

Ms. Ref. No.: 2015-8

Title: Do Soaring Global Oil Prices Heat Up the Housing Market? Evidence from Malaysia

RESPONSE TO REVIEWER 2' COMMENTS

I am grateful to the referee for helpful suggestions. I agree with all the comments raised by the referee. The following specifies how I am going to take the referee's comments into account when revising the manuscript.

Comment 1

This paper investigates the effects of oil prices on Malaysian housing market. The transmission mechanisms of oil price changes to housing sector for oil-exporting countries (like Malaysia) are discussed in the paper. The author applies several econometric techniques to examine the effects using the quarterly data from Malaysia. The results of causality tests indicate that oil prices help to predict Malaysian housing prices and the impulse response functions show that shocks in oil prices have positive effects on Malaysian housing prices.

Topic is interesting and motivation is well discussed.

Response:

I would like to thank the referee for this kind comment on my paper.

Comment 2

Data should be described and analysed in more details, possibly using figures to show the patterns of series across the time and giving summary statistics. The interest rates do not need to be transformed by natural logarithm.

Response:

I strongly agree with the referee. It would be informative to present a table with summary statistics of the variables as well as to include a figure with plots of the data series over the investigation period. These will be included in the revised manuscript.

With regard to the transformation of interest rate, I find that the evidence from the literature is mixed. Specifically, some uses $\ln(1+\text{rate}(\text{in percentage})/100)$ to transform the rates, some employs normal natural logarithm transformation and others do not carry out any transformation for the rates. However, I agree with the referee and will follow the referee's suggestion when revising this manuscript. That is, I will keep interest rates as is and run regressions.

Comment 3

All the models used should be given explicitly.

Response:

I fully agree with the referee that it would be clearer to give explicit descriptions for all the models employed in the study, including the basic estimation model and the Gregory-Hansen models. This will be addressed in the revised version of the manuscript. Specifically, as per my responses to Comments 2 and 3 of the first referee, the following paragraphs will be added in the revised manuscript:

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The baseline model consists of oil price (*oilp*), housing price (*housep*), labor force (*labor*), consumer price index (*cpi*) and lending rate (*lendr*). All the variables are in natural logarithm except for lending rates.

The VAR model is based on quarterly data for $y_t = (\text{oilp}_t, \text{housep}_t, \text{labor}_t, \text{cpi}_t, \text{lendr}_t)$.

The reduced form VAR is given by:

$$y_t = c + \sum_{i=1}^p A_i y_{t-i} + D_t + u_t$$

where c is a vector of constants, p denotes the lag length, A_i are the 5×5 parameter coefficient matrices, and u_t is a vector of error terms.

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Compute modified versions of the cointegration ADF tests of Engle and Granger (1987), as well as modified Z_t and Z_α tests of Phillips and Ouliaris (1990) are, respectively, ADF^* , Z_t^* and Z_α^* as described in Equations [Eq.1], [Eq.2], and [Eq.3] in page 15 of the original manuscripts.

I will also put a note in the revised manuscript that: The details of how these tests are modified in the Gregory and Hansen (1996) cointegration test are provided in pages 104-106 in Gregory and Hansen (1996). To conserve space, they are not presented here.

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The Gregory-Hansen (1996) test allows to assess if cointegration amongst variables of interest holds over a first period of time and then, in an a priori unknown period T_b (the timing of the change point), it shifts to another long run relationship.

This study employs three different models C, C/T and C/S corresponding to the three different assumptions concerning the nature of the shift in the cointegrating vector: the level shift model (C), the level shift with trend model (C/T) and the regime shift model (C/S). To model the structural change, the step dummy variable $D_t(T_b)$ is defined as: $D_t(T_b) = 1$ if $t > T_b$ where $1(\cdot)$ denotes the indicator function, and $D_t(T_b) = 0$ otherwise. The three models: C, C/T and C/S representing the general long-run relationship are respectively defined as follows:

$$y_t = \mu + \theta D_t(T_b) + \alpha' x_t + u_t \quad [\text{Eq. 1}]$$

$$y_t = \mu + \theta D_t(T_b) + \alpha' x_t + \beta t + u_t \quad [\text{Eq. 2}]$$

$$y_t = \mu + \theta D_t(T_b) + \alpha' x_t + \delta' x_t D_t(T_b) + u_t \quad [\text{Eq. 3}]$$

where y_t is a scalar variable, x_t is an m-dimensional vector of explanatory variables (both x_t and y_t are supposed to be $I(1)$), u_t is the disturbance term, parameters μ and θ measure respectively, the intercept before the break in T_b and the shift occurred after the break, while α are the parameters of the cointegrating vector, β is the trend slope before the shift, and δ is the change in the cointegrating vector after the shift.

