

Informational Efficiency of CPO Futures Contracts

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Introduction

The growing importance of palm oil in the country's economy, in the world trade and to the welfare of participants in the sector requires a more stable price. To reduce the price risk of the producers/investors in the underlying market, appropriate information regarding the future path of palm oil price is essential. Therefore if producers and investors are in fact using only futures prices as expected prices (other than hedging and arbitraging) when allocating resources, then an assessment of the quality of the price is also an important research issue. The unifying theme is that futures market collects, generates and synthesizes information (about underlying cash assets), which is instrumental in determining the futures prices. Therefore the futures price plays an important role in the cash price discovery process when cash market traders incorporate the futures price in their decisions (Kawai, 1983, Turnovsky, 1983, 1979). Hence the greater the accuracy of the forecast embodied in the futures price, the less is the impact of "random noise" in cash price determination and the smaller is the price uncertainty to cash market traders. Therefore studies on the informational efficiency of futures markets have important implications for the issue of whether economic resources are being optimally allocated. The role of information in futures trading is an important ingredient in the overall smooth functioning of commodity cash market. This study attempts to investigate these issues empirically

Materials and Methods

This study applies cointegration test to ascertain the presence of stationarity in the series examined. Cointegration test Cordae and Ouliaris (1986), Nassir and Ariff (1990) and Baillie and Bollerslev (1989) argue that, in the presence of

non-stationarity in many financial time series data, the unit root test provides unbiased and consistent results. For theoretical and practical reasons, the Dickey-Fuller test is applied to the regression run. If two time series X_t and Y_t are both non-stationary in levels but stationary in the first difference, it is said that variables X_t and Y_t are integrated of order 1 that is $I(1)$. If two variables are integrated of order 1, denoted as $I(1)$, their linear combinations, $Z_t = X_t - \alpha Y_t$ are generally also $I(1)$. However if there is an α , such as that Z_t is $I(0)$, then Z_t is integrated of order 0 or stationary in level. If Z_t is $I(0)$, then the linear combination of X_t and Y_t is stationary. It is said that the two variables are co-integrated. Under the cointegration methodology, the maximum likelihood method is also used to estimate the cointegration relationship between variables developed by Johansen (1988).

By integrating the concepts of cointegration and causality in the Granger sense, it is possible to develop a model that allows for the testing of the presence of both a short-term and a long-term relationship between the variables. This model is known as the error correction model (ECM) proposed by Engle and Granger (1987) and is discussed in numerous papers. Key recent references include Zapata and Rambaldi (1996) and Giannini and Mosconi (1992).

Results and Discussion

The findings suggest that the futures and spot price series are non-stationary in level form. These results demonstrate that the futures, spot price series and open interest are integrated in the first order [i.e. $I(1)$]. The results using the Johansen procedure show that 4-month before the expiration, cointegration relation between spot and futures is weak. The null hypotheses cannot be rejected at 5 percent level where three-

month before expiration month to the expiration month; the results show strong cointegration relation between spot and futures prices. During 1990-1992 period, three-month before expiration month to the expiration month, the results show strong cointegration relation between spot and futures prices. But in previous period, four month before there was a long run relationship.

During 1993-1995 period, there are some significant changes. These changes reduce the reliability of futures market as a forecasting tool for the future path of the cash price. The results of Johansen test show that there is no long run relationship between spot and four-month and three-month and even two-month ahead futures price. Only expiration month contracts price showed strong cointegration with spot prices. For several reasons, this period is very important. First, there is a financial crisis during this period, second, increasing importance of agricultural commodity (especially palm oil and rubber, largest foreign currency earner). It is assumed that CPO futures are a well-established derivative market. Therefore financial crisis should not destabilise the market and, if any, then the correction process should be quick and efficient. There is strong long run relationship between spot and four-month, three-month, two-month ahead futures price and also with the expiration month contracts price.

The error correction results implies long run bi-directional informational flow between the two markets during the expiration month. Because of the lower transaction costs in the futures market, spot price adjustment to shocks in the futures market should be stronger than its own shocks. The ECM explains, on average, 25.1 percent of the variations in the spot price innovation and only 3.3 percent of the variation in the futures price innovations.

The relatively high R^2 for the futures to spot direction suggests that the futures market play a leading role in incorporating new information.

In the case of short run adjustment, only lagged futures price coefficients are statistically significant (measured by F-value of 65.32, 41.83, 2668, and 8.95). Whereas lagged spot price coefficients are not statistically significant either individually or jointly. It suggests that most of adjustments in short run comes from the futures market not from spot market. It can be argued that spot market, specially for the agricultural commodity, is not centralised whereas financial futures market is well organised and centralised market. At the same time, informational exchange in spot market is not highly sophisticated. Therefore most of the adjustments in the short run comes from the futures market. In the financial market, both futures and its underlying asset market are centralised and well organised. Therefore, short run adjustments occur instantaneously in both markets.

