The linkages among energy consumption, economic growth, relative price, foreign direct investment, and financial development in Malaysia

Published: 08 November 2012

Volume 48, pages 781–797 (2014) Cite this article

Quality & Quantity

Aims and scope →

Submit manuscript →

Chor Foon Tang [1] & Bee Wah Tan [2]

Abstract

The aim of this study is to analyse the causal relationship among energy consumption, economic growth, relative price, financial development (FD) and foreign direct investment in Malaysia using a multivariate framework. This study covers a sample from 1972 to 2009. Both the Johansen–Juselius cointegration test and bounds testing approach to cointegration consistently suggest that the variables are cointegrated. We find that energy consumption and economic growth Granger causes each other in the short and long run. In addition, both FDI-led growth and finance-led growth hypotheses are also supported by the findings from

this study. Ultimately, energy is a prominent resource for financial sector development in Malaysia because we find that energy consumption Granger causes FD. Policymakers should implement a dual strategy that, on one hand, increases investment in energy infrastructure to ensure that the supply of energy is sufficient for the financial sector and economic development, while, on the other, encourages R&D in green technology such as exercising proper soil conservation techniques and sustainable farming practices in order to reduce the consumption of fossil fuels. By doing so, environmental problems such as carbon dioxide emissions can be minimised without affecting economic growth and financial sector development in Malaysia.

References

Ang J.B.: Financial development and the FDI-growth nexus: the Malaysian experience. Appl. Econ. **41**, 1595–1601 (2009)

Ang J.B., McKibbin W.J.: Financial liberalization, financial sector development and growth: evidence from Malaysia. J. Dev. Econ. **84**, 215–233 (2007)

APERC.: APEC energy overview 2010. Asia Pacific Energy Research Centre,

Tokyo, Japan (2011)

Bekhet H.A., Othman N.S.: Causality analysis among electricity consumption, consumer expenditure, gross domestic product (GDP) and foreign direct investment (FDI): case study of Malaysia. J. Econ. Int. Financ. **3**, 228–235 (2011)

Chandran V.G.R., Sharma S., Madhavan K.: Electricity consumption-growth nexus: the case of Malaysia. Energy Policy **38**, 606–612 (2010)

Chen S.T., Kou H.I., Chen C.C.: The relationship between GDP and electricity consumption in 10 Asian countries. Energy Policy **35**, 2611–2621 (2007)

Cheung Y.W., Lai K.S.: Finite-sample sizes of Johansen's likelihood ratio tests for cointegration. Oxf. Bull. Econ. Stat. **55**, 313–328 (1993)

Dolado J.J., Lütkepohl H.: Making wald tests work for cointegrated VAR systems. Econom. Rev. **15**, 369–386 (1996)

Economic Planning Unit.: Tenth Malaysian Plan 2010–2015. Prime Minister's Department, Putrajaya, Malaysia (2010)

Engle R.F., Granger C.W.J.: Co-integration and error correction: representation, estimation, and testing. Econometrica **55**, 251–276 (1987)

Fatai K., Oxley L., Scrimgeour F.G.: Modeling and forecasting the demand for electricity in New Zealand: a comparison of alternative approaches. Energy J. **24**, 75–102 (2003)

Gandolfo G.: Quantitative Analysis and Econometric Estimation of Continuous-Time Dynamic Models. North-Holland, Amsterdam (1981)

Granger C.W.J.: Investigating causal relations by econometric models and cross-spectral methods. Econometrica **37**, 424–438 (1969)

Henricsson R., Lundbäck E.: Testing the presence and the absence of PPP: results for fixed and flexible regimes. Appl. Econ. **27**, 635–641 (1995)

Islam, F., Shahbaz, M., Alam, M.: Financial development and energy consumption nexus in Malaysia: a multivariate time series analysis. MPRA Paper, No: 28403 (2011)

Johansen S.: Statistical analysis of cointegration vectors. J. Econ. Dyn. Control **12**, 231–254 (1988)

Johansen S., Juselius K.: Maximum likelihood estimation and inference on cointegration with—applications to the demand for money. Oxf. Bull. Econ. Stat. **52**, 169–210 (1990)

Jomo K.S.: Mahathir’s Economy Legacy. Vinlin Press Sdn. Bhd., Kuala Lumpur (2003)

Kanioura A., Turner P.: Critical values for an F-test for cointegration in a multivariate model. Appl. Econ. **37**, 265–270 (2005)

Karanfil F.: How many times again will we examine the energy-income nexus using a limited range of traditional econometric tools. Energy Policy **37**, 1191–1194 (2009)

Kremers J.J.M., Ericsson N.R., Dolado J.J.: The power of cointegration tests. Oxf. Bull. Econ. Stat. **54**, 325–348 (1992)

Kwiatkowski D., Phillips P.C.B., Schmidt P., Shin Y.: Testing the null hypothesis of stationarity against the alternative of a unit root: how sure are we that economic time series have a unit root?. J. Econom. **54**, 159–178 (1992)

Lean H.H., Smyth R.: Multivariate Granger causality between electricity generation, exports, prices and GDP in Malaysia. Energy **35**, 3640–3648 (2010a)

