asian (Ahmadi *et al.* 2011). For instance, as the crisis became worse, the global stock market crashed with high volatility history.

Analysts and forecasters normally use inter-market analysis to judge the relationship among several financial market variables. This research will scrutinize relevancy of the inter-market theory to explain empirical relationship among financial market variables amidst global financial crisis. In this research, the financial market variables consist of exchange rate index, stock price, bond prices and commodities prices. In detail, the goal of this essay is to examine the

relationship among four major classes of financial market, comparing between theory and fact in the era of global financial crisis (2009 to 2011).

The essay consists of literature review, research methodology, result's discussions, as well as conclusion and recommendation. In the literature review, the essay will discuss about the theoretical background for the inter-market analysis. It will also explain the definition of inter-market analysis as well as how theoretical correlations among financial markets are formed. After that, the essay will turn into the research methodology. To discuss about the statistical result as well as data analysis. Then, it will be finalized with the conclusion part.

B. Literature review

1. *Globalization of economic and its impact to the financial markets*

The emerge of the globalization economic influence financial markets around the world to become more interconnected and interdependent. It means financial market analysts must change their paradigm in analyzing the effect of global financial crisis to the local economic.

Mundell (2000) stated that the 1970s as the beginning of a new era in the international financial system as a result of the oil shock

and the breakup of the Bretton Woods system. The foreign exchange market has had an ever growing influence on the equity, bond, commodity and real estate markets, having changed dramatically since the advent of free-floating currencies in 1971. This change was brought on by the explosive growth of globalization.

In the last decade, most of financial market analysts concentrate their research only on foreign exchange market when they want to investigate the cause of economic change. This was because foreign exchange market was commonly believed to have strongest influence to the economic change. It was caused by closed relationship between the movement of foreign exchange market and the change in interest rate. Based on the conventional economic theory, interest rate is the most important indicator to study about the economic in one country. Because of this argument, in the past many of financial market analysts did not take into account the effect of other financial markets (such as stock market, bond market and commodity market) to the economic change. Later, an issue of interdependency and interconnectivity insist financial market analysts to give more consideration to the relationship among financial markets. This is the foundation of inter-market analysis development.

2. Financial markets

Financial market is a market in which specific financial assets is traded. There are four major classes of financial markets like stocks market, bonds market, commodities market and foreign exchanges market. It is strongly believed that all four markets are correlated each other's.

Gayed (1990) stated that “the continuation or reversal of a major trend in any market is a function of other trends emerging in other sectors of the economy”.

According to the previous research, foreign exchanges market has an impact on all markets but it has closely relationship with commodities market. A study by Chen, Rogoff, and Rossi (2008) find that “foreign exchange rates of commodity exporting countries have strong forecasting ability for the spot prices of the commodities they export”. Chen, Rogoff, and Rossi argue that the foreign exchange market is price efficient and can incorporate useful information about future commodity price movements. Generally, when US dollar weakens against other currencies, commodities market moves in the different way. Furthermore, commodities market affects bonds market, when commodities price increase, bond price tend to lower. Barr

and Campbell (1997) stated that bond markets react to any phenomena related to monetary and macroeconomics policies. The link that explain the interactions between bonds and commodities is inflation. Furthermore, a stocks market will not directly react negatively with the increase of commodities market. In reality, these conditions are not happen simultaneously but there are response lags between each market's reaction.

3. Inter-market analysis

Market interactions theory is developed to answering the questions related to the relationship between different financial markets (stocks,bonds,commodities,currencies).

There are some important researches related to the market interaction theory, research wrote by Dalkir (2009), also Sciezka and Holyst (2009). Dalkir focused on stock markets whereas Sciezka and Holyst gave attention to the commodities market.

Dalkir (2009) studied about co-movement in stock market indices during the high volatile periods and his research confirmed that interdependence between stock markets are higher during volatility periods. The higher interdependence between stock markets is caused by traders reaction in different markets to protect

their assets against high uncertainty during high volatile periods.

Sciezka and Holyst (2009) analyzed the commodities market inner relationship and pointed out that starting from 2003 the global commodities market has become more correlated. This is because commodities markets are not only affected by their unique fundamental environment but also by other markets behavior, they constantly affect each others' performance. For instance, oil price and natural gas price.

