# *POWER SECTOR REGULATION AND PRIVATE SECTOR PARTICIPATION IN AFRICA*

Alpha Ly, Université Paris Dauphine, +33753417911, alpha.ly@dauphine.eu
Raja Chakir, Université Paris-Saclay, +33632955420, raja.chakir@inrae.fr
Anna Cretì, Université Paris Dauphine, +33673235945, anna.creti@dauphine.psl.eu

## Overview

To address the challenges of access to electrification in Africa, most governments on the continent have opened up power generation to private actors, notably through independent power producers (IPPs) or public-private partnerships (PPPs). However, private participation in investments requires certain conditions, such as regulation of quality that guarantees a return on investment. However, the link between regulation in general and private participation is not clear enough in the literature. Indeed, a number of studies have shown the favourable role of sector regulation in the participation of private actors, such as Pargal (2003), Andres et al. (2007), Cubbin and Stern (2005), Cubbin and Stern (2006) and Gassner et al. (2009) in the case of developing countries; Wallsten (2002) in the case of the telecommunication sector; and Rubino and Cuomo (2015) in the specific case of electricity transmission lines. On the other hand, for some authors such as Parker and Kirkpatrick (2012), Bertoméu-Sánchez et al. (2018), Andrés et al. (2013), Carvalho et al. (2012) or Estache et al. (2010), there is growing uncertainty about the effectiveness of regulatory agencies in attracting private actors. These authors suggest that, in general, regulatory agencies do not guarantee a major improvement in private investment.

Given this difficulty in establishing a clear link between regulation and private sector participation in investment in general in the literature, we focus mainly on economic regulation and in particular the issue of pricing in the African power sector. Specifically, we analyse the impact of an increase of generation costs on private sector participation in power sector investment. In order to overcome the unavailability of data, we use two factors (inflation shocks and depreciation shocks), assumed to be exogenous, which influence generation costs. Our testable hypothesis is that, all other things being equal, any exogenous shock leading to an increase in generation costs naturally reduces the producer's margin, the profitability expected by private actors and therefore the incentive for them to invest in the sector.

## Methods

First, we adapt the theoretical framework of Nucci and Pozzolo (2001) in order to set the ideas on how an inflationary shock could give rise to an exchange rate shock (vicious circle inflation-depreciation), and then how these exchange rate fluctuations impact - negatively in the absence of a regulation of quality - the investment decision, especially of private actors in power generation. Then, we develop an empirical methodology that combines impact assessment (the doubly robust AIPW estimator) and Local Projections à la Jordà (2005) in order to capture the effect of inflationary and exchange rate crises on the evolution of installed capacity and power generation according to the characteristics of the power sector in different African countries (existence of an independent regulatory agency, application of standard norms in terms of pricing such as the reflexivity of generation costs, automatic tariff adjustment mechanism, etc). Our empirical model has been tested in a sample of 54 coutries in Africa over a period of 30 years (1990-2019).

## Results

Broadly, our main results show that the effects of inflationary and exchange rate crises on private participation (installed capacity and power generation) are mitigated for the group of countries that have established an independent power regulator compared to countries that have not yet done so. This mitigating effect is reinforced for countries whose regulator adopts a tariff adjustment mechanism and the reflexivity of generation costs for private operators in particular.

To illustrate, for countries with a regulatory agency in place, the cumulative loss in installed capacity over five years due to a currency crisis is 3.36% compared to 7.58% for countries without a regulatory agency in place. The loss is twice as great for the latter. When analysing the impact of an inflation crisis, the five-year loss in installed capacity is only 1.67% for countries with a regulatory agency in place, compared to 5.66% for countries without an independent regulatory agency. In terms of loss in power generation, a currency crisis results in a 1.24% loss over five years for countries that have established a regulatory agency, compared to a 5.29% loss for countries without an independent electricity regulator. As for the inflationary crisis, it only induces a loss of 2.35% of output over five

years for countries with a regulatory agency, compared to 12.01% for the unregulated sectors. We obtain the same trends when we focus on the implementation or not of an automatic tariff adjustment mechanism, or the adoption or not of generation cost reflexivity.

## Conclusions

The African authorities must ensure that domestic prices are kept under control. As we recalled with the hypothesis of the vicious circle of inflation and depreciation, a rise in domestic prices could lead to a depreciation of the national currency against the currencies of partners. This, as we have shown through our theoretical framework, could penalise private actors who import fixed capital (turbines, generators, etc.) and variable inputs such as fuel in their power generation process. If domestic prices cannot be controlled for structural reasons, the implementation of a fixed exchange rate regime could break this link between domestic price increases and local currency depreciation. In the extreme case where the country is facing important exogenous shocks, which makes the fixed exchange rate regime inappropriate, then for the proper continuation of the electrification programmes, the authorities must imperatively put in place independent regulatory agencies which in turn ensure that a proper tariff methodology is put in place in order to further incite the private actors to invest massively in the power sector in Africa and to connect the 600 million people still in the dark.

## References


Andres, L. A., Guasch, J. L., and Straub, S. (2007). Do regulation and institutional design matter for infrastructure sector performance? World Bank Policy Research Working Paper, (4378).

Andrés, L. A., Schwartz, J., and Guasch, J. L. (2013). Uncovering the drivers of utility performance: Lessons from Latin America and the Caribbean on the role of the private sector, regulation, and governance in the power, water, and telecommunication sectors. World Bank Publications.

Bertoméu-Sánchez, S., Camos, D., and Estache, A. (2018). Do economic regulatory agencies matter to private-sector involvement in water utilities in developing countries? Utilities policy, 50:153–163.

Carvalho, P., Marques, R. C., and Berg, S. (2012). A meta-regression analysis of benchmarking studies on water utilities market structure. Utilities Policy, 21:40–49.

Cubbin, J. and Stern, J. (2005). Regulatory effectiveness and the empirical impact of variations in regulatory governance: Electricity industry capacity and efficiency in developing countries, volume 3535. World Bank Publications.

Cubbin, J. and Stern, J. (2006). The impact of regulatory governance and privatization on electricity industry generation capacity in developing economies. The World Bank Economic Review, 20(1):115–141.

Estache, A., Baldwin, R., Cave, M., Lodge, M., et al. (2010). Regulation in developing economics: A survey of theory and evidence. Technical report, ULB–Universite Libre de Bruxelles.

Gassner, K., Popov, A. A., and Pushak, N. (2009). Does private sector participation improve performance in electricity and water distribution?, volume 6. World Bank Publications.

Jordà, Ò. (2005). Estimation and inference of impulse responses by local projections. American economic review, 95(1):161–182.

Jordà, Ò. and Taylor, A. M. (2016). The time for austerity: estimating the average treatment effect of fiscal policy. The Economic Journal, 126(590):219–255.

Nucci, F. and Pozzolo, A. F. (2001). Investment and the exchange rate: An analysis with firm-level panel data. European Economic Review, 45(2):259–283.

Pargal, S. (2003). Regulation and private sector participation in infrastructure. The limits of stabilization: infrastructure, public deficits, and growth in Latin America, pages 171–97.

Parker, D. and Kirkpatrick, C. (2012). Measuring regulatory performance. The economic impact.

Rubino, A. and Cuomo, M. (2015). A regulatory assessment of the electricity merchant transmission investment in eu. Energy Policy, 85:464–474.

Wallsten, S. (2002). Does sequencing matter? regulation and privatization in telecommunications reforms. Regulation and Privatization in Telecommunications Reforms (February 2002).