

DETERMINANTS OF MALAYSIAN PALM OIL PRICE – THE AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) APPROACH

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Objective

- To examine the long run relationship between crude palm oil (CPO) price in Malaysia with palm oil supply and demand, price of soybean oil, price of crude oil and exchange rate.

Scope of Study

- Scope: Crude palm oil (CPO) Price
- Data: Monthly data (Jan 2008 – Dec 2017):
 - CPO prices
 - Malaysian palm oil – Production, Export, Import, Ending stocks
 - Soybean oil price (SBO)
 - Crude oil prices
 - Exchange rate (USD/MYR)
- Models:
 - Autoregressive Distributed Lag (ARDL)

Introduction

- ARDL is a method of examining the co-integrating relationships between variables.
- ARDL can determine the long run and short run relationship between the variables.
- Applicable when variables have different integrating order, $I(0)$ and $I(1)$.
- The general function of the model as follows:

$$= (\quad , \quad h \quad) \quad ,$$

ARDL Process

Unit Root Test

- Augmented Dickey Fuller (ADF)
- Phillip Pheron (PP)

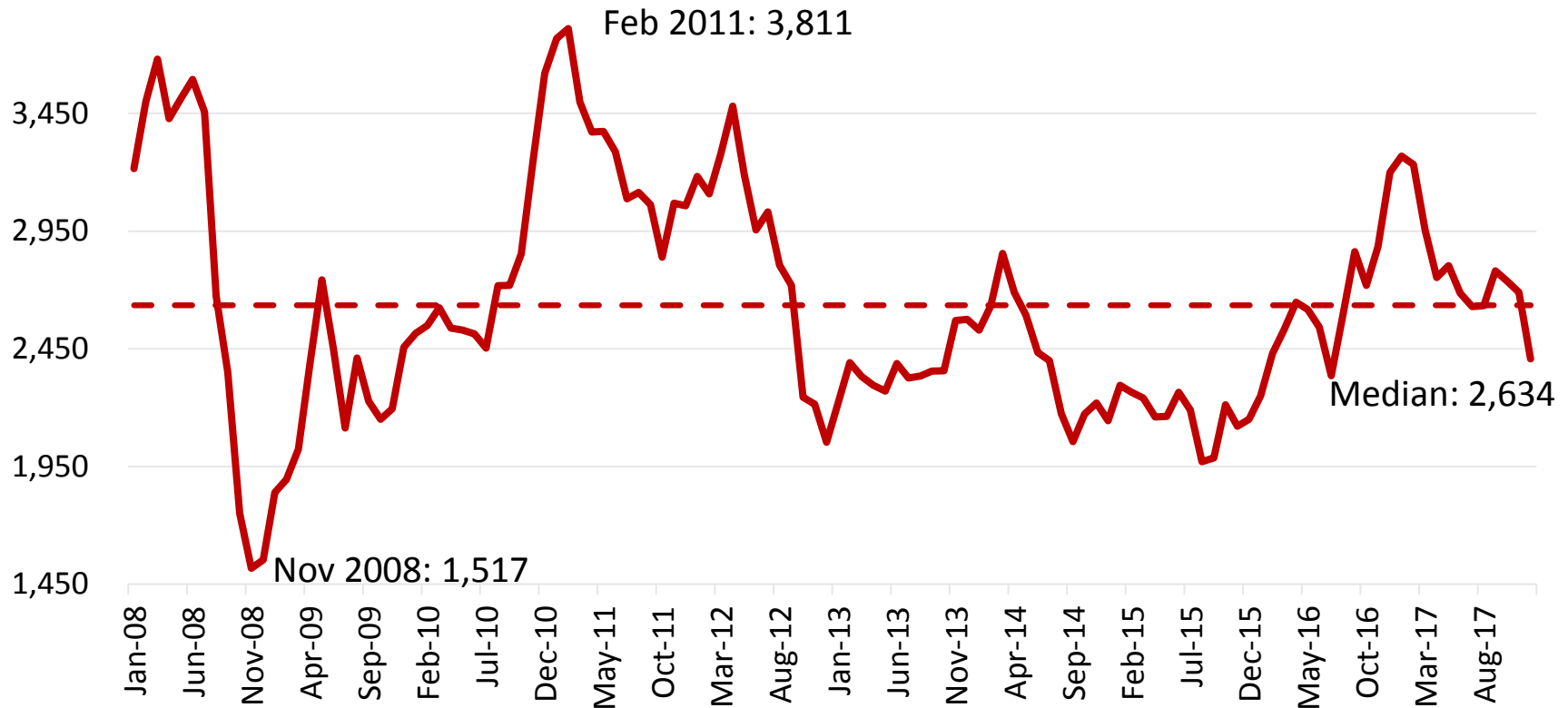
ARDL Bound Test

- Long – Run Estimation
- Error Correction Model (ECM)

Diagnostic Checking

- LM Serial Correlation
- Heteroskedasticity
- Normal Distribution
- Stability Test

Monthly CPO Prices, 2008-2017



Source: MPOB

- Each point of the CPO price show the price equilibrium determined by supply and demand factors.

