Does the ‘Environmental Kuznets Curve’ exist?  
An application of long-run structural modeling to Saudi Arabia

Mansur Masih and Lurion De Mello, King Fahd University, Saudi Arabia

This study examines the relationship between income and CO₂ emission on a per capita basis in Saudi Arabia during 1975-2004. It is motivated by the recent heightened world concern over global warming pollution which resulted in the formulation of the Kyoto protocol and its rapid ratification by a majority of countries in the late 1990s. There have been many attempts to explain the increase in per capita CO₂ emission by relating it to per capita income growth in a country via the ‘Environmental Kuznets Curve’ (EKC). The EKC is usually postulated to have an inverted-U shape, which means that per capita income growth is initially associated with an increase in per capita CO₂ emission. However, beyond a certain point, the relationship reverses and further per capita income growth is associated with a decrease in per capita CO₂ emission. The practical implication of an EKC with inverted-U shape is that a continued increase of per capita income alone would ultimately reduce per capita CO₂ emission, thus obviating the need for any proactive political intervention.

In contrast to the above, our study, based on a recently developed rigorous time series technique known as the Long Run Structural Modeling (LRSM) (Pesaran and Shin, *Econometric Reviews*, 2002), indicates that at least in the context of Saudi Arabia (1975-2004) the EKC possesses a cubic-N shape. This implies that although increasing per capita income may indeed be associated with decreasing per capita CO₂ emission for a certain period, in the long run the trend will reverse and it will again be associated with increasing per capita CO₂ emission. This empirical finding of our study has a significant policy implication in that increases in per capita income alone are not enough to reduce per capita CO₂ emission, but should be supported by a proactive industrial/technological policy that tackles related causes and also, since CO₂ emission is evidenced to be mainly income-driven, policies should be focused on environment-friendly GDP growth. Moreover, not only the production but also the consumption of GDP, in particular the tastes and preferences of high-income individuals need to be environment-friendly. These findings have profound policy implications for both the developing and the developed
economies of the world.