The Journal of Economic Asymmetries 12 (2015) 110–123

Contents lists available at ScienceDirect

The Journal of Economic Asymmetries

journal homepage: www.elsevier.com/locate/jeca

Electricity regulation and FDIs spillovers in the OECD: A panel data econometric approach

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A R T I C L E   I N F O

Article history:
Received 21 July 2014
Received in revised form
4 May 2015
Accepted 13 May 2015

JEL classifications:
L51
L1
L94
C2

Keywords:
Regulation
Foreign direct investments
Electricity sector
OECD countries

A B S T R A C T

The aim of this paper is to investigate the regulatory process in the electricity sector and determine the extent to which it has affected the level of Foreign Direct Investments (FDIs). For this purpose, we use an annual data set covering the period 1975–2010 and panel data econometric techniques. Our results suggest a feedback effect between electricity regulation and the attraction of FDIs in the OECD countries. This finding highlights the existence of a sound regulatory environment in the examined electricity sectors, implying that a liberalized and competitive electricity sector can be employed under specific settings by policy makers to attract FDIs. Further, we find a two-way Granger type causation between FDIs and effective regulation in the electricity sector, thus providing sufficient evidence that a proper regulatory environment is a prerequisite for increases in the level of FDIs.

1 Introduction

In the last few decades there is a wide spread movement to abolish electric monopolies and establish liberalized electricity markets with effective regulation (see for example Lesher & Miroudot, 2008; Sharma, 2005). Throughout the world, from the USA to China and from Australia to Mexico, there are strong initiatives to liberalize and properly regulate electricity markets in order inter alia to attract foreign direct investments (Borenstein & Bushnell, 2000; Zhang, 2012). A crucial role towards this change has played the expectations of various Governments that in this way they could enhance their electricity markets' performance through the attraction of FDIs in the field and the subsequent use of the FDIs' spillovers (Del Bo, 2013; Keller, 2004). However, despite expectations, there is no consensus that liberalized and regulated electricity markets can lead to increases in foreign direct investments' inflows and thus to more prosperous electricity markets regimes in the host countries (Lim, 2001; Moura & Forte, 2010; Shi & Kimura, 2010; Xuegong, Liyan, & Zheng, 2012).

Thus, despite the various empirical studies that have occasionally contributed in the topic through the use of various methods (see also Lim, 2001; Masayuki & Ivohasina, 2005; Moore, 1993; Singh & Kwang, 1995; Wafure & Nurudeen, 2010; Wheeler & Mody, 1992), it remains difficult to compare and determine results on the matter. In order to advance the field, this paper provides further insight about the potential links between effective regulation in the electricity sector and the level of FDIs.

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http://dx.doi.org/10.1016/j.jeca.2015.05.004

In order to address the problem and capture the complex phenomenon in the relationship between regulation in the electricity sector and the level of the FDIs, we empirically tested this relationship across 30 OECD countries for the period 1975–2010 by using panel data econometric techniques and cointegration analysis. To that end, we also use the regulatory reform index (RRI) for electricity sector provided by OECD as a proxy for the effectiveness of the regulatory environment. Further, unlike previous studies, we attempt to determine Granger type causation between the regulatory performance in the electricity sector and the investment activity.

The contribution of this paper is three-fold. First, it goes beyond the existing literature in that it uses cointegrated panel data analysis to assess the issue. Second, unlike previous studies, our analysis combines static and dynamic panel data econometric methodologies to test the robustness of our results. Third, but most important, the paper attempts to assess the relationship between the effective electricity regulation and the level of foreign direct investment activity in which rather scant attention has been paid in the past.

The rest of the paper is organized as follows. Section 2 reviews the empirical literature on the determinants of the FDIs' inflows. Section 3 describes the electricity regulatory framework in OECD countries. Section 4 presents the methodology used in our empirical analysis, while Section 5 reports the main empirical findings. Section 6 concludes the paper and provides some policy implications.

