REGULATION, COMPETITION AND PRICE FORMATION
IN THE UK GAS INDUSTRY

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1. Introduction

The price outcomes achieved by the UK gas industry since it was privatised in 1986 and subsequently liberalised over the ensuing years, have been a function of the interaction between regulation and competition: upstream and supply competition + regulation for the industrial/commercial ‘contract’ market and upstream competition + downstream regulation for the domestic ‘tariff’ market. However, simply making such a straightforward statement could be seen as almost revolutionary: interest in price outcomes has in general been subordinate to interest in the process of liberalisation and when price outcomes have been in the limelight they have been popularly ascribed to the success of privatisation and liberalisation, with an implicit message that competition and choice have been the engine of change. To our knowledge, there has been no comprehensive attempt to analyse the evolution of prices in the UK gas market since privatisation. Moreover, this is also uncharted academic territory from a theoretical point of view: how do regulation and competition combine in the formation of prices in an industry which, moving from upstream to downstream, has three distinct segments?

Figure 1 provides a broad overview of the price outcomes which will command our attention, expressed in real terms. Of course there is much which lies behind these broad brush trends which describe the average experience of the two main market segments, the industrial/commercial ‘contract’ market and the domestic ‘tariff’ market. However, two points may be borne in mind at this stage: (a) the decline in real domestic prices was modest and less than the decline in industrial/commercial prices (b) the decline in industrial prices saw two marked downward shifts, one between privatisation and about 1990 and the other in the mid-nineties.
2. Price Formation in the Contract Market

We should first of all distinguish the industrial/commercial ‘contract’ market from the domestic ‘tariff’ market. The latter only became completely free of economic regulation in April 2002, while the larger scale consumers in the former could all exercise choice of supplier by 1993. Moreover, the analysis is assisted by periodising to distinguish between the period when British Gas remained a vertically integrated monopoly and the period during which it was progressively ‘unbundled’ and the market liberalised. In this and subsequent sections we chose to use actual i.e. nominal price data, either because the distinction between nominal and real prices is irrelevant to the analysis (e.g. in analysing price differentials) and/or because where there are important implications for real prices these are clear from the nominal data (nominal prices actually falling). Using nominal prices also of course conveys information about what intermediate, wholesale and retail consumers have actually been paying for their gas.

2.1 Competition under Monopoly

During the period of competition under monopoly there was little in the way of ‘gas-on-gas’ competition, which began haltingly in 1989. Instead the source of competition to British Gas was supposed to come from other, potentially substitute fuels. This proved to be a flawed project leading quickly to referrals to the Office of Fair Trading and the Monopolies & Mergers Commission (in 1988 and 1993) and a conclusion that structural liberalisation was the cure for a privatised monopoly which had been found to have engaged in price discrimination between its customers. However, it could also be said that British Gas had clearly responded to the nature of the competition which it faced from potentially substitute fuels: most specifically it reinstated the price of heavy fuel oil as the main competition driver and clearly linked this price to the most vulnerable part of its market, that for interruptible gas (Figure 2).

![Figure 2: HEAVY FUEL OIL DRIVES GAS PRICES](source: MMC (1993))
This resulted in the first substantial downward shift in industrial gas prices, something which thereby had little to do with what was happening in the gas market *per se* and everything to do with the oil market.

2.1 Competition after Monopoly

The period after 1993 which saw the unbundling of British Gas, eventually into separate companies, also saw the single competition driver which had been a feature of the period immediately after privatisation replaced by four different competition drivers operating in what became a segmented market. The first of these was ‘forced competition’.

*Forced Competition*

Part of the structural liberalisation package which emerged out of the Monopolies & Mergers Commission report in 1993 was a ‘forcing’ of British Gas to reduce its share of the industrial/commercial (contract) market. The extent to which this happened is apparent from Figure 3.

![Figure 3: BRITISH GAS' LOSS OF MARKET SHARE 1990-1996](source: OFGAS Annual Competitive Market Review)
This dramatic change in the market place, which signalled the replacement of interfuel competition with ‘gas-on-gas’ competition, exercised a discernible closing effect on price differentials both between small consumers and the large and medium (Figure 4) and between firm and interruptible customers (Figure 5).