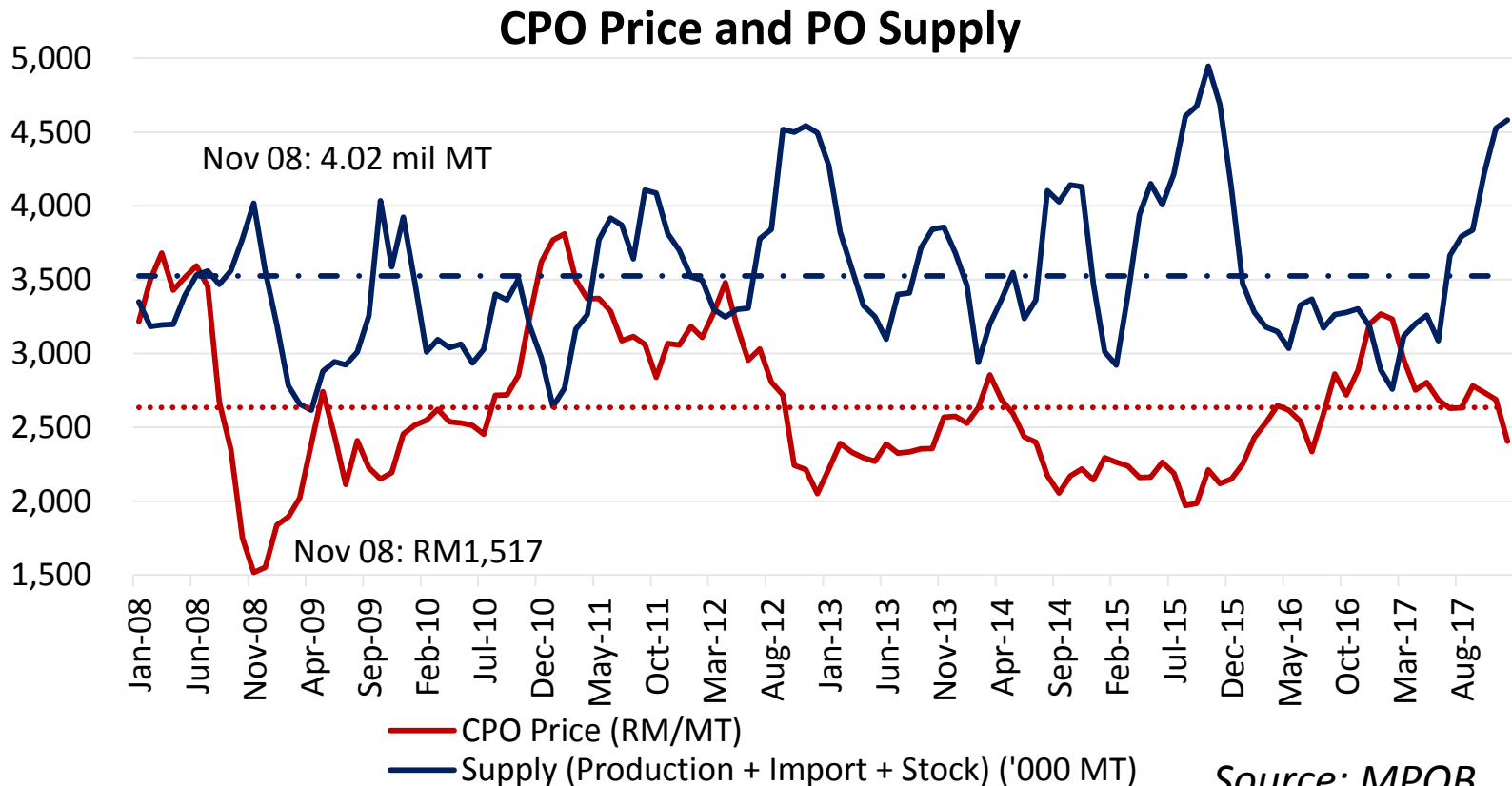
Factors Affecting CPO Price

- Palm oil supply and demand
- Price of other substitute oils i.e soybean oil (SBO), rapeseed oil (RSO), sunflower oil (SFO)
- Price of crude oil
- Other factors (El Nino & La Nina, policies & regulations, political crisis and impact of natural disasters)

