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Financial development and environmental quality: The way forward

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HIGHLIGHTS

- A positive shock in economic growth leads carbon emissions.
- Energy consumption and financial development add in environmental degradation.
- Financial resources should be allocated to environment friendly ventures.

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ABSTRACT

The present paper re-examines the asymmetric impact of financial development on environmental quality in Pakistan for the period 1985Q1 to 2014Q4. A comprehensive index of financial development is generated using Bank- and Stock market-based financial development indicators. The results show that inefficient use of energy adversely affects the environmental quality. This suggests adoption of energy efficient technology at both production and consumption levels. These technologies would be helpful to improve environmental quality, enhance the productivity in long-run and save energy. Bank-based financial development also impedes the environment. The government should encourage lenders to ease the funding for energy sector and allocate financial resources for environment friendly businesses rather than wasting them in consumer financing.

1. Introduction

Economic development is a long process that promises a high standard of living but also causes environmental degradation. A large body of literature is available on the association between environmental degradation and economic development, known as the Environmental Kuznets curve (EKC), which was proposed by Grossman and Krueger (1995).[1] The EKC hypothesis posits that economic growth is initially accompanied by environmental degradation but that environmental quality begins to improve as the economy achieves the threshold level of the per capita income (for details, see Stern (2004) and Carson (2010)). This notion has been empirically supported by various studies, such as Aldy (2005) for US states, Acaravci and Ozturk (2010) for European countries, Apergis and Ozturk (2015) for Asian economies, and Jebli et al. (2016) for OECD nations. Similarly, in the energy economics literature provides, many studies have investigated the EKC hypothesis by using time-series data for individual countries. For instance, (2015) have validated the EKC for Turkey, France, Pakistan, India, Malaysia and Cambodia, respectively. Tamazian et al. (2009) argue that the omission of financial development from carbon dioxide emissions functions leads to erroneous empirical results. In a later study, Tamazian et al. (2009) report that financial development is a potential factor for economic growth, energy consumption and carbon dioxide emissions and disagree that financial sector development affects environmental quality via the scale effect (domestic output expansion), business effect (increase in investment activities) or wealth effect (developed efficient stock market).

The rationale of the present study is to examine the link between financial development and carbon dioxide emissions rather

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[1] Achieving sustainable economic development as well as better living standards with positive environmental outcomes has been the desire of developing countries.

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than to empirically investigate the EKC hypothesis. In a study on this topic, Tamazian et al. (2009) empirically investigate whether financial development affects carbon emissions for BRIC countries. They argue that developed financial markets help reduce financing costs and channel financial resources in order to purchase fresh equipment and fund new projects, which in turn, creates energy demand and affects CO_2 emissions. Furthermore, their analysis indicates that financial development supports energy efficient technologies and hence shrinks carbon dioxide emissions. Tamazian and Rao (2010) examine the association between financial development and environmental degradation by incorporating institutional quality into carbon dioxide emissions functions, and they find that financial development increases environmental quality by lowering CO_2 emissions in countries with strong institutions and vice versa. Similarly, Frankel and Romer (1999) state that financial development attracts foreign direct investments, and consequently, advanced research and development activities lead to better environmental conditions. (2010) confirm that financial development induces listed companies to use energy-efficient technology, which consequently helps reduce carbon emissions. Zhang and Lin (2011) contribute to the ongoing debate about the financial development-CO_2 emissions nexus by separating efficiency and scale effects.

In contrast, according to Sadorsky (2010) and Zhang (2011), financial development may contribute to carbon dioxide emissions. Stock market development assists public companies in reducing financial costs, enlarging financial channels, sharing operational risks and finding a balance between assets and liabilities to acquire new installations and allocate resources for the implementation of new projects, which ultimately increases energy consumption and carbon dioxide emissions. Zhang (2011) documents that financial intermediation allows for the purchase of household items (i.e., cars, houses, air conditioners, washing machines, etc.), which consume energy and add to carbon dioxide emissions. Al-Mulali et al. (2016) empirically investigate the nexus between financial development and carbon dioxide emissions for European countries; they note that financial development devastates environmental quality by increasing carbon dioxide emissions.

