
The Determinants of CO₂ Emissions in ASEAN+3 Countries

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Abstract - This study investigates the determinants of carbon dioxide emissions in ASEAN+3 countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, China, Japan and South Korea) during the period of 1991 to 2010. The methodologies employed in this study include the Im, Pesaran, and Shin Panel Unit Root test, the Pedroni (Engle-Granger based) Cointegration Test, and the Granger-Causality based on the Vector Error Correction Model (VECM). Results from the panel unit root test show that all the variables are integrated of order one, I (1). For the cointegration test, the results indicate that there is a long relationship between carbon dioxide emissions, energy consumption, economic growth, urbanisation, trade openness, and transportation. The empirical results show that economic growth, energy consumption, and trade openness are the determinants of CO₂ emissions in ASEAN+3.

Keywords: CO₂ emission, Environmental Kuznets curve, ASEAN+3.

1. Introduction

Climate change has been the concern of researchers and policy makers and it is closely related to the long-term rise in sea levels, higher frequency of tropical storms, and the alarming rate of cardiovascular and respiratory diseases (Stocker et al., 2009). The global climate change is also expected to increase the vector-borne diseases incidences, especially malaria and dengue in Southeast Asia and Latin America (Centres for Disease Control and Prevention, 2014). The increase in the global temperature due to the increase in greenhouse gases emissions particularly carbon dioxide concentrations has become a major threat of global warming. The main causes of human-induced global warming are fossil fuels combustion and other smaller industrial sources (Oliver, Janssens-Maenhout, Munteen, and Peters, 2013). The rising concern over climate change has triggered a stream of research on the nexus between air pollution and economic growth, which can be categorised into three strands. Various studies focus on examining the validity of the environmental Kuznets curve (EKC) hypothesis such as Managi and Jena (2008), Stern (2004), as well Martínez-Zarzoso and Bengochea-Marancho (2004). On this note, past studies have also investigated the economic growth energy consumption nexus (Tang and Tan, 2013; Fallahi, 2011), and studies by Soytas and Sari (2009), Ang (2007), and Lean and Smyth (2010) have investigated the dynamic relationship between economic growth, energy consumption, and