Variables

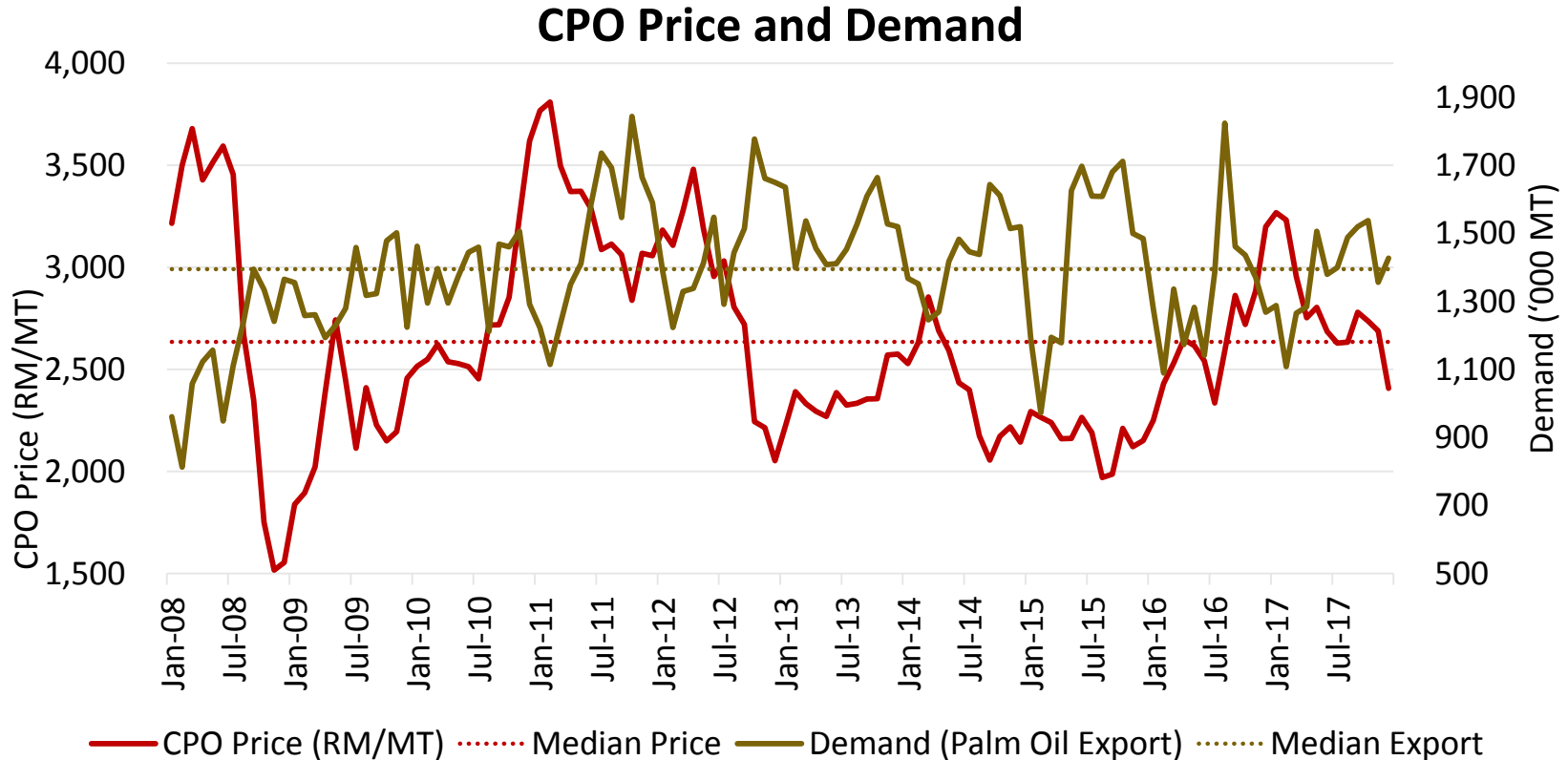
- In this model, the variables that have been used are:
- Dependent variable: CPO Price
- Independent variables:
 1. Palm oil supply (Production, import, stocks)
 2. Palm oil demand (Export)
 3. SBO price
 4. Crude oil price
 5. Exchange rate (USD/MYR)

Significance negative relationship between CPO price and palm oil supply



- High supply but slow demand → low CPO price
- Low supply but high demand → high CPO price