Financial markets (commodities,bond,stock and currencies) are interact each other based on the fundamental mechanism of free market economy.

To analyzing the relationship among financial markets, one tool was introduced by John. J Murphy (1991) and it was called as an inter-market analysis. An Inter-market analysis is a part of technical analysis method; actually it's a charting tool to analyze price movement of any financial markets. This study based on assumption such as the change in related markets, for example commodity price will affect to the stock market and need to be understood to get brief understanding of the future direction of the stock market.

4. *Role of financial markets in macroeconomics*

It is strongly agreed that financial market has an important role in macroeconomics development in one country.

Shumpeter (1934) said that “financial development causes economic development”. This is because financial markets promote economic growth by channeling funds to the entrepreneurs with high return projects.

A good economic condition is signed by lowering interest rates to increase money supply that could be accelerated production. For example, economic growth is usually followed by business expansion. Business expansion means companies need more capital to expand their market-share, a new product development, a new market penetration, etc.

Financial markets could be solution for capital which is needed by a company. A company could issue stock or bond. Stock is an injection of capital through sharing the ownership whereas bond is a long term debt. Whether, Stock price and bond price are directly or indirectly affected by other financial assets such as commodity price and US dollar.

On the other hand, increasing interest rates indicate economic is lowering, money supply decrease and following by declining production level.

Based on the classical theory of economic (Bernanke,2015), there are two economic conditions: inflationary stage and deflationary stage. Both conditions impact financial markets differently.

5. *Inflationary stage*

Inflationary stage is indicated by increasing the general level of prices for goods and services, and subsequently, purchasing power is failing. Under inflationary stages, there are varied relationships between financial market instruments.

Firstly, in the period, the relationship between bond and stock is positive. As the inflation mount, the interest rate will rise. When the interest rate increases, the bond remaining cash flows will deflate, and bond value become worth less (Ross *et al* 2006). Beside, inflation will shrink stock performance (Mehalko 2009). In the inflationary environment, company will be challenged with higher price. As the corporation need to pay more expensive goods and labor, inflation will burdensome their profits. Therefore, the stock performance will perform poorly.

The picture below shows the relationship between bond price and stock price during a period of inflation. According to the picture, during the inflationary period bond price and stock price are moving in the same direction. It is proved the

statement as following “*in the inflationary period, stock and bond have a positive relation*”.



(Source: Stockcharts.com)

Secondly, rising industrial and agricultural commodities will soar up inflation (Nicolau 2010). The increasing commodities price will mount to more expensive interest rate. Thus, increasing interest rate will fall the bond price.

Furthermore, in the inflationary stage, stock has a positive correlation with

commodities market. In this case, stronger market stock value will be generally transmitted to higher commodities price.

Finally, US dollar index and commodities have an inverse relationship. In this paper, US dollar index represents world currency index. With the stronger economic foundation, currencies will be stronger

(Stockcharts.com). A rising dollar index will induce a lower commodities price, since many commodities are priced with dollars. Therefore, there is inverse relationship between US dollar index and commodities prices.

6. Deflationary stage

Deflation is an economic theory that has a linkage with the decreasing general price as well a reduction of goods or assets' price (Economywatch 2010). Deflationary stage is indicated by overall declining in prices, often caused by reduction supply of money or credit. Deflation could bring negative effect such as falling profit, closing factory, increasing unemployment and reducing income. Cited from the

stockcharts.com, the relationship among financial markets follows the pattern on below.

- A positive relation between stocks and bonds
- An inverse relation between commodities and bonds
- A positive relation between stocks and commodities
- An inverse relation between US dollar and commodities

The second picture below shows the relationship between bond price and stock price during deflationary period. The picture proves relationship between bond price and stock price in deflationary period is an inverse.



(Source: Stockcharts.com)

Economic data

Table on below shows US inflation/deflation data from September 2009 to December 2011

	Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2011	0.48%	0.49%	0.98%	0.64%	0.47%	0.11%	0.09%	0.28%	0.15%	0.21%	0.08%	0.25%
2010	0.34%	0.02%	0.41%	0.17%	0.08%	0.10%	0.02%	0.14%	0.06%	0.12%	0.04%	0.17%
2009									0.06%	0.10%	0.07%	0.18%

(Source: Inflationdata.com)

Notes:

...% = Inflation

....% = deflation

In summary, the relationship among the financial market variables either in inflationary or deflationary period is summarized on the following table.