Lean H.H., Smyth R.: On the dynamics of aggregate output, electricity consumption and exports in Malaysia: evidence from multivariate Granger causality tests. Appl. Energy **87**, 1963–1971 (2010b)

Lumsdaine R.L., Papell D.H.: Multiple trend breaks and the unit-root hypothesis. Rev. Econ. Stat. **79**, 212–218 (1997)

Maddala G., Kim I.: Unit roots, cointegration, and structural change. Cambridge University Press, Cambridge (1998)

Murry D.A., Nan G.D.: A definition of the gross domestic product-electrification interrelationship. J. Energy Dev. **19**, 275–283 (1994)

Narayan P.K.: The saving and investment nexus for China: evidence from cointegration tests. Appl. Econ. **37**, 1979–1990 (2005)

Narayan P.K., Smyth R.: Electricity consumption, employment and real income in Australia evidence from multivariate Granger causality tests. Energy Policy **33**, 1109–1116 (2005a)

Narayan P.K., Smyth R.: The residential demand for electricity in Australia: an application of the bounds testing approach to cointegration. Energy Policy **33**, 467–474 (2005b)

Ozturk I.: A literature survey on energy-growth nexus. Energy Policy **38**, 340–349 (2010)

Payne J.E.: A survey of the electricity consumption-growth literature. Appl. Energy **87**, 723–731 (2010a)

Payne J.E.: Survey of the international evidence on the causal relationship between energy consumption and growth. J. Econ. Stud. **37**, 53–95 (2010b)

Perron P.: The great crash, the oil price shock, and the unit root hypothesis. Econometrica **57**, 1361–1401 (1989)

Pesaran M.H., Shin Y., Smith R.J.: Bounds testing approaches to the analysis of level relationships. J. Appl. Econom. **16**, 289–326 (2001)

Reinsel G.C., Ahn S.K.: Vector autoregressive models with unit roots and reduced rank structure: estimation, likelihood ratio test and forecasting. J. Time Ser. Anal. **13**, 353–375 (1992)

Sadorsky P.: The impact of financial development on energy consumption in emerging economies. Energy Policy **38**, 2528–2535 (2010)

Sadorsky P.: Financial development and energy consumption in Central and Eastern European frontier economies. Energy Policy **39**, 999–1006 (2011)

Shahbaz M., Tang C.F., Shahbaz Shabbir M.: Electricity consumption and economic growth nexus in Portugal using cointegration and causality approaches. Energy Policy **39**, 3529–3536 (2011)

Stock J.H., Watson M.W.: Forecasting using principal components from a large

number of predictors. J. Am. Stat. Assoc. **97**, 1167–1179 (2002a)

Stock J.H., Watson M.W.: Macroeconomic forecasting using diffusion indexes. J. Bus. Econ. Stat. **20**, 147–162 (2002b)

Tang C.F.: A re-examination of the relationship between electricity consumption and economic growth in Malaysia. Energy Policy **36**, 3077–3085 (2008a)

Tang C.F.: A re-examination of the role of foreign direct investment and exports in Malaysia's economic growth: a time series analysis, 1970–2006. Int. J. Manag. Stud. **15**, 47–67 (2008b)

Tang C.F.: Electricity consumption, income, foreign direct investment, and population in Malaysia: new evidence from multivariate framework analysis. J. Econ. Stud. **36**, 371–382 (2009)

Tang C.F., Tan E.C.: Electricity consumption and economic growth in Portugal: evidence from a multivariate framework analysis. Energy J. **33**, 23–48 (2012)

Toda H.Y., Yamamoto T.: Statistical inference in vector autoregressions with possibly integrated processes. J. Econom. **66**, 225–250 (1995)

Wolde-Rufael Y.: Re-examining the financial development and economic growth nexus in Kenya. Econ. Model. **26**, 1140–1146 (2009)

Yoo S.H.: The causal relationship between electricity consumption and economic growth in the ASEAN countries. Energy Policy **34**, 3573–3582 (2006)

Zivot E., Andrews D.W.K.: Further evidence of the great crash, the oil-price shock and the unit-root hypothesis. J. Bus. Econ. Stat. **10**, 251–270 (1992)

Author information

Authors and Affiliations

Department of Economics, Faculty of Economics and Administration, University of Malaya, 50603, Kuala Lumpur, Malaysia

Chor Foon Tang

Centre for Policy Research & International Studies (CenPRIS), Universiti Sains Malaysia, Penang, Malaysia

Bee Wah Tan

Corresponding author

Correspondence to Chor Foon Tang.

Electronic Supplementary Material

The Below is the Electronic Supplementary Material.

ESM 1 (DOC 64 kb) (download DOC ⭳)

Rights and permissions

About this article

Cite this article

Tang, C.F., Tan, B.W. The linkages among energy consumption, economic growth, relative price, foreign direct investment, and financial development in Malaysia. *Qual Quant* **48**, 781–797 (2014). https://doi.org/10.1007/s11135-012-9802-4

Published Issue date

08 November 2012 March 2014

DOI

https://doi.org/10.1007/s11135-012-9802-4

Keywords

Energy–growth | Financial development | FDI

Profiles

1. Chor Foon Tang

View author profile

Search

Search by keyword or author

Navigation

Find a journal

Publish with us

Track your research