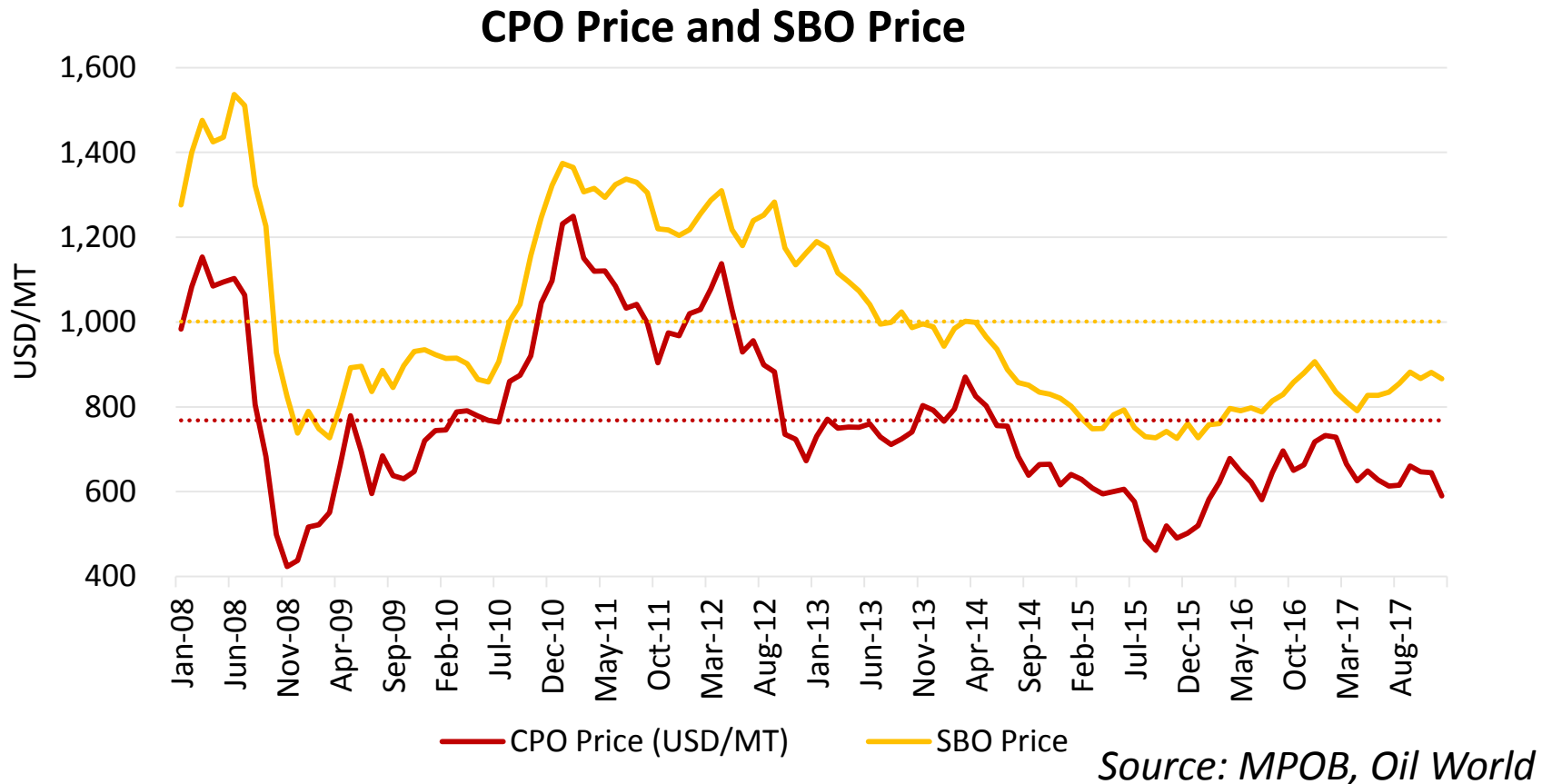
Inverse relationship between CPO price and palm oil demand



Source: MPOB

- This situation is in line with the supply and demand law where strong demand will lead to the higher price