![Figure 5: FIRM AND INTERRUPTIBLE GAS PRICES TO MANUFACTURING](image)

Sources: DTI (2001) and DOE (various months)
Upstream Overproduction

The second downward shift in industrial gas prices which occurred between 1995 and 1997 was quite extraordinary. Some might have hailed this development as a triumph of the new competitive environment and indeed there was a sharp intensification of ‘gas-on-gas’ competition. But this was a symptom rather than the underlying cause – for the cause was rooted in a massive overproduction of gas in the North Sea, the development of which is charted in Figure 6.

The causes were, on the one hand, that production increased considerably as a result of (a) new fields coming on stream and (b) substantial amounts of associated gas seeking a market as a result of oil production increases in response to higher than expected oil prices in 1996. On the other hand, the increase in consumption slowed as a result of (a) continuing milder winter weather which held down domestic consumption and (b) delays in commissioning new gas-fired power generators (also no new gas-fired stations were contracted between 1993 and early 1995). Industry estimates of the surplus of gas supplies – defined as the surplus of annual contracted quantities over demand – were put at around 10 billion cubic metres per year during 1996 and 1997 (IEA 1998) compared with a total net production of 84.4 Bcm and 85.8 Bcm in those years. Both the base prices in new contracts and the spot prices of
short-term gas sales fell markedly under the downward pressure from the build-up of these surplus volumes.

Gas Prices paid by Gas-Fired Power Stations: A Special Case of Under and Over Exposure to the Market

Substantial increases in the demand for gas for power generation originated after 1991 as increasing numbers of CCGT power stations were commissioned. Figure 7 shows that the price for power station gas has occupied a special market segment: in contrast with the price of gas sold to the manufacturing sector which, as we have just observed, fell very sharply during 1996 and 1997, the price of gas sold to the power generation market, while behaving in a more volatile manner than the manufacturing sector gas price, on average did not fall and remained largely unchanged between 1994 and 1999.

The behaviour of the power market gas price is explained by the coincidence of two separate factors: on the one hand, as a result of the first ‘dash for gas’ (1990-93) generators signed long term contracts (up to 15 years) with British Gas and other upstream producers which locked them in to quite high prices (encouraged by the risk-free environment for new entrant gas generators created by the design of the liberalised UK electricity market – see Wright and Thomas (2001)). In contrast manufacturing industry generally bought gas under short term contracts. However since power generators have had to resort to
the spot market more frequently than the manufacturing sector "average gas prices to power generators, which include an element of spot purchases, have been more volatile." (IEA 1998).

The Development of Spot and Futures Markets 1997-2001

The fourth competition driver to emerge as a result of the impact of increasing liberalisation was spot and futures markets. Following the establishment of the Network Code in 1996 and the introduction of the New Gas Trading Arrangements in 1999 the scene was set for the emergence of wholesale spot and futures gas markets in which prices were determined by suppliers seeking to balance their daily inputs and off-takes from the system, and where traders emerged to buy and sell both physical and ‘paper’ gas. However, the majority of natural gas continued to be traded under contracts, such that it was only up to 30% of the market which was affected by this development, about 20% serviced by spot trading with about another 10% traded under spot-related contracts (estimate by PH Energy).

Figure 8 shows that the evolution of the monthly spot price (Heren Index) up until the end of 2001 first of all fell into a seasonality pattern and then rose sharply upwards during 2000, quickly feeding its way into contract prices. This unexpected break in the seasonality pattern prompted the UK Government to commission an investigation by the consultancy firm ILEX Energy. This concluded that the opening of the Interconnector Pipeline in October 1998 from Bacton to Zeebrugge had linked the UK’s gas industry to the much larger European market where gas prices were indexed to oil, and as the oil price increased during the first half of 1999, it pulled European gas prices up with it, eventually to the point where it became possible for UK Gas suppliers to enjoy arbitrage profits by diverting supplies to the
European market (ILEX 2001, pp.17-20). At this point UK spot prices began to equate to Continental prices (minus the Interconnector transportation charge) which then influenced UK short-term contract prices both directly and indirectly. Once again the gas market was shown not to be independent of the oil market.