Table 1 Relationship among financial market variables

Relationship	Inflationary period	Deflationary period.
commodities and bonds	Inverse	Inverse
bonds and stocks	Positive	Positive
Stocks and commodities	Positive	Positive
US Dollar and commodities	Inverse	Inverse

Furthermore, generally agreed that during period of September 2009 to December 2011, US was under inflationary stage even though deflation randomly occurred for short periods.

Based on assumption that US was under inflationary stage, this essay try to examine the validity of the inter-market relationship theory under this stage, by comparing the theory with the actual

market condition during the observation years.

a. Samples

The objects of analysis are S&P500 Index, US5Y Bond, CRB Index, and USD Index. The reason to select these object because all of them are already have a long history and their influence strongly to global financial markets.

b. Research method

Statistic: Correlation

The relationship among 4 major financial markets during the global financial crisis from September 2009 to December 2011 is the objective of research. There are two factors in relationship between 2 variables, the strength of relationship and the significance of relationship. This statistic method uses to calculate two or more set of scores for the same individual or matched groups.

The strength of the relationship:

Correlation coefficient describes direction and degree of the linear relationship between two variables. A direction indicates positive or negative relationship between monitoring variables whereas degree shows how strong these relationship. Correlation coefficient has not implied a causal effect.

Calculating the correlation coefficient

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{[\sum (x - \bar{x})^2][\sum (y - \bar{y})^2]}}$$

Or on the algebraic equivalent:

$$r = \frac{n\sum xy - \sum x\sum y}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

Where:

r = Sample correlation coefficient

n = Sample size

x = Value of the independent variable

y = Value of the dependent variable

The interpretation of correlation coefficient (r) is following if one variables increase when the second one increases, and then there is a positive relation. In this case correlation coefficient will be closer

to 1. Furthermore, if one variables increases when the second one decreases, then there is a negative relation. For this case correlation coefficient will be closer to -1.

The significance of relationship:

The second steps is to conduct significant test by developing mutually exclusive hypotheses as following

H0: $\rho = 0$ (no correlation)

HA: $\rho \neq 0$ (correlation exists)

If $p = 0$ then the hypothesis is rejected, on the other hand, if $p \neq 0$ the hypothesis is accepted.

c. Results' discussion

The table on below shows the result of correlation analysis for four major types of financial markets during global financial crisis from September 2009 to December 2011.

Table 1. Correlation Results

No	Relationship	Direction	Correlation coeff.	Significancy (p-value)
1	commodities and bonds	Negative	(-)10.7%	Not significant (0.5872)
2	bonds and stocks	Negative	(-)25.36%	Not significant (0.1928)
3	Stocks and commodities	Positive	85.84%	Significant (0.0000)
4	US Dollar and commodities	Negative	(-)62.40%	Significant (0.0005)

(Source: result of EViews calculation)

The meaning of the statistical table is described in the following as:

- The negative relationship between commodities and bonds is not statistically significant
- The negative relationship between bonds and stocks is not statistically significant
- The positive relationship between stock and commodities is statistically significant

- The negative relationship between US dollar and commodities is statistically significant

1) *Commodity and Bonds*

Based on the inter market theory, in the inflationary stage, commodities and bond prices have an inverse relationship. From the data shown below, commodity price and bond price are moving in different direction under inflationary environment 2009 to 2011. This fact is

relevant with inter-market theory under

inflationary stage.

