EFFECTS OF LAND, LABOUR AND ENERGY ON ECONOMIC GROWTH IN ASIA'S EMERGING MARKET AND DEVELOPING ECONOMIES (EMDES)

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Overview

Emerging market and developing economies (EMDES) have played an important role in in the global economy in recent years, and they account for more than 75 percent of global growth in output and consumption in 2017 (IMF, 2017). According to forecasts from the International Monetary Fund (IMF), Asia's developing economies are poised to expand an average of 6.5 percent in 2018, which is 4.9 percent for all emerging markets (Karunungan, 2018). Singapore's central bank chief said that emerging markets in Asia are in a stronger position than others because of solid economic growth prospects, low inflation and strong reserve buffers (Businesstimes, 2018). However, inhibited by natural resource, labour supply, and local energy is likely limit potential output growth of EMDEs economies.

Hubacek and van den Bergh (2002) found that land-use changes are most often directly linked with economic decisions. Futhermore, Walmsley et al., (2015) mentioned that East and South-East Asia will face major demographic changes over the next few decades with many countries' labour forces starting to decline. Last but not least, energy efficiency would have a positive impact on macro economic factors, which can drive Asia's economic growth (Sharma et al., 2014). This paper investigates the effects of land use, labour supply and energy consumption with relation to gross domestic product (GDP) per capita and technology transfer in Asia's economic growth in EMDEs. The 12 countries in this study include Bangladesh, Brunei Darussalam, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka and Thailand. The data are provided by the World Bank, consisting of yearly data for the 20 years encompassing the period 1995 to 2014, with such data subjected to panel data analysis.

Methods

This study investigates the effects of land, labour supply and energy consumption on economic growth on EMDES in Asia. Two stage least squares (2SLS) of panel data analysis is employed to determine the gross domestic product (GDP) growth function, while controlling for unobserved cross section heterogeneity (Baltagi, 2013). A panel data model is constructed conferring two dimensions (year and country) upon the variables. There is a cross-sectional unit of observation, which in this case is country (i), and there is a temporal reference (t), which in this case is the year. This paper estimates 2SLS panel estimators with regard to pooled ordinary least squares (pooled 2SLS), fixed effects (FE-2SLS) and random effects (RE-2SLS). The Hausman test (1978) is employed to compare random effects versus fixed effects (Green, 2008). In addition, this study employs the LM test to decide between a random effects regression and POLS regression (Breusch and Pagan, 1980).

The pooled 2SLS estimator makes use of variation of both time and cross sectional units to estimate β by stacking data over i and t into one long regression with NT observations, and estimating by ordinary least squares (OLS). The GDP growth model can be shown as follows.

$$GDP_{it} = \alpha_0 + \beta_1\, LA_{it} + \beta_2\, LS_{it} + \beta_3\, EU_{it} + \sum_{n=1}^{s}\gamma_p z_{p,i} + \varepsilon_{it} \tag{1}$$

where
$$EU_{it} = \alpha_0 + \alpha_1\, GPPP_{it} + \alpha_3\, TEC_{it} + \sum_{p=1}^{s}\gamma_p z_{p,i} + \varepsilon_{it,2} \tag{2}$$

GDP stands for the dependent variable which is economic growth (percent of annual). There are three observed variables, which are LA stands for arable land (hectares per person), LS stands for labour supply (percent of population ages 15-64 years old), and EU stands for energy use (kg of oil equivalent per capita). z stands for unobserved variables (for example natural disasters and political unrest), α_0 is the intercept which represents the individual-specific constants, β_1 is a parameter, γ is an s-dimensional column vector of parameters, and ε is an error term. However, EU is an endogenous variable. There are two instrumental variables, which are GDP per capita: $GPPP$ (current US$) and technology: TEC (percent of service communications, computer, etc imports, BoP). These instruments are correlated with EU.

Results and Discussion

Following expectation, the 2SLS of panel data analysis results show that an increase of energy use gives a highly significant result of increasing economic growth to Asia's EMDEs. Therefore, these economies can still get a weaker growth impulse from energy price, which has a negative relationship with electricity demand. In addition, an increase of arable land gives a significant result of rising economic growth. However, rather than increase the amount of land use, sustainable land management can promote the efficient use of land by motivating owners through the benefit of proper management and farm development. The fact that there appears no effect of labour supply growth on economic growth in Asia's EMDEs might be due to entrepreneurs employing more technology and machinery rather than human labour.

Conclusions

This paper explores the effects of land use, labour supply and energy consumption on economic growth for EMDEs in Asia, through 2SLS of panel data analysis. The study involves data from 12 countries, with 20 yearly samples from the period 1995 to 2014. The results show, with a high level of statistical significance, that increases in energy use and arable land deliver a pronounced enhancement in economic growth for Asia's EMDEs. However, there appears no effect of labour supply on economic growth. Such a finding provides affirmation that, for EMDEs in Asia, energy and land can be instrumental in markedly assisting the national economy. Because of increase in income and technology transfer, it is difficults to reduce energy demand for developing countries. Policy makers would be wise to encourage economic growth to continue or last longer by reducing energy prices through promoting energy market integration and renewable energy.

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