***THE IMPACT OF ELECTRICITY PRICE LIBERALISATION ON BANGLADESH ECONOMY***

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## Overview

Electricity, as an energy carrier is considered as a key sector in the modern economy. In many developing countries, government control energy prices and keep the prices below the full economic cost of supply for consumers who could not afford electricity otherwise and to support production through subsidised fuel. Hence, electricity and fuel subsidy is widespread and a common phenomenon across the world, especially in the developing countries. However, energy subsidies are costly and can crowd out growth enhancing public spending. One IMF (2013) report shows that electricity and fuel subsidies exceeded 3% of GDP in four countries (Bangladesh, Brunei, Indonesia, and Pakistan). The effectiveness of these subsidies seems to be questionable as they can place a heavy burden on government finances and hamper the economic growth. Moltke et al. (2004) provides evidence that, in many countries in the world, the net effects of subsidies are negative and overall social welfare would be higher without subsidies. Jamasb (2006) argue that electricity reform in developing countries requires extensive restructuring of prices and subsidy arrangements.

However, to the best of our knowledge, existing literature has not paid any attention to examine the effect of electricity price reform on Bangladesh economy in a dynamic stochastic framework. This paper addresses this concern and considers a Dynamic Stochastic General Equilibrium (DSGE) model to study some alternative electricity pricing experiment for policy purposes in Bangladesh as an example of small developing country where energy (mainly electricity and fuels) subsidy is very high, energy prices are distorted and government controls energy prices. Price adjustments and subsidy reforms are needed in the developing countries to ensure economic sustainability. Since policy discussions were primarily focused in this paper, we examine the effects of some proposed energy reforms particularly electricity pricing reform policies on household welfare and macroeconomy in Bangladesh in its endeavours to develop and enhance electricity systems. Although the analysis mainly focuses on Bangladesh electricity sector, the results and policy implications are also relevant for the other developing countries undertaking reform in this sector.

We simulate our model for Bangladesh to analyse the impacts of oil price shocks on the model variables through Impulse Response Functions (IRFs) when government controls electricity and fuel prices and then when liberalise price controls. We also discuss the steady state conditions of different economic variables (GDP, consumption, etc.) under different scenarios. Our results show that governmental intervention in electricity market as a price setter in Bangladesh is not welfare enhancing as i) all types of consumption increase and ii) Bangladesh economy is found to be less vulnerable to oil price shocks if the government abolishes energy price controls through liberalisation and moves towards a free market economy.

## Methods

To find a numerical solution, model calibration is necessary. Hence, the model is calibrated following Kydland and Prescott (1982). The data needed to calibrate the model for Bangladesh economy comes from Bangladesh Bureau of Statistics (BBS), Bangladesh Economics Review (BER), World Development Indicator (WDI), Bangladesh Labour Force Survey (BLFS), Bangladesh Power Development Board (BPDB), Bangladesh Petroleum Corporation (BPC), Summit Power Limited, Dutch Bangla Power and Associates Limited and Bangladesh Tax Handbook.

Parameter values are specified in different ways. Wherever possible, parameter values are taken from the available data sources. In some cases, the parameters are chosen freely from the literature and thus are not implied by the steady state restrictions. The other parameters are obtained by calibration in a way that the real picture of the economy is extrapolated as the steady state trajectory.

We run the program Dynare version 4.4.3, which is a pre-processor and a collection of Matlab routines to solve and simulate the model and to approximate the dynamics of our model economy (See Stéphane Adjemian et al., 2011 for the methodological details). These routines linearize the system around its deterministic steady state and perform a second order Taylor approximation.

## Results

## Our model is calibrated for Bangladesh economy and the main contribution of this paper to the literature, comes in the form of analytical and numerical results. Our results reveal that price liberalisation in electricity market leads to an increase of overall household consumption as the relative price of electricity faced by the household has declined. Industry enjoys lower input price since electricity prices go down under price liberalisation which expands the industrial production by 2.85%. There is a reallocation of the usage of fuel needed to generate electricity because of the changes of the relative prices faced by the producer. The overall electricity supply is also increased by 43.44%. Government has no control over prices and increase the electricity generation to match the overall electricity supply. Since all the price distortion has been removed, this is a welfare enhancing policy as observed in the results. There is a 20.87% increase in household welfare in this policy experiment. GDP has also increased by 2.15% here.

## Conclusions

The extent of electricity price distortions in many developing countries like Bangladesh is considerably higher and cost reflective pricing liberalisation become inevitable. Economic theory also argues that cost-reflective prices result in net social welfare gain (Jamasb, 2002). Thus, this paper develops an energy augmented DSGE model for a mixed economy and includes a detailed disaggregation of the energy sector to examine the macroeconomic impacts of electricity price liberalisation. We evaluate the policies in terms of various macroeconomic and energy indicators.

Our results reveal that Bangladesh economy performs better in a free market economy. Our results also portray that energy price reform policies (restructuring of energy prices) increase household welfare and GDP in Bangladesh mainly by reducing the dependency on oil, increasing household consumption and electricity generation. Therefore, price controlling is no longer justified for the Bangladesh economy. Given our results, policymakers could carefully assess the overall welfare effect of price liberalisation and when appropriate, take some measures to redistribute welfare from the industrial sector to the household sector. Since household heterogeneity is a crucial element in the determination of how the energy market reform and oil price shocks affects the household’s behaviour and welfare, the model developed in this paper can be extended with heterogeneous households in their income to examine the distributional effects of price liberalisation in energy market. This field however, is left for future research.

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