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# Does country-risk influence electricity production worldwide? ☆

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## Abstract

This paper investigates the relationship between country-risks (or conflicts) within countries and electricity production. The determinants of electricity production have been neglected in the literature that favours the relationship between energy consumption, growth and development, and despite of the major challenges on electricity supply systems. We empirically establish that weighted conflict index, as well as sub-items as anti-government demonstrations, government crises and riots negatively influence electricity production *per capita*, after controlling for income *per capita*. Country conflicts affect electricity production mostly in the long-run. Our results imply that conflicts may affect electricity production substantially and consequently the economy as a whole. Policy should emphasize the institutional framework to avoid conflicts within countries in order to secure electricity production.

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## 1. Introduction

The security of electricity production has been taken very seriously by international policy makers. As recognized by [European Commission \(2013\)](#), “EU legislation imposes an obligation

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on Member States to maintain minimum stocks of oil. A supply crisis caused by our supply of petroleum from third countries being unexpectedly interrupted would most likely have a serious impact on the European economic activity. Breaks in supply could also occur within the EU.” On the other hand, [Stevens and Hulbert \(2012\)](#) stated that “A key outcome of the Arab uprisings has been a significant increase in the prices needed by the producers to manage their fiscal position. This is a serious indictment of producers failure to diversify their economies away from dependence on oil revenues over the last 20 years.”

According to the International Energy Association, consumption, production and trade of electricity has increased a lot in the last 40 years, being more increasingly sloped for the developing countries in the last 20 years ([IEA, 2015](#)). Also, the same Association considered that “Electricity security is a major component of energy security in modern economies. It involves significant activity in terms of governance and market arrangements, directly under the responsibility of governments. (. . .) Nevertheless, in terms of overall energy security, there is increasing concern that electricity may be the least well prepared area.” ([OECD/IEA, 2013](#)) One of our aims is thus to inform policy where to act to improve electricity security.

There is a huge literature on the influence of country-risk on economic growth and on its factors of production (e.g. [Alesina, Ozler, Roubini, & Swagel, 1996](#); [Aisen & Veiga, 2013](#)). However, despite of electricity being considered a factor of production, there was no scientific attempt to evaluate if and how much country-risk affects its production. We wish to fill this gap in the literature. We do that using a large panel data considering almost all countries in the world with annual data since the XIX<sup>th</sup> century. We also consider the time-series features of the very long-run data. Thus our contribution is twofold: (i) we study the macroeconomic determinants of electricity supply, focusing on conflicts inside countries, implying that when policies improve institutions that reduce conflicts also improve the electricity production security and thus all the economy; (ii) we implement an econometric model that accounts for cross-country correlations on electricity supply, income and other common factors affecting both.

The new stylized facts relating energy and economic growth and development concentrate in energy consumption and energy use ([Csereklyei, Varas and Stern, 2016](#); [Novkovska & Novkovski, 2017](#); [Carter, Craigwell, & Moore, 2012](#)). Some earlier works focused on the relationship between country risk (or related variables linked with policy and politics) and energy demand or consumption. [Erdogdu \(2013\)](#) focused in the level of corruption as explanatory variable for reforms in energy markets. He found that the level of democracy, civil liberties and corruption in a country are significantly correlated with how far reforms have gone in that country. [Farzenegan and Markardt \(2012\)](#) showed that the quality of democratic institutions has a greater influence on local environmental problems than on global environmental issues in the Middle East and North Africa region. None of the previous works focused on the macroeconomic determinants of electricity production.

The remaining of the paper is organized as follows. Section 2 provides evidence according to which country-risk measures, income and electricity production should be seen as crosscountry dependent and non-stationary. This serves as motivation for the use of the common correlated estimator model, augmented to account for common omitted variables and reverse causality. Section 2 contains the description of the econometric model. Section 3 presents the main results and several extensions and robustness checks. Finally, Section 4 concludes and presents the policy implications of our results.

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