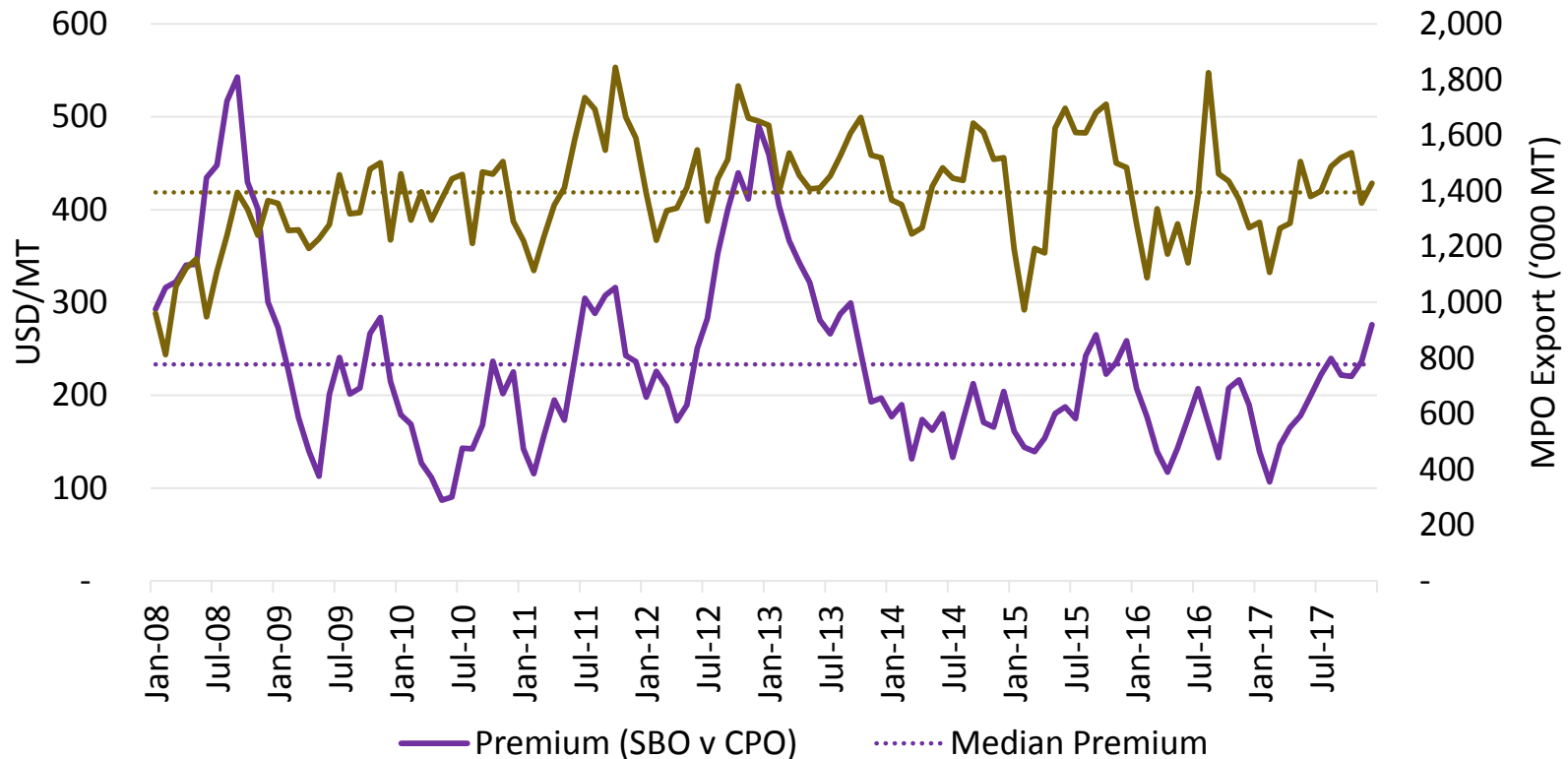
Highly significant positive relationship between CPO price and SBO price



- CPO price has positive correlation with SBO price at 0.9019
- CPO price has always been at discount to SBO price

