**ECONOMETRIC ANALYSIS OF THE CAUSALITY BETWEEN ENERGY CONSUMPTION, CO2 EMISSIONS AND ECONOMIC GROWTH IN MALAYSIAN INDUSTRIAL SECTOR**

**Chiang-Ching TANa,b[[1]](#footnote-1) and Syvester TANb**

aSchool of Business and Management, University College of Technology Sarawak, 96000 Sibu, Sarawak, Malaysia.

*bDepartment of Economics, Faculty of Economics and Business, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Malaysia*

**Unit Root Test Results**

ADF & KPSS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **ADF** | |  | **KPSS** | |
|  | **Intercept** | **Trend and Intercept** |  | **Intercept** | **Trend and Intercept** |
|  | **Level** | | | | |
| Y | -1.8127[0] | -0.7899[0] |  | 0.6746[5]\*\* | 0.1896[4]\*\* |
| EC | -2.0222[0] | -0.0311[0] |  | 0.6585[5]\*\* | 0.1897[4]\*\* |
| CO2 | -1.8824[0] | -1.9439[0] |  | 0.5600[5]\*\* | 0.1723[4]\*\* |
|  | **First Differences** | | | | |
| ∆Y | -4.8071[0]\*\* | -5.2784[0]\*\* |  | 0.3924[0] | 0.1032[6] |
| ∆EC | -5.1713[0]\*\* | -5.6922[0]\*\* |  | 0.4203[4] | 0.1219[5] |
| ∆CO2 | -7.9646[0]\*\* | -5.7979[1]\*\* |  | 0.2973[2] | 0.0357[0] |
| Notes: "∆" is the first different operator. Asterisks (\*\*) indicate statistical significance at 5 per cent level. Figures in […] are the lag lengths. The asymptotic and finite sample critical value for ADF is obtained from MacKinnon (1996). The ADF test examines the null hypothesis of a unit root against the stationary alternative. The KPSS test critical values are obtained from Kwiatkowski et al. (1992, Table 1, p.166). KPSS tests the null hypothesis that the series is stationary against the alternative hypothesis of a unit root. | | | | | |

**References:**

Kwiatkowski, D., Phillips, P.C.B., Schmidt, P., & Shin, Y. (1992). Testing the Null Hypothesis of Stationarity against the Alternative of Unit Root: How Sure Are We that the Economic Time Series Have a Unit Root? *Journal of Econometrics*,54, 159-178.

MacKinnon, J.G. (1996). Numerical Distribution Functions for Unit Root and Cointegration Tests. *Journal of Applied Econometrics*, 11, 601-618.

1. Corresponding author. E-mail address: [tan.chiang.ching@ucts.edu.my](mailto:tan.chiang.ching@ucts.edu.my) (C.C. Tan), [stcw9255@gmail.com](mailto:stcw9255@gmail.com) (S. Tan) [↑](#footnote-ref-1)