Pricing decisions and market power in the UK electricity market: A VECM approach

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ABSTRACT

This paper examines the influence of market power in the formation of retail and wholesale electricity prices in the UK over 1998–2012 on the basis of Vector Error Correction model (VECM). Market power is measured as the influence of the market share of the Big Six in a dynamic demand and supply VECM. The findings indicate that market power of the Big Six in the wholesale industry has a significant and large positive influence on the wholesale mark-up in the short-run. The long-run estimates support the arguments about ‘revenue rebalancing’ resulting from vertical integration. That is, low market power (and hence low revenues) in the wholesale industry leads to higher prices (hence higher revenues) in the retail industry. These findings are in contrast to the CMA's finding that no market power is exercised in the wholesale industry. Retail electricity prices are affected directly by both the wholesale and retail market concentration ratios in the long-run rather than indirectly through the wholesale mark-up. Overall, the findings in this paper provide support for the view that the UK electricity market exhibits significant anti-competitive conduct in both the retail and wholesale segments.

1. Introduction

The UK electricity market has gone through substantial changes since the late 1980s involving privatisation, changes in the wholesale market from the Pool to the NETA, introduction of retail competition and deregulation of prices for end users (Waddams-Price, 2005). While wholesale prices declined in the earlier years partly because of falling gas prices (Newbery and Pollitt, 1997), these gains could not be maintained in the long term. High prices in wholesale markets under the Pool led to the adoption of a bilateral contract system with the introduction of the NETA in 2001. However, this reform failed to deliver the low and stable prices that would be expected from a competitive market (Woo et al., 2003).

In more recent years there have been concerns about retail price increases, which instigated a probe in 2008 by Ofgem leading to a set of recommendations (Ofgem, 2013a). Despite these, the reported revenues, costs and profits of the large energy companies (British Gas, EDF Energy, E.ON UK, NPower, Scottish Power and SSE – collectively referred to as “The Big Six” continued to rise. Ofgem (2013b) showed that the earnings before interest and tax in the domestic supply market increased by 74.7% from 2011 to 2012. On the other hand, the wholesale electricity cost for the average household customer only saw a 2.3% increase in the same period (Ofgem, 2013c), suggesting that retail prices increased with a significantly greater pace than wholesale prices. The Big Six justified this on the grounds of rising in input (fuel) costs and investment requirements.

In March 2014 Ofgem referred the energy markets to the Competition and Market Authority (CMA). This investigation identified a number of areas in the supply of retail electricity and gas where the real problems lie. Firstly, the lack of switching or what is termed as ‘weak customer engagement’ is highlighted as the most significant shortcoming, giving the Big 6 a position to have unilateral market power. Secondly, the reforms introduced by Ofgem after 2011 are claimed to have weakened the competition in the sector. Thirdly, limited use of smart meters and lack of a settlement system based on more frequent readings, are considered to have adverse effects on competition in the sector. Finally, the existing financial reporting systems in the energy sector as a whole are found to be non-transparent, constraining decision making by regulators and policy-makers. The possibility of tacit coordination amongst suppliers is ruled out on the basis of lack of evidence. The profitability in the wholesale energy markets is not found to be a problem (CMA, 2016). A critical assessment of these findings from a policy perspective can be found in Amountzias et al. (2017).

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Consumer inertia is indeed an issue that emerges in several studies on retail electricity markets. For example, Giulietti et al. (2005) argue that an important source of market power acquisition in the retail industry relates to the significance of consumers’ decisions regarding switching suppliers. Lack of switching enhances the incumbent firms’ market power, and this is reflected in their prices. Among the studies that acknowledge and support this view are Defeulley (2009), Waddams-Price (2004) or Waddams Price and Wilson (2007).

Market structure is another major issue that has been explored by a multitude of researchers. Writing before any NETA effects could be observed, Macatangay (2001) offers a number of ways in which providers could abuse the framework and acquire greater marker power. The definition of market power in the electricity market is not necessarily the same across different studies. Karthikeyan et al. (2013) provide a comprehensive review of the various methodologies that have been used for studying market power. In an assessment of NETA, Giulietti et al. (2010b) provide empirical evidence showing that, rather than improving the competitiveness of the market, the shift to NETA ‘... merely rearranged where money was made in the system’ (p.1165). The data they provide are consistent with Toke’s theoretical argument that no drastic changes should be expected by the reforms in the electricity market (Toke, 2011).

This paper estimates the impact of market power on pricing decisions in the wholesale and retail segments of the UK electricity industry, employing a Vector Error Correction Model (VECM) of demand and supply over 1998–2012. The paper is organised as follows: Section 2 provides a discussion of the existing literature on the subject matter. Section 3 describes the model, the assumptions and the methodology we use to study pricing decisions in the retail and wholesale electricity sector in relation to the suppliers’ market power. Section 4 presents and discusses the results and Section 5 concludes by focusing on the policy implications of our findings.