Discount has positive correlation with MPO export at 0.58

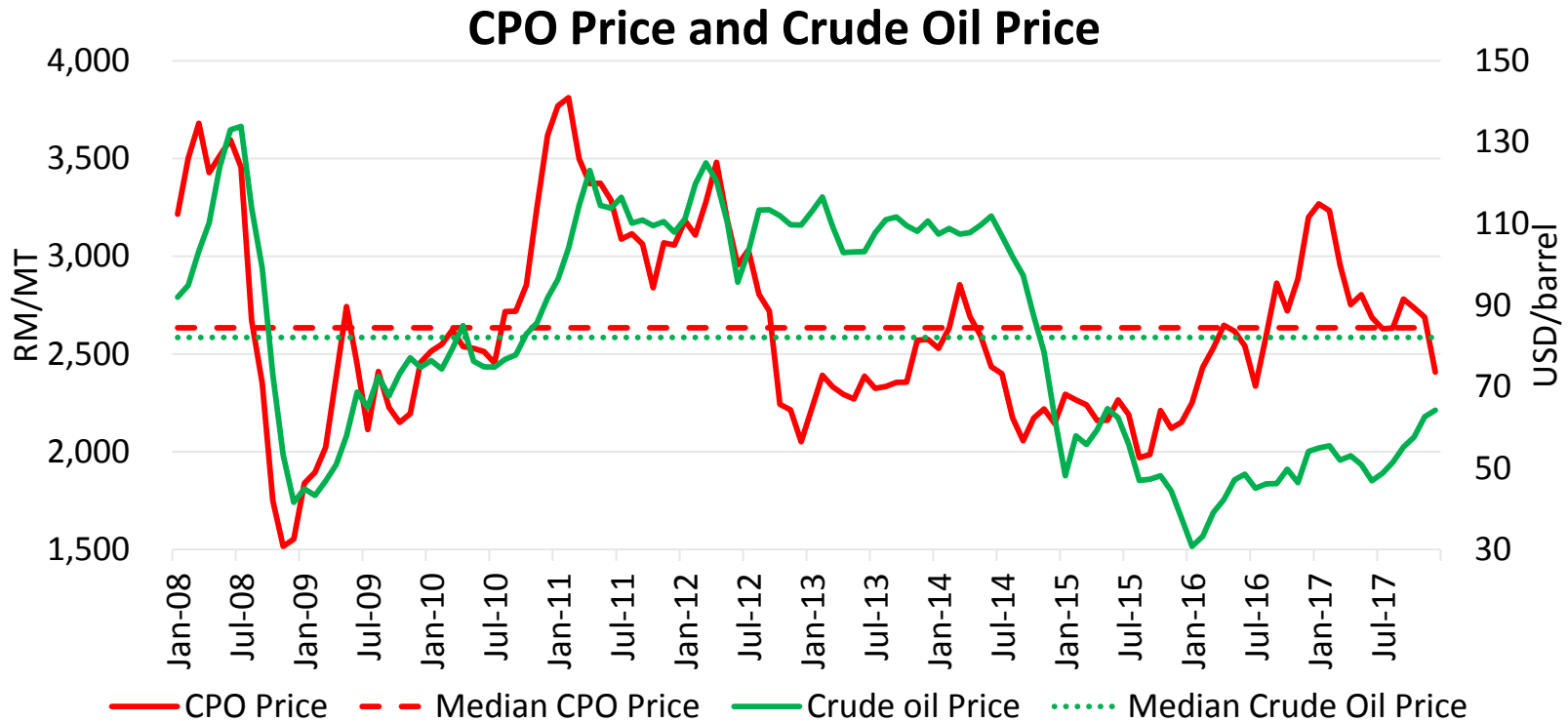
Premium (SBO v CPO) and MPO Export



Source: MPOB, Oil World

- Wider price gap between SBO and CPO resulted in higher demand of palm oil

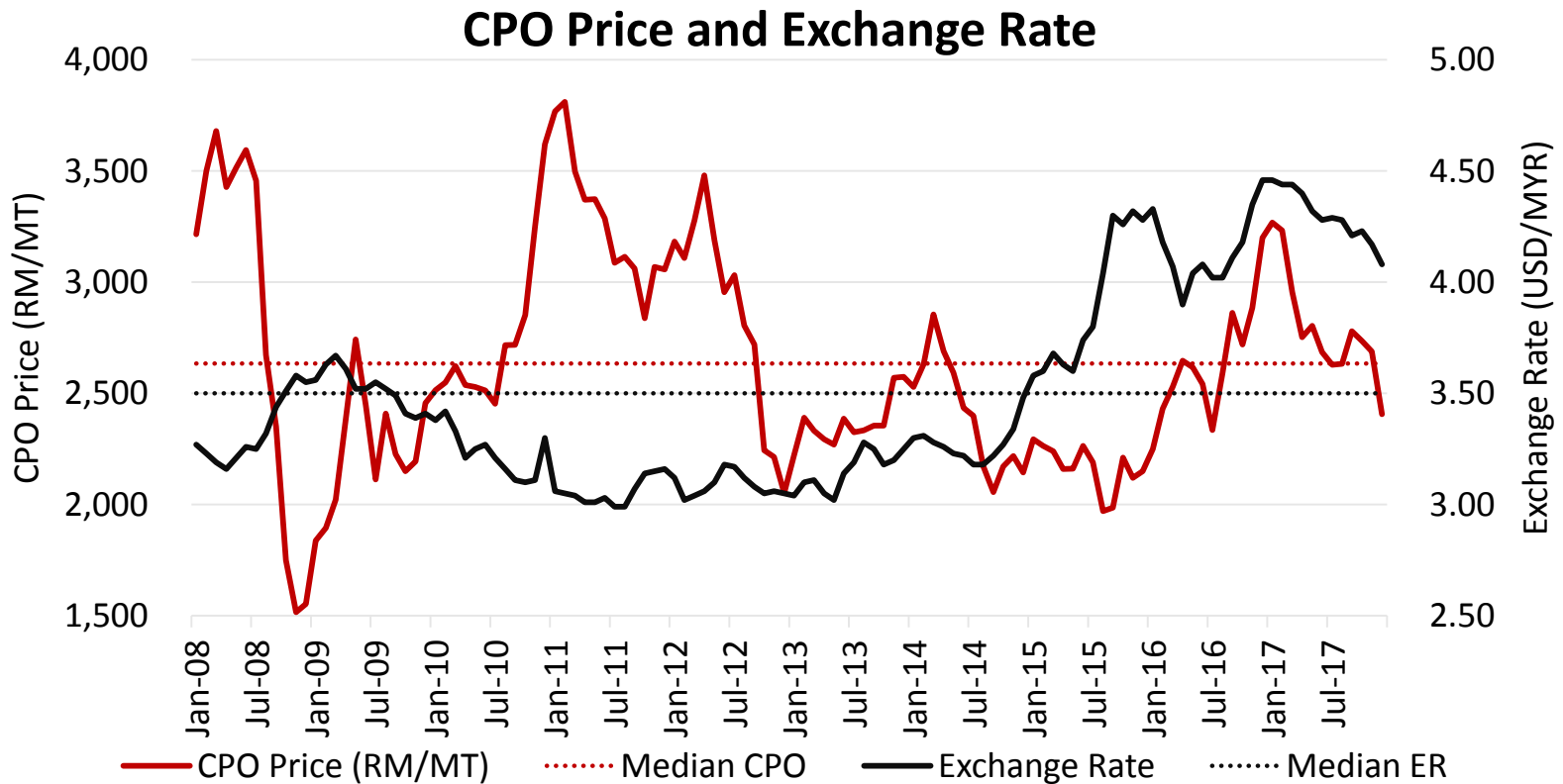
Strong correlation between CPO price and Crude oil price, 0.78



Source: MPOB, IndexMundi

- Crude oil price increase, will increase the demand of biodiesel and it will push CPO price too.