In the existing literature, studies also find a insignificant effect of financial development on carbon dioxide emissions (for example, Ozturk and Acaravci, 2013; Dogan and Turkekul 2016; Omri et al., 2015; Ziaei, 2015). In the case of Pakistan, Javid and Sharif (2016) follow Shahbaz et al. (2012) and incorporate financial development as additional factor in their EKC function. Their results indicate a positive effect of energy consumption on carbon dioxide emissions, providing support for the EKC hypothesis in Pakistan. Their empirical analysis further shows that financial development degrades environmental quality by increasing carbon dioxide emissions, and the analysis of causation indicates the presence of response effect of financial development on carbon dioxide emissions. In a recent study, Abbasi and Riaz (2016) re-estimate the association of financial development with carbon dioxide emissions by including foreign direct investment in the carbon dioxide emissions equation. They use total credit, domestic credit and market capitalization as an indicator of financial development.[2] Their results indicate that financial development indicators have insignificant impact on carbon dioxide emissions in the full sample (1971–2011); however, in the reduced sample (1988–2011), total credit is negatively associated with carbon dioxide emissions. They also note that economic growth increases environmental degradation by stimulating carbon dioxide emissions. For more details, a summary of the studies on the financial development-CO_2 emissions nexus is provided in Table 1.

Moreover, inappropriate proxies for financial development have provided biased empirical results from studies investigating the financial development-carbon dioxide emissions nexus. For example, Khan et al. (2014) explore the link between carbon dioxide emissions and financial and economic variables such as (M_2) and (M_3), domestic credit to private sector, and FDI in South Asia and find a positive effect of these factors on carbon dioxide emissions in the long run. Lee et al. (2015) explore the link between financial development and carbon dioxide emissions by employing data from OECD economies through a panel FMOLS approach. They use domestic credit to the private sector as a proxy for financial development and find that financial development is a catalyst to improved environmental quality. Ziaei (2015) use domestic credit to the private sector and the stock market turnover ratio as indicators of financial development and find a conflicting effect on energy consumption and hence on CO_2 emissions. Chang (2015) use five indicators of financial development[3] to examine their effects on carbon dioxide emissions and obtain biased results. Thus, a compound measure of financial development must be used to avoid multicollinearity and obtain unbiased empirical evidence.

Over time, Pakistan has implemented numerous economic policies, such as the structural adjustment program (SAP), to provide support during periods of slower economic growth, budget deficits and poverty alleviation, and the implementation of SAP has gradually affected our fiscal policies. Pakistan has also faced geopolitical tensions, such as terrorism, because of its collaboration with the USA during the Afghan war. Further, structural changes in business cycles have occurred in Pakistan because of the implementation of numerous economic policies and external shocks that have also affected Pakistan's economy as a result of economic, social and political globalization. Pakistan's inflation is sensitive to the exchange rate, and production costs are affected by crude oil prices in the international oil market. Because of these factors, nonlinearity (asymmetries) may be found in macroeconomic variables. Such asymmetries may arise in macroeconomic variables because of interest rate differentials across countries, economic phases (booms or depressions, recessions or recovery periods), the oil price mechanism in the international oil market, international trade, and the supply and demand of domestic products in local and international markets. The allocation of credit to the private sector to stimulate business at low, medium and high levels is also conditional on the interest rate in the local market. Finally, many hidden factors may engender asymmetries in time-series data.

The literature also shows that ignoring the presence of asymmetries or nonlinearity in macroeconomic variables may provide biased empirical results. This study provides a comprehensive effort to fill this gap in the existing literature in the field of energy economics. The contribution of the present study is fourfold: (i) Using quarterly data from 1985 to 2014, the study generates a composite index of financial development by considering three indicators from the banking sector (M_2, M_3 and domestic credit to the private sector) and three indicators from the stock market (stock market capitalization, stock market traded value and stock market turnover) in Principal Component Analysis (PCA). (ii) The Fourier ADF (Enders and Lee, 2012) is used to analyse the level of integration of the variables to accommodate possible nonlinearities. (iii) The nonlinear autoregressive distributed lag

[2] Using these indicators together in a regression may create a multicollinearity problem because of the high correlation between the indicators. The presence of multicollinearity leads to erroneous empirical results (Polat et al., 2015).

[3] These indicators include domestic credit to the private sector, domestic credit provided by the banking sector, total value of stocks traded, ratio of total value of stocks traded to stock market capitalization, and net inflows of foreign direct investment.