

# Energy Efficiency in Transition: Do Market-Oriented Economic Reforms Matter?

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## (1) Overview

Theory suggests that market-oriented reforms should promote substantial energy efficiency due to the adoption of more liberalised commercial policies and increased openness to private investment as generally believed by the academic scholars (Anderson, 1995). Economists believe that the combined adoption of privatization, regulatory reform and liberalisation enhances economic efficiency and improves service standards in all economic sectors (Megginson and Netter, 2001). Improvement in energy efficiency coincides with the overall economic aims of increasing productivity and competitiveness of the economy. Efficient energy use can bring the energy costs down the cost curve and free up resources that can be mobilized elsewhere more productively. Hence, the reliance on market, both, as a resource allocating agency and as an incentive mechanism can optimize energy allocation. It also incentivises consumers to reduce waste and choose from the most cost-reflective energy saving equipment and appliances (Fan, et. al, 2007). Energy largely serves as an intermediate factor input in production and as a necessary final consumption good. Thus, effective market signals in the form of cost-reflective energy prices imply that producers decrease energy consumption by switching to other substitutes when energy prices rise. It can also induce energy saving technologies and innovations (Jorgenson and Wilcoxon, 1993; Popp, 2002). From a policymaking perspective, energy efficiency and economic efficiency can be considered to be complementary goals under many circumstances (Sutherland, 1991). In addition, best energy policies are often those aimed at making markets work better by eliminating market imperfections, mitigating market power through competition policies, and internalizing environmental externalities (such as climate change impacts) using flexible market-based mechanisms (Joskow, 2001). Hence, it can be argued that energy efficiency improvement is strongly linked with policies aimed at strengthening the effectiveness of market forces in the economy (Meyers, 1998).

Nonetheless, the quantitative evidence on the linkage between market-oriented economic reforms and energy efficiency remains relatively unexplored in the economics literature. Such analysis can be important considering the twin concerns of climate change and security of supply towards economic development. This paper, thus, aims to contribute towards the relatively scarce literature studying the impacts of various market-oriented economic reforms on energy efficiency. We consider the popularly termed ‘transition economies’ (TECs hereafter) comprising twenty-nine countries of Central and Eastern Europe and the Former Soviet Union (FSU) for this purpose. This is because these countries, being highly energy intensive and energy inefficient prior reforms initiated economic transformation from central planning towards market since the early 1990s allowing us to capture the effects of market-based economic transformation on energy efficiency after more than two decades of reforms. Hence, this paper analyses the impacts of different market-oriented economic reforms on energy efficiency during the two decades of market driven reforms in the transition countries.

## (2) Methods

It is well established in econometric literature that a dynamic LSDV model with a lagged dependent variable generates biased estimates when ‘T’ is small as is the case (see for e.g. Roodman, 2006). The estimates obtained from a dynamic LSDV become meaningless unless corrected for bias in small samples. Kiviet (1995) devised a bias-corrected LSDV estimator

applicable only for balanced panels which is understood to have the lowest Root Mean Square Error (RMSE) for panels of all sizes (Bun and Kiviet, 2003). Based on these previous works, a version of bias-corrected LSDV estimate (LSDVC) has been developed by Bruno (2005). Hence, we use panel data econometrics based on bias-corrected fixed effect analysis (LSDVC) to examine the drivers of energy efficiency in transition countries since the start of the transition period. An alternative to dynamic LSDV panel estimates would be to use other consistent Instrumental Variable (IV) and Generalized Methods of Moments (GMM) estimators as proposed in econometrics (Roodman, 2006). However, the relative performance evaluation of LSDVC in comparison to LSDV, AB and BB estimators by Bruno (2005) for unbalanced panels with small 'N' concludes that the STATA computed LSDVC version outperforms all other estimators in terms of root mean square errors (RMSE) and bias.

### **(3) Results**

The results from the LSDVC analysis suggest that privatization has been the sole driver of energy efficiency in transition countries. The result supports the earlier findings that market-based instruments and policies such as private ownership can significantly improve the energy efficiency in an economy (Farinelli et al. 2005; Sinton and Fridley, 2000). This result is in line with the theoretical motives of privatisation involving improvements in economic efficiency and efficient resource allocation (Vickers and Yarrow, 1988). However, other market-based reforms remain insignificant in improving energy efficiency. To some extent, this indicates the lack of institutional robustness in transition countries to support market-based in inducing any effects on energy efficiency.

### **(4) Conclusions**

This paper analysed whether market-driven economic reforms matter or not in driving energy efficiency by analysing the impacts of various market-based economic reforms on energy efficiency across the transition countries. The results from the bias-corrected fixed effect analysis (LSDVC) suggest that privatisation has contributed to energy efficiency improvements in the transition countries. Other market-based reforms might have failed to produce any significant impacts maybe due to the lack of appropriate institutional support to complement those reforms as indicated by the results. However, it is necessary for the policymakers to understand that the markets as well as the institutions to support them are not perfect. Thus, the resulting market imperfections can lead to market failures which require appropriate government interventions to offset the effect of market failures.

### **Some References**

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