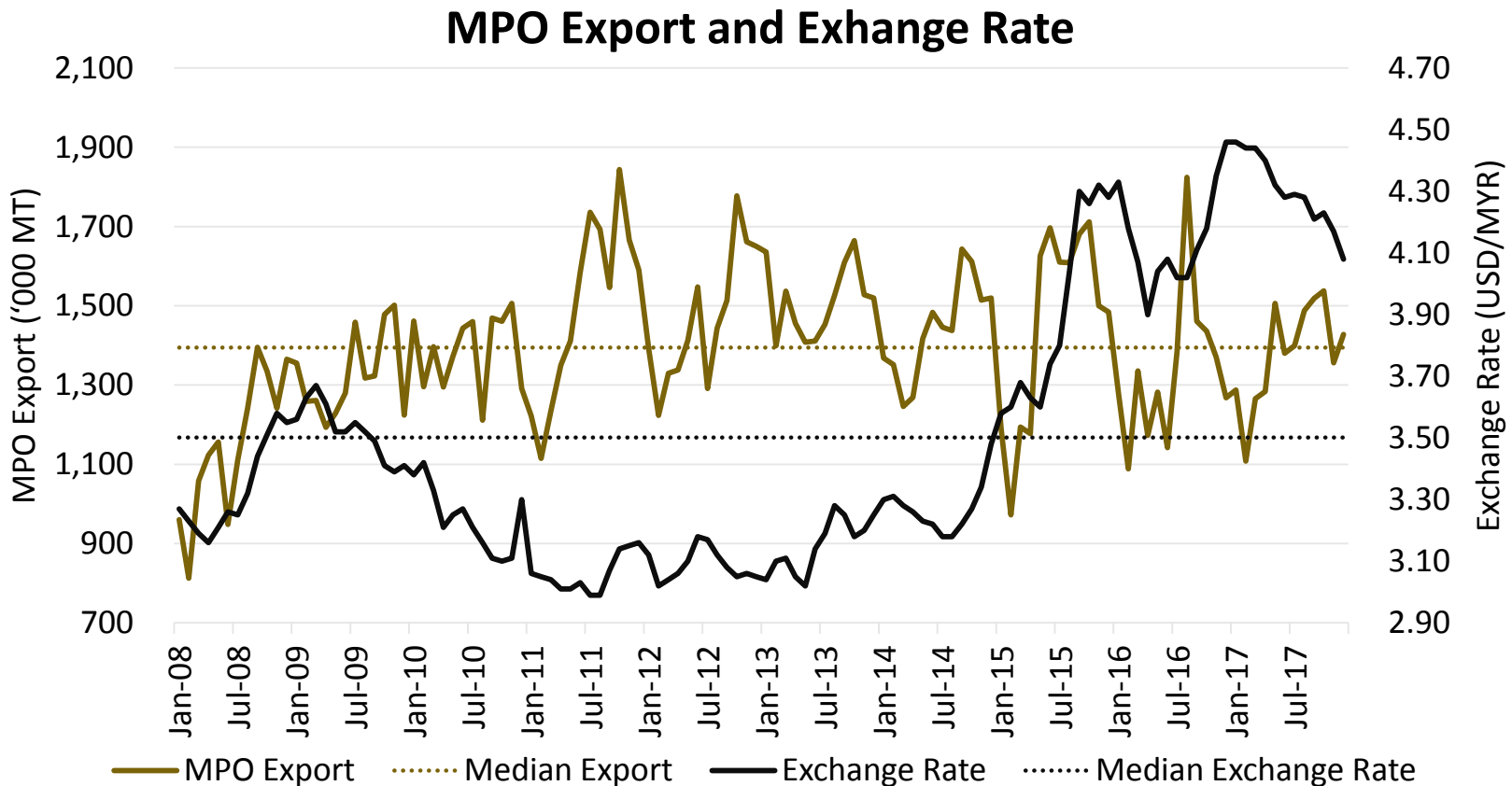
CPO price has inverse relationship with exchange rate, -0.64



Source: MPOB, OFX Group

- Weaker in Ringgit will leads to the drop in CPO price

No significant relationship between MPO export and Exchange rate



Source: MPOB, OFX Group

- No relationship can be established from both variables.