2 Review of the literature

During the last decades, various empirical studies suggested certain determinants of FDIs. These studies can be broadly classified into three categories regarding the following: (a) the type of data used (time series, cross-section, panel data), (b) the level of aggregation, and (c) the stage of transnational investment decision. The first category of those studies refers to the examination of the economic determinants of FDIs' inflows either at a micro or a macro-level with a special attention to the role of company taxation as one of the main determinants of the global FDIs flows (see for e.g. Bénassy-Quéré, Fontagné, & Lahrèche-Révil, 2005; Bénassy-Quéré, Gobalraja, & Trannoy, 2007; Devereux & Lockwood, 2006; Hajkova, Nicoletti, Vartia, & Yoo, 2006; Wolff, 2007).

As we noted above, part of the literature suggests that the taxation effect on FDIs is a rather controversial issue. An obvious hypothesis employed by such studies is that higher taxes discourage FDIs. However, some of the empirical studies highlighted that the last hypothesis may be also misleading (see for example Blonigen, Davies, Waddell, Glen, & Naughton, 2004; Bloningen, 2005; Desai, Foley, & Hines, 2004; Hallward-Dreimeier, 2003). As these studies indicate, the effects of taxes on FDIs can vary substantially by type of taxes, measurement of FDIs' activity, and tax treatment in the host and parent countries. For this reason, other empirical studies recently began to examine alternative related taxes beyond corporate income taxes. For example, Desai et al. (2004) find evidence that indirect business taxes have an effect on FDIs that is in the same range as corporate income taxes. Further, other scholars have recently examined the effect of bilateral international tax treaties on FDIs' activity, an issue which was also underexplored (Blonigen et al., 2004; Hallward-Dreimeier, 2003).

The second category of studies investigates the role of governance infrastructure of a host country as expressed by its political, institutional and legal environment (Altomonte, 2000; Bevan & Estrin, 2000; Globerman & Shapiro, 1999; Mody & Srinivasan, 1998; Morisset, 2000; Stevens, 2000; Tuman & Emmert, 1999). These studies utilize certain indicators to examine the effects of governance infrastructure on both FDIs' inflows and outflows for a broad sample of developed and developing countries. Along these lines it is suggested that governance infrastructure is an important determinant of both FDIs' inflows and outflows. Further, investments in governance infrastructure are considered not only able to attract capital, but also to create the conditions under which domestic multinational firms emerge and invest abroad. The majority of this category suggests that a country's economic performance over time is determined to a great extent by its political, institutional, and legal environment.

The last category of studies links the investment activity with the firm specific characteristics (i.e. R&D intensity, advertising intensity, managerial skills, etc.) that act as catalysts in attracting the FDIs' inflows (Blonigen, 1997; Dunning, 1993; Feenstra & Hanson, 2004; Kogut & Chang, 1991). This type of studies attempts to answer whether firm's characteristics, like certain technologies, managerial skills, and other intangible assets can be used as key drivers of the FDIs' activity.

Regarding the electricity sector there is limited research that examines the FDIs' effects. In particular, Jaraite and De Maria (2012) argue that FDIs' inflows of several EU countries are found to positively influence productivity in the electricity generation sector and enhance environmental efficiency. In another study, Lam and Shiu (2001) fail to find a significant effect of foreign presence on China's productivity in electricity generation. Lesher and Miroudot (2008) provide estimates of foreign spillovers and report the existence of positive vertical spillover effects in the aggregate sector of production and distribution of electricity, gas and steam, while also detecting negative and significant horizontal spillovers from foreign presence. In a recent study, Del Bo (2013) claims that regional FDIs' spillovers are different with respect to the analysis based on regional administrative boundaries. He suggests that spatial aggregation, along with industrial aggregation, is relevant in accounting for productivity spillover effects of foreign presence in the EU electricity sector.

To sum up, the literature on the determinants of FDIs is quite substantial, though arguably still in its infancy (Bloningen, 2005). A large body of literature examines how (exogenous) factors, such as taxes and exchange rates, affect the firm-level decisions to invest. A more recent body of literature attempts to frame such decisions in a general equilibrium framework