2.2 The Role of Regulated Costs in Price Formation

If the preceding sections have established apparently plausible links between various competition drivers and price formation both in the industrial market in general, and in particular segments of it, they did not bring the role of regulation into play. Most importantly, did regulated transportation costs, which have been estimated as accounting for between a quarter and a third of final price (OFGAS 1996a, Vol 1 p.9), have any influence on price outcomes? An a priori answer to this question would be no - because suppliers in the liberalising industrial market could not engage in ‘cost plus’ pricing. Indeed, British Gas admitted to the Monopolies & Mergers Commission as early as 1988 that even ‘Competition under Monopoly’ was incompatible with cost plus pricing (MMC 1988, p.70). However, it should also be borne in mind a. that, being fixed by the Regulator, suppliers were not able to exercise independent pressure on transportation charges, and would therefore seek to pass them through to final consumers and b. transportation charges might passively accommodate changes in supply prices which might otherwise not have happened.

In the case of Transportation prices charged by Transco to gas shippers and suppliers, there is no official data series. In any case we would expect these to be fairly close to the regulated maximum average unit revenues mandated by OFGEM. However it has been possible to calculate average unit revenues from transportation and storage for Transco between 1994 and 2000, using the Annual Reports of British Gas plc, BG plc and Lattice Group plc.

Both this series and an estimate of Centrica’s transportation cost (higher than the Transco figure because...
of the preponderance of higher cost retail customers among Centrica’s customers) in Figure 9 show a progressive decline as the Regulator began to exercise increasing pressure on Transco. Coupling this information with the behaviour of the margin over beach prices (Figure 10), we can draw a conclusion. The disappearance or virtual disappearance of the gross industrial margin after 1995, even though transportation charges were declining, strongly implies that regulated costs and indeed costs in general had no influence over the behaviour of prices in the industrial/commercial market.

3. Price Formation in the Tariff (Domestic) Market

3.1 Regulation

The general trends in domestic tariffs during the period between 1986 and the present day has largely been a function of regulation, not just with respect to transportation and supply costs, but also with respect to upstream gas costs. While it is true that all domestic gas consumers have been free to choose their supplier since June 1998, tariffs were still capped for all domestic consumers until April 2000. Thereafter, they were still capped for non-Direct Debit customers until April 2001 (for ‘PromptPay’, ‘Standard’ and ‘Prepayment’ customers – some 9 million customers in total, compared with 5 million Direct Debit customers) and differentials were then frozen until April 2002. Before engaging with the data,

1 The official beach price series published by the Department of Trade & Industry doesn’t accurately reflect the gas cost to all suppliers and is therefore only used to indicate trends. This is apparent from the fact that the industrial supply price appears to actually fall below gas cost between 1996 and 1998.
it therefore seems sensible to remind ourselves of the changes in the regulatory regime as far as it affected the franchise market (Figure 11).

<table>
<thead>
<tr>
<th>REGULATORY PERIOD</th>
<th>GAS COST</th>
<th>TRANSPORTATION</th>
<th>SUPPLY</th>
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<tr>
<td>1987-1992</td>
<td>Pass-through</td>
<td></td>
<td>X = minus 2</td>
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<tr>
<td>1994-1997</td>
<td>Capped Pass-through</td>
<td>X = minus 5</td>
<td>X = minus 4</td>
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<tr>
<td>1997-2002</td>
<td>Pass-through with</td>
<td></td>
<td>X = minus 5</td>
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<td></td>
<td>economic purchasing</td>
<td></td>
<td>(from April 1998) applied to a split (50/50) revenue cap/volume-driven cap; base-year P = minus 21; Storage unbundled under separate regime</td>
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<tr>
<td></td>
<td>test until 2000; Capped</td>
<td></td>
<td>X = minus 5 (tariff cap on British Gas only) until 2000; X = minus 4.5 (tariff cap on non-Direct Debit customers only) until April 2001; capped differentials until April 2002</td>
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</tbody>
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From this summary it appears relatively straightforward to link most of the broad changes we have seen in overall domestic gas prices (Figure 11) to the various regulatory changes, also taking account the introduction of indirect tax (VAT) on gas. Figure 12 is designed to assist in clarifying these relationships. Between 1987 and 1991, prices rose under a relatively weak regulatory regime, while the disturbances in the regulatory relationship between the Retail Price Index and gas prices mainly reflected the unrestricted pass-through of gas costs which was permitted during this period. For example, in 1991, when gas prices actually rose faster than inflation, there had been a sharp increase in the beach price of gas from 0.511 p/KWh to 0.561 p/KWh (c.10% -Department of Trade & Industry). In 1993 we can observe the impact of the introduction of a much higher X factor, followed in 1994 by the once-and-for-all impact of the introduction of VAT at 8% in the second quarter of that year - plus that of the reduction in the X factor from minus 5 to minus 4 for the Supply business following the recommendations of the Monopolies & Mergers Commission in 1993. In the last quarter of 1997, VAT was reduced to 5% and then in 1998 we can clearly observe the sharp impact of the dramatic base-year P reduction applied to Transportation following the Monopolies & Mergers Commission Report in 1997. In 2000, we can surmise that the combined impact of an imposed 4.5% tariff reduction for non-Direct Debit customers plus the impact of growing supply competition for Direct Debit customers was reducing prices.
3.2 Competition