ARDL Result

Long Run Coefficients

R squared = 0.9844

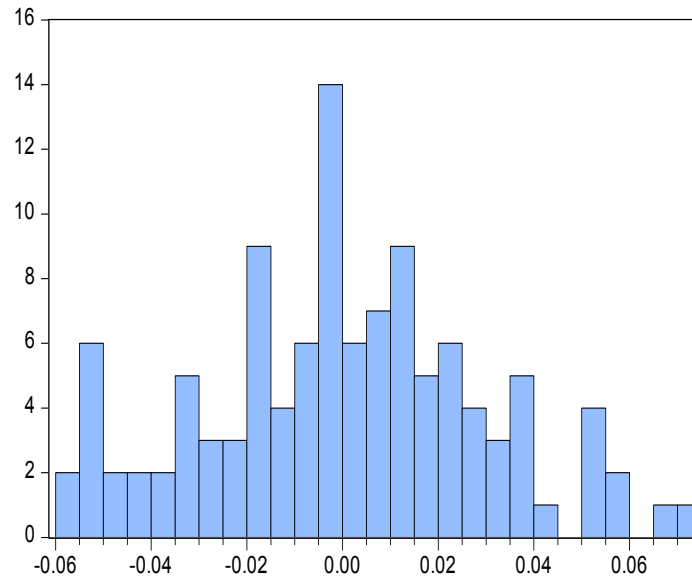
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNS	-1.272922	0.413910	-3.075357	0.0029
LND	-0.989882	0.423678	-2.336399	0.0221
LNSB	0.917230	0.183182	5.007202	0.0000
LNCD	0.321782	0.213112	1.509918	0.1352
LNER	-1.171674	0.601797	-1.946959	0.0552
C	6.947362	3.788828	1.833644	0.0706

- PO Supply, PO demand and exchange rate showed significant negative relationship with CPO price at 1 percent, 5 percent and 10 percent significance level respectively.
- While SBO price and Crude oil price showed significant positive relationship with CPO price at 1 percent and 10 percent significance level respectively.

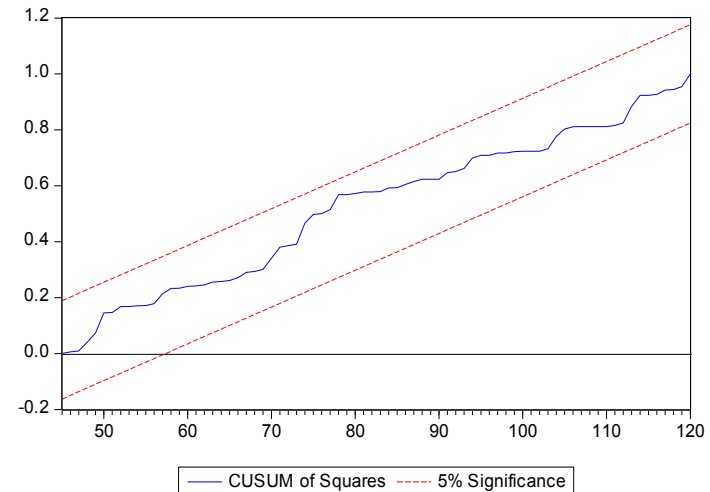
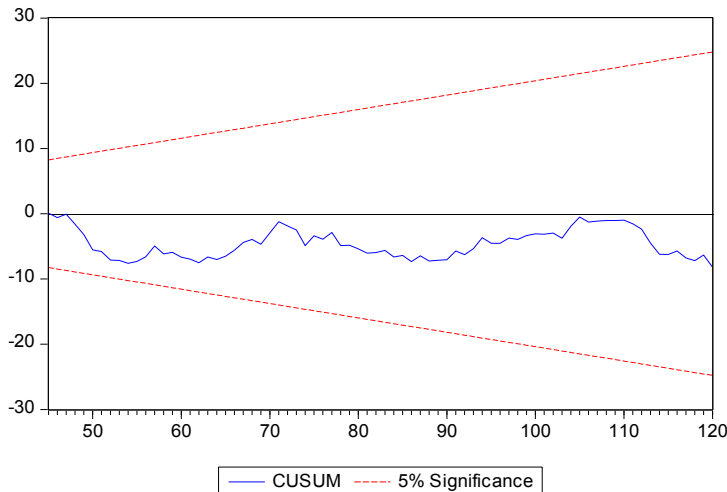
Diagnostic Tests

This model passed all the diagnostic tests:

Diagnostic Tests	Result
Breusch-Godfrey Serial Correlation LM Test	F-statistics = 0.335949
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistics = 0.911294
Normal Distribution	Probability = 0.704507
CUSUM	Stable
CUSUM Square	Stable



Series: Residuals	
Sample 9 120	
Observations 112	
Mean	-1.09e-15
Median	-0.001053
Maximum	0.071442
Minimum	-0.057753
Std. Dev.	0.029201
Skewness	0.078116
Kurtosis	2.645456
Jarque-Bera	0.700514
Probability	0.704507



Conclusion

- CPO price crucially depends on palm oil supply and demand factors.
- However, the price will change significantly when other market sentiments occurs.
- In the long run, palm oil supply and demand, SBO price, crude oil price and exchange rate have significant relationship with CPO price.
- Based on the factors that affect the price, CPO price for 2018 is projected between RM2,450 and RM2,750.

Thank you.

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