Bulletin

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Taking away the electric shocks

UNDERSTANDING THE CYCLE IN POWER PRICES

Volatile commodity prices have long been observed and, in many sectors, accepted as a fact of life. Why then do episodes of high energy prices, such as we have experienced in 2005-06, make politicians so jittery? The characteristics of electricity and gas markets make them prone to cycles more pronounced, more local and seemingly more in need of intervention than other commodity markets. Should the urge to intervene be resisted?

UK electricity and gas prices rose sharply in the autumn of 2005, and have remained volatile since (as shown in figure 1). Investigations carried out by the regulator, the Office of Gas and Electricity Markets (Ofgem), have found no evidence of market abuse.

The UK is not unique. Other European countries have experienced high energy prices and suspected, but generally failed to establish, market abuse. So what's the explanation?

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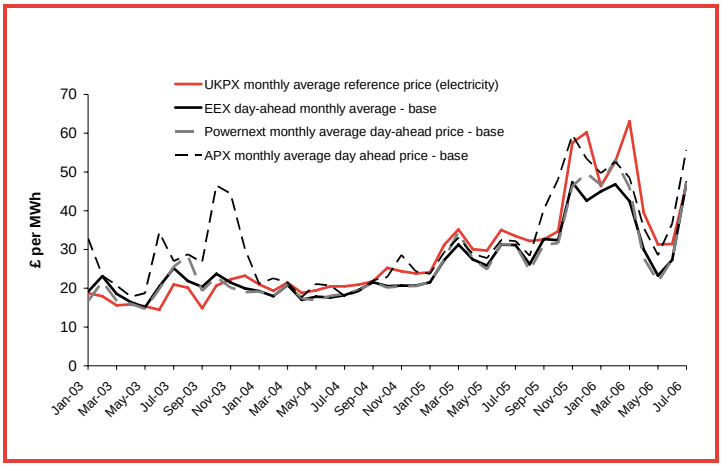

Figure 1: UK gas and electricity prices

Source: Argus Gas and McCloskey Power Focus

Commodities are, in general, homogenous goods for which the price is very sensitive to the balance between demand and supply. Typically, supply cannot adjust quickly to changes in price. On the demand side, commodities figure little in final consumption, being mainly inputs to the manufacture of other products. Often the effect of a commodity's price on the final product price is very small. This means that the demand for the commodity is typically very inelastic. Hence, even a small mismatch between demand and supply for the commodity can have a very big implication for its price.

These characteristics have implications for the shape of price cycles. In a competitive commodity market, prices will, on average, equate to the long-run marginal cost (LRMC) of supply. In the short term, if there is excess capacity, prices should approximate to the short-run marginal cost (SRMC) of supply.

When capacity is fully utilised, prices should rise to match demand to the supply available from that capacity. However, this will not give rise to a symmetric pattern – i.e., one with prices below and above LRMC for similar proportions of time. Inelastic demand implies that during periods when capacity is scarce, prices will tend to be very much higher than LRMC; whereas when there is excess capacity, prices will still have a floor of SRMC. For prices to average LRMC over a period of years, we should expect them to spend substantially more time below LRMC than above.

However, for the relatively short periods when prices do go high, they may be prone to go very high. What's more, long periods with prices below LRMC create expectations of a "normal" price level that make the high price episodes even more alarming.

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We can expect electricity and gas markets to exhibit these same commodity characteristics, although for only some of the same reasons. Like some commodities (for example, metals), but not all, electricity and gas are capital-intensive, with long lead times for additions to capacity. But unlike most commodities, electricity and gas are consumed directly by households: there is final as well as intermediate demand for them.

However, this does not mean that the price elasticity of demand for electricity and gas is much higher that for other commodities, at least in the short term. Nobody in the developed world is prepared to live in the dark just because electricity has become more expensive, and global warming has yet to leave us comfortable in winter without heat. Inflexible metering arrangements (of which more later) also damp down the responsiveness of domestic consumers to changes in price.

So on both the supply and demand side, energy markets contain the essential ingredients for marked price cycles. Moreover, some other characteristics of the electricity and gas industries may exacerbate these tendencies.

- Although the growth of liquefied natural gas (LNG) is beginning to globalise the gas market, at present most electricity and gas supply is location-specific. Other commodities are easier to transport long distances, smoothing out local supply/demand imbalances.
- Electricity is essentially impossible to store and gas storage options are still limited. Other commodities can be stored more easily and stocks act as a buffer, easing supply/demand mismatches.
- The volatility in electricity prices to be expected in a capital-intensive industry may be exacerbated by the sharp changes in the price of gas (as an input) and now also by the volatility in CO_2 costs (see Frontier bulletin *Money to burn*).
- Demand growth is typically slow. This will tend to lengthen price cycles and lead to longer periods of time in which consumers (and regulators) get used to prices beneath LRMC. Short memories will then find the episodes of high prices even more shocking.

It is also worth noting that regulators' laudable efforts to make wholesale energy markets more competitive may tend to make price swings worse. As a result of these efforts, prices are likely to be low for a greater proportion of the time; but this in turn means that, to average out at LRMC, they will have to shoot much higher.

TO INTERVENE OR NOT TO INTERVENE?

Other commodity price cycles are well understood and in general do not elicit a clamour for intervention. Why then do energy price movements cause such a political storm? The following are just some of the more obvious reasons for public sensitivity.

- **Unfamiliarity** – it is little more than a decade since Europe embarked on electricity and gas liberalisation. Before that, typically, supply was the responsibility of state-owned utilities concerned with supply security rather than efficiency and price competition. Sharp movements in price are therefore new and disturbing.
- **Suspicion of market abuse** – the geographical limitations of electricity markets, in particular, coupled with their history of dominant incumbents,

naturally raise the question as to whether high prices may have been caused by the exercise of market power.

- **Political sensitivity** - domestic consumers are voters and electricity and gas cost domestic consumers much more than any other commodity. No government can be indifferent to media coverage of pensioners suffering hypothermia because they cannot afford to heat their homes.
- **Local regulation** - no national government thinks it appropriate or even feasible to intervene in the world copper market. However, electricity and gas are nationally regulated, with implicit or explicit duties on the regulators to "protect the consumer".

If the temptation to intervene is obvious, is there an economic rationale? Any industry characterised by lumpy, indivisible investment and imperfect or non-existent forward markets will exhibit some form of market failure. However, establishing the existence of market failure does not prove that intervention is warranted. Interventions are unlikely to have perfect incentive properties and there will certainly be costs.

The fundamental question is whether liberalised markets are delivering the required capacity; the problem is that we do not know what capacity is required. Limitations in metering technology mean that the price that consumers face will frequently not be the true opportunity cost of power. Only real-time metering can solve this problem, using price to match demand and supply and give the right signals for capacity creation or destruction. Since this is unlikely to be available to a sufficient proportion of price-sensitive customers in the short term, either load shedding must be tolerated, or there must be intervention, to ensure more capacity is built than an otherwise well-functioning liberalised market will provide.

So policy-makers have a choice. They can be brave, pushing for a very competitive market and put up with a rougher ride than a more oligopolistic model would have provided; or try to intervene in a way that works with the grain of liberalisation, recognising that some of its benefits will be lost. A laissez-faire policy, coupled with some tolerance for oligopoly, may produce pretty similar results to well-designed intervention. Either approach is likely to require consumers to pay a slight premium for avoiding the worst of the price swings that a fiercely competitive market would be likely to produce.

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