Trading Energy in Africa: The Role of Climate Change

Eric Strobl, *Ecole Polytechnique* and *SALISES*

Sufficient access to energy is widely believed to be intrinsically linked to economic development and hence it is no surprise that many have argued that one way of promoting economic growth in Africa is through investment in its energy sector. In this regard one should note that Africa is a continent rich in natural resources, many of which can be used to generate energy, such oil, natural gas, coal, water etc. However, importantly in this regard is that these natural resources are not evenly distributed across the continent. For example, countries within the Congo Basin have access to large waterbodies which can be used to generate hydroelectricity, while Southern Africa is characterized by a relative richness in coal and natural gas. This creates a setting of large potential benefits to be gained from power pool sharing, as is currently seen in Europe. As a matter of fact, in Africa the trade in energy has grown considerably over the last 50 years. Moreover, in recent years a number of power pool authorities have been created with the explicit goal of further enhancing the trade of power between countries.

Surprisingly, to date there is no comprehensive study about the nature and determinants of current international trade in power within the African continent. In this paper we thus set out to investigate for a first time to econometrically investigate the nature and determinants of this neglected trade flow. In particular, we focus on investigating the role of climate change within this setting. More specifically, seen as a cheap power source may international donors as well as national governments have in appropriate areas within Africa heavily invested in hydro-power to generate electricity for national use as well as to be traded across countries. As a matter of fact, about 50% of all energy within Africa is sourced to hydropower. One of the problems with using hydropower as a source of electricity generation is of course that its primary input, water, will depend on the local weather at its source. In this regard Africa is well known to have relatively volatile and unpredictable weather, with frequent and long lasting droughts that can affect water flow in certain areas for years, but, importantly, is also geographically very variable. Here we specifically set out to estimate how such weather events affect the trade flows of energy between countries. To this end we create measures of the 'input' shocks into hydropower generation by using data on the location of major dams within Africa and rainfall of the areas feeding water into these dams via river networks. We then test the impact of a such 'shocks' on the imports and exports of energy across countries using , by using data from the UN energy database, which comprises a panel of energy trade flows at the national level. Factors that are likely to play a role are the extent to which a country uses hydro- versus other sources of power, participation in a power pool, and institutional features such good governance etc. Our results are likely to unearth a unique insight into how power is shared on the African continent.