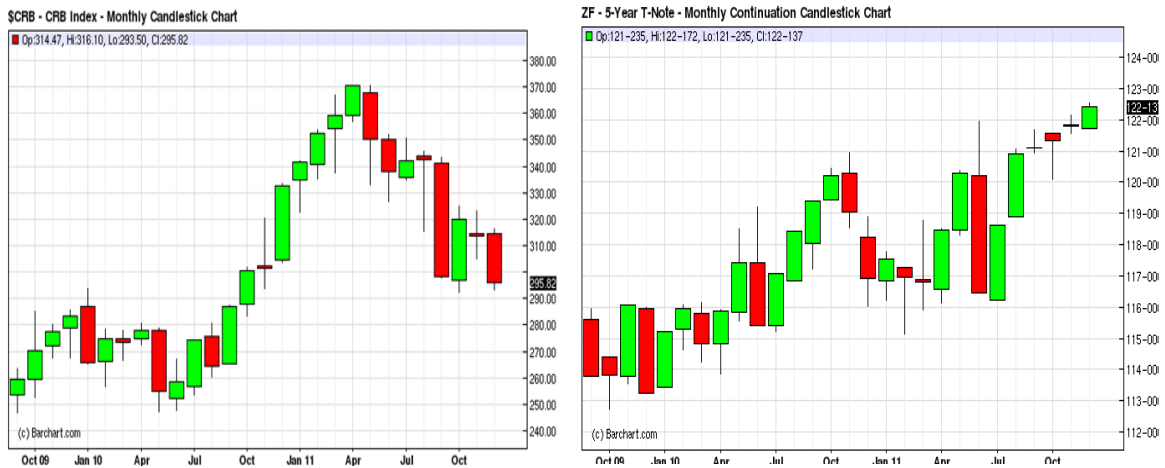


Figure 3. Commodities Index and Bond charts

Nevertheless, when the analysis is further advanced into statistical inference, the significant of those variables relationship becomes weak. According to statistical assessment in table 1, the relationship between those variables is not statistically significant.

2) *Bonds and Stock*

According to inter-market theory, in the inflationary stage, the relationship

between bond and stock prices is positive. Nevertheless, as seen in the graph, stock price and bond price movement under inflationary stage during global crisis 2009 to 2011 are irrelevant with the inter-market theory under inflationary stage. This may because bond price movement headed stock price. Although statistically insignificant, the statistics demonstrate a reverse relationship between these variables in the table 1.

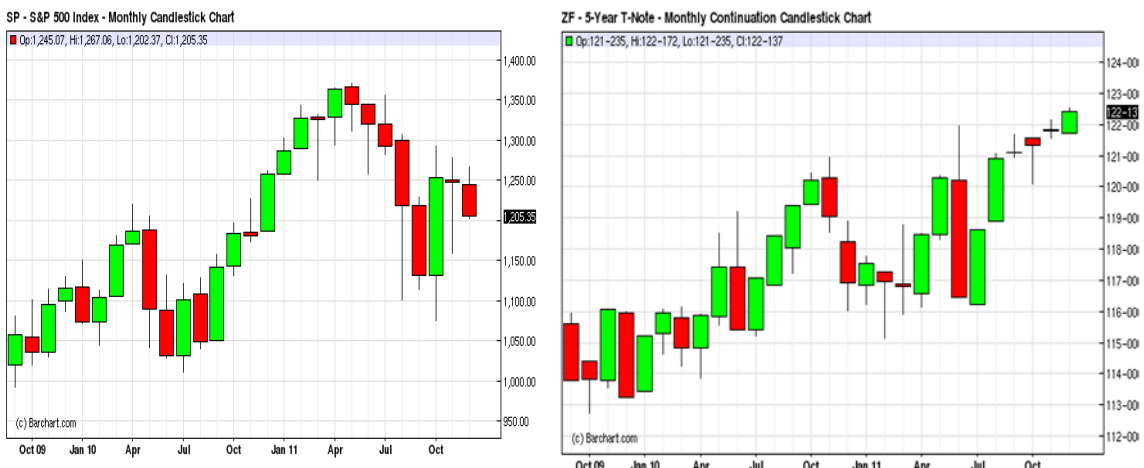


Figure 4. Bond and Stock Index chart

3). Stock and Commodities

In the inflationary stage, the relationship between stock and commodities is positive. Based on the following graph, commodity and bond prices are moving in different direction

under inflationary environment 2009 to 2011. Furthermore, based on statistical inference, the relationship of those variables shows a significant result. This fact strengthens the relevancy of that empirical variables relationship with inter-market theory under inflationary stage.