2. Market power in the UK electricity industry

There is a consensus that market power was a major issue in the UK power market in the years following the privatisation and the implementation of the Pool. For example, Sweeting, (2001, 2007) compares the actual Pool prices with the estimated competitive prices and provides evidence of coordinated, tacit collusion by the generators in the second half of the 1990s. This claim is supported by a number of studies that arrive at the same conclusion using different methodologies (for instance, Wolfram, 1999, or Bunn and Martocchia, 2005). Green (2006) offers a comprehensive review of the problem of market power in the UK electricity industry from the privatisation and until the end of the Pool.

Generally, the literature on the UK power market has mainly considered three different factors in the analysis of prices:

a) prices of incumbents in comparison to other suppliers operating in the same area,

b) firm level or industry level price-cost margins

c) competitive pressure from the demand side; i.e. switching customers.

For example, Salies and Waddams-Price (2004) show that the incumbents charged between 4–13% more for credit and direct debit customers, despite the fact that they faced greater level of competition for these customers from the non-incumbents than for pre-paying customers. The difference for credit and direct debit customers is explained on the basis of the reluctance of some customers to switch to another supplier even if there are considerable gains. The pre-payment services, on the other hand, are more costly and subsidised, and the incumbents with larger market share are in better position to maintain these subsidies. Giulietti et al. (2010b) report similar findings about persistent advantage of the incumbents that allowed them to mark up prices by about 10% in comparison to non-incumbents, largely because of search costs.

Moreover, Salies (2008) tests the response of real tariffs to supply factors in the UK electricity industry over January 2004. Such factors refer to distribution and transmission costs, consumer density and the length of low voltage underground circuit. The model investigates the effect of ownership group through dummies on simulated electricity retail bills to capture the effect of market power through vertical integration. The findings suggest that the retail price of integrated suppliers vary according to the nature of integrated networks. Nevertheless, there is a significant negative effect on the price level when there is a change in the number of costumers and a positive effect of charges in rural areas.

Other studies indicate that the increases in retail prices might be reflecting a rebalancing of revenues, costs and profits across highly integrated retail and wholesale activities. For example, Olgem (2013d) hints at the possibility that the rising bills might be a way for the suppliers to make up for the quite dramatic decrease of the average margin (by about 50%) from 2011 to 2012 in the non-domestic market. Giulietti et al. (2010b) use price-cost margins to trace the developments in the pricing strategies of electricity companies. Their findings suggest that the shift to the bilateral contract system brought about the intended benefits of lower prices in the wholesale electricity market, but the decline in wholesale prices have been counterbalanced by rising retail prices and profit margins.

Research into retail electricity prices does not support the claim that increases in prices are solely accounted by cost factors. Instead, supply side factors, market domination and power might be considered to explain the price increases, along with a number of demand side factors (Otero and Waddams-Price, 2001). Despite the domination of the Big Six, the market has seen periods of entry and exits. For example, there was a phase when initial entrants into the retail market either exited or merged with other companies and as a result the share of the Big Six suppliers rose to 99% of the demand (Giulietti et al., 2010a). Other researchers viewed the growing tendency for vertical integration (or physical hedging) in the sector as a risk management strategy in an environment in which demand risks are high and there are limits to other potential hedging strategies (Finon and Boroumand, 2011). Interestingly, in the last few years, entry in the power sector has been growing again largely because of exemptions provided by the government although the share of the Big 6 still remains high (around 90%) (CMA, 2016).

More recent work by Boroumand (2015) concludes that retail competition is not satisfactory in the UK electricity industry because of its multimarket setting. This setting, in conjunction with vertical integration, promotes oligopolistic profits for the retail firms by utilising parallel pricing strategies. The author juxtaposes his analysis of the UK market with Norway's electricity industry which he uses as a benchmark for being very fragmented (about 150 suppliers in 2008) and much less concentrated than the UK (the largest 6 suppliers only account for 45–50% of the market share). Despite the example of Norway, it appears that market power in the electricity industry is a problem in most developed countries. Olsen et al. (2006) argue that the Swedish and Finnish retail markets are not performing as well as Norway's, mainly because of weak consumer engagement and market structure. With regards to EU countries, a report by the ECME Consortium (2010) asserts that there is limited price competition in the EU-27 countries (based on consumers’ ratings in these countries) and finds that Germany, Finland and the Netherlands are the member states with the highest level of price competition, and to a lesser extent Austria, Belgium, Ireland, Sweden and the UK. In Spain, the regulations that were introduced in 2006 in an attempt to mitigate the market power of the two main electricity producers (Endesa and Iberdrola) were only partly successful (Moutinho et al., 2014). Karthikeyan et al. (2013) include a review of market power in the electricity industry across a selection of countries.
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