For the period of 1990-1992, unidirectional informational flow from futures to spot from three month before the expiration to expiration month is observed. The cash and futures prices start to converge in the final month of a contract. In the ECM model, error term on spot equation is not significant with expected sign at least at 5 percent level of significance, which is contrary to the futures market theory. It implies long run bi-directional informational flow between the two markets during the expiration month.

For the period of 1993-95, there appeared to be lack of integration between spot and futures price except in the expiration month. There are several reasons, which may responsible for this divergence. Strong industrial economy, high return on financial market (i.e. stock market, currency market) that reduced the supply of arbitrage and speculators in commodity futures market, high uncertainty of palm oil price in the world market might have caused this divergence. Lack of integration between spot and futures will reduce the reliability of futures market.

Between 1996-1998 there were evidences to show strong long run unidirectional causality from futures to spot with an expected sign for spot and four

month before expiration futures price series. For spot and three month before expiration futures prices, the ECM results show some surprises. The direction of causality changed to spot to futures. In the short run, spot market also became dominant over the futures market. R^2 values also changed drastically. The ECM explains only 4.7 percent of the variation in the spot price change and 45.2 percent of the variation in the futures price change. This directional change may be due to the financial crisis. During the crisis, ringgit value depreciated and subsequently making palm oil to become cheaper in the world market, which boosted its exports. Consequently the demand in the spot market increased because of the short-term profit. But after the fixed currency and capital control, the demand and supply of CPO became stable. Subsequent results suggest that market adjust quickly after the crisis. All the error correction terms are statistically significant with expected sign for spot and two-month and also expiration month futures prices. It indicates the bi-directional interaction between spot and futures in the short run. In the case of short run adjustment, this period results showed a strong bi-directional causality even four month before the expiration. This period results showed some significant changes in spot price behaviour in term of information role though futures price showed strong information role. It may be due to the financial crisis that makes the spot market more volatile compare to the normal economic condition.

Conclusions

In summary, in the futures market, delivery and non-delivery month played a crucial role for restoring equilibrium. Therefore equilibrium situations are different for delivery and non-delivery month contract. Therefore, one of the important contributions of this study is that it investigated the informational efficiency by separating the futures prices according to maturity (delivery and non-delivery) life cycle. In this case, we choose four months ahead to expiration month prices series. If futures price formation follows the rational expectation, then information will flow from futures to spot and not the other way around.

As pointed out by Granger (1986), an error correction model should produce

better short-run forecasts and will certainly produce long-run forecasts that hold together in an economically meaningful way. Therefore, if futures prices become reliable proxies of expected cash prices, it will lead to the spot price into equilibrium.

The results are generally consistent with the assumption. That means, all distant month error terms in spot equation are statistically significant for three sub-samples (87-89, 90-92, 96-98). It suggests that futures price Granger cause the spot price by providing future information regarding the expected CPO prices. The evidence is therefore consistent with the important price discovery role served by the futures market.

The results from the third sub-sample (1993-1995) are not consistent with the assumption. All the error term surprisingly are insignificant except the ones for expiration month. There is no causal relation either from futures to spot or spot to futures. It requires some economic explanation why both markets became independent. The tremendous increase in industrial output reduced the importance of agriculture economy. Liberalisation of the economy further exposed the CPO market open to tough competition from imported edible oils. With high uncertainty investors were not keen to invest in the commodity market and therefore market lost equilibrium. During this period there are some important financial liberalisation strategy (innovation) introduced in the country, which produced high return with low risk in the financial market compared to the commodity market. This might be another important reason for divergence between spot and futures, which reduced the informational role of futures market.

Terminal month equilibrium indicates the supply of arbitrage activity and efficiency of this activity. If terminal month equilibrium holds, then spread will tends to be zero after adjustment of transaction cost. In addition, all expectation will converge into the terminal month prices. Therefore, spot market will play dominant role along with futures to adjust each other. The results are generally consistent with this assumption. All error terms in both equations are statistically significant. Therefore, spot and futures prices appear to

be dependent on each other in terminal month.

This study found that regional economic crisis does not change CPO futures market's microstructure. Only the 3-month ahead price series (1996-1998) shows that spot market surprisingly became dominant over the futures market whereas market adjusted quickly after this period of financial crisis. Therefore subsequent price series (2-month ahead futures and spot price series) shows the dominant role of futures market over the spot market. Therefore, these findings support the strength of the market microstructure of a matured market.

Benefits from the study

The study provides an understanding of the informational efficiency of the CPO futures market. It also provides some empirical evidence on the behaviour of futures market, which is useful for

policy analysis and further research on this subject matter.

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