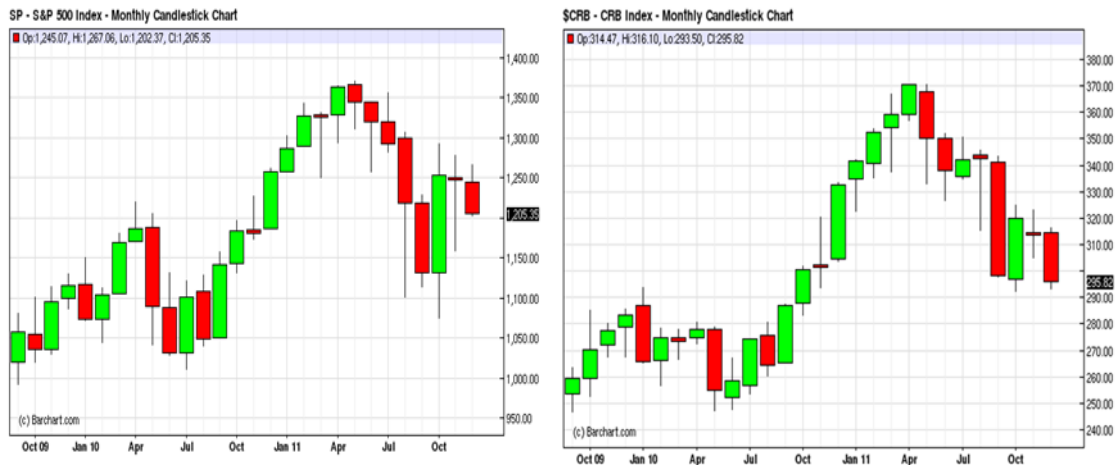


Figure 5. Stock Index and Commodities Index chart

4) Exchange rate and Commodities

In the inflationary stage, according to inter-market analysis, US dollar index and commodities will move in different direction (negative relationship). US dollar and commodity has an inverse relationship under inflationary stage between 2009 to

2011. This finding is also strengthened by the statistical result. Based on the statistics assessment, it is found the inverse relationship between US dollar index and commodities is statistically significant. This is relevant with the inter-market theory under inflationary stage.

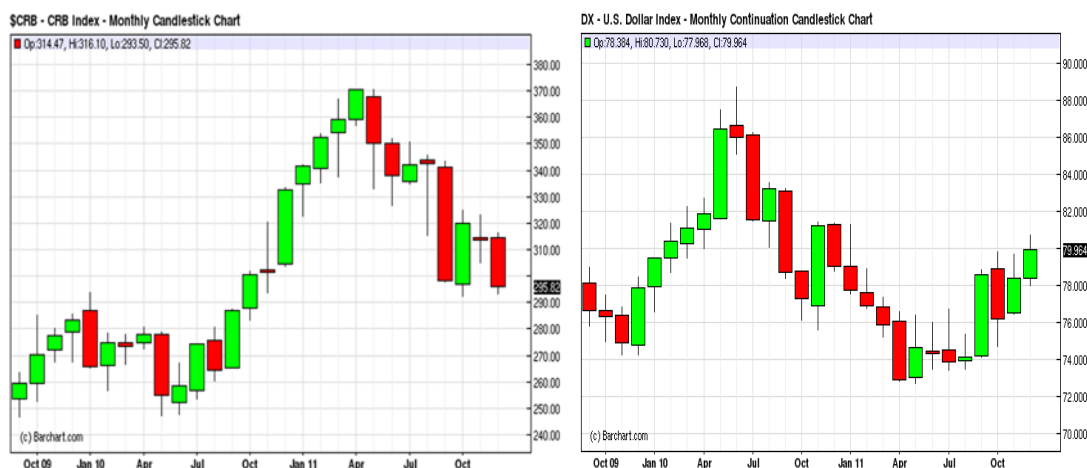


Figure 6. Exchange Rate Index and Commodities Index chart

C. Conclusions and recommendations

From the data analysis, the empirical relationship between stock and commodities has the coherence relationship with the inter-market theory. Furthermore, the relationship between exchange rate and commodities has a matched relationship with the inter-market theory in the inflationary stage, where the period of global crisis occurs.

Nevertheless, in the global crisis period, the relationship between commodities and bond prices is irrelevant with inter-market theory. Similarly, such irrelevant relationship happens for the empirical relationship between bond and stock.

Therefore, other relevant theory needs to be in place to explain such irrelevant relationship in the global crisis. By utilising other theories, financial actors or decision makers can have more complete

information what happens on those markets in the global crisis period.

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