The standard methods of testing the null hypothesis of no cointegration are residual-based. Ordinary Least Squares (OLS) are employed to estimate Equations (1), (2), and (3), and a unit root test is then applied to the regression errors (Gregory and Hansen, 1996). The time break is treated as an unknown and is estimated with a data dependent method. That is, it is computed for each break point in the interval $[0.15T, 0.85T]$ where T denotes the sample size (Zivot and Andrews, 1992). The date of the structural break will correspond to the minimum of the unit root test statistics computed on a trimmed sample.”

Reference

Gregory A, Hansen B. (1996). Residual-Based Tests for Cointegration in Models with Regime Shifts. *Journal of Econometrics*, 70, 99-126.

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Comment 4

The author stresses the importance of structural breaks in implementing cointegration tests, which is good. But if there are no structural breaks in the long-run relationship (according to the results of Table 2), it is better to also conduct the conventional cointegration tests as the complement to Gregory and Hansen's test.

Response:

I agree with the referee that it would be helpful to conduct robustness checks using conventional cointegration tests in the case of no structural breaks in the long-run relationships. I will run conventional cointegration tests when revising the manuscript and report the results for robustness checks.

Comment 5

Compared with the conventional Granger causality test which is normally applied to stationary series, Toda-Yamamoto (TY)'s causality test is robust for the integration and cointegration of the process. But it is not appropriate to interpret the results of TY's test as the long-run causality.

Response:

I strongly agree with the referee. In the original manuscript, I followed several studies in literature that interpreted Toda-Yamamoto (TY)'s causality test as long-run Granger non-causality test (see, for example, Aziz et al., 2000; Payne, 2009; Tachiwou, 2009).

However, I agree that this is not appropriate to interpret the results of TY's test as the long-run causality. I would like to thank the referee for pointing out this careless mistake. In fact, Toda-Yamamoto (1995)'s causality test is asserted to be the test of the short-run non-causality between sets of variables (Yamamoto and Kurozumi, 2006). Perhaps it is confused between Toda and Yamamoto (1995)'s test and Yamamoto and Kurozumi (2006)'s test. The latter is a long-run Granger non-causality test but it is only applied to a cointegrated system, which is not the case of this study.

References

Aziz, A. M. et al. (2000). Testing for Causality Between Taxation and Government Spending: An Application of Toda-Yamamoto Approach. *Pertanika Journal of Social Science and Humanities*, 8(1), 45-50.

Payne, James (2009). On the Dynamics of Energy Consumption and Employment in Illinois. *Journal of Regional Analysis and Policy*, 39 (2), 126-130.

Tachiwou, A.M. (2009). Causality tests between stock market development and economic growth in West African Monetary Union. *Economia. Seria Management*, 12 (2), 14-27.

Toda, H.Y., Yamamoto, T. (1995). Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. *Journal of Econometrics*, 66, 225-250.

Yamamoto, T., Kurozumi, E. (2006). Tests for Long-Run Granger Non-Causality in Cointegrated Systems. *Journal of Time Series Analysis*, Wiley Blackwell, 27(5), 703-723.

Comment 6

I suggest using AIC to choose the lags for causality tests, as AIC is best for prediction.

Response:

I agree with the referee that AIC is best for prediction and will use this criterion when revising the manuscript.

Comment 7

Since there is no cointegration relationship among the variables, the author may also perform the conventional Granger causality test using the first difference of variables. In addition, to distinguish between short-run and long-run causality, the author can test Granger causality at different horizons using the method proposed by Dufour and Renault (1998) and Dufour, Pelletier and Renault (2006).

Response:

I fully agree with the referee that since there is no cointegration relationship among the variables, the conventional Granger causality test could be conducted using the first difference of variables. I will conduct it when revising the paper for robustness checks with the results obtained from running Toda-Yamamoto (1995)'s causality test.

I would like to thank the referee for suggesting methods proposed by Dufour and Renault (1998) and Dufour, Pelletier and Renault (2006) to examine short-run and long-run causality in time series. I have looked through these two interesting articles. I will conduct these methods when revising the paper and will consider including the new results if appropriate.

References

Dufour, J.M., Renault, E. (1998). Short Run and Long Run Causality in Time Series: Theory Econometrica, 66(5), 1099-1125.

Dufour, J.M., Pelletier, D., Renault, E. (2006). Short run and long run causality in time series: inference. Journal of Econometrics, 132(2), 337-362.

Comment 8

One of the core references, Toda and Yamamoto (1995) is missing from the reference list.

Response:

I completely agree with the referee and will add this core reference in the revised manuscript, as follow:

Toda, H.Y., Yamamoto, T. (1995). Statistical Inference in Vector Autoregress-sions with Possibly Integrated Processes. Journal of Econometrics, 66, 225-250.