While supply competition only began to impact on price formation in the domestic market at the very end of the period under consideration, we can still offer some observations about the way in which the incipient retail competition has been developing in the gas market: about customer ‘switching’, industrial structure and about the costs of competition.

**Customer Switching**

The latest figures from OFGEM, for March 2003 (OFGEM 2003), show that despite the almost five years during which retail gas consumers have been able to exercise choice over their gas supplier, 63% of them have remained with or gone back to British Gas (Centrica). Moreover, very recently Energywatch, the energy consumers’ ‘watchdog’ warned that energy market competition is “in danger of failing” because of a sharp fall in the rate at which households are switching from their original electricity and gas suppliers (Financial Times, 16/6/2003). If to this we add the fact that when customers are switching away from the former incumbent in the gas market, more often than not this will to a former incumbent in the electricity market – and *vice versa*. For example British Gas may have lost 37% of its domestic customers for gas, but it has simultaneously gained a 22% share in the domestic electricity market (OFGEM 2002a, p.5) which represents 60% of the new entrant market share in the market for retail electricity.
Industrial Structure

This last point, involving as it does the horizontal integration of incumbent gas and electricity suppliers into each others’ markets, raises the question of the emerging industrial structure in the gas market and how compatible this appears to be with the goal of developing competition. Figure 13 provides a recent snapshot of what has been happening to the industrial structure of both domestic gas and domestic electricity suppliers.

<table>
<thead>
<tr>
<th>Figure 13: DOMESTIC GAS AND ELECTRICITY SUPPLIERS IN BRITAIN 2003</th>
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<tbody>
<tr>
<td>GAS</td>
</tr>
<tr>
<td>SEMPRA ENERGY (Atlantic Electric &amp; Gas Ltd)</td>
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<tr>
<td>CENTRICA (British Gas, Scottish Gas)</td>
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<tr>
<td>CAMBRIDGE GAS &amp; ELECTRICITY COMPANY</td>
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<td>COUNTRYWIDE GAS</td>
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<td>CROWN ENERGY</td>
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<td>ELECTRICITE DE FRANCE</td>
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<td>EON (Powergen,TXU)</td>
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<td>GAS SUPPLY COMPANY</td>
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<td>NORTH WALES ENERGY / ENERGY SUPPLIES</td>
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<td>RWE (Innogy Holdings: npower)</td>
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<td>SCOTTISH &amp; SOUTHERN ENERGY</td>
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<td>SCOTTISH POWER</td>
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<td>TELECOM PLUS plc</td>
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It shows, first of all, that once the apparently much larger number of gas and electricity suppliers have been traced back to their parent companies, the industrial structure in both markets is highly concentrated and, moreover, horizontal integration between the two markets means that they are both dominated by just six suppliers. In addition, the companies highlighted in black are those companies which are also owners of electricity generation assets and are therefore vertically as well as horizontally integrated in the electricity market. The same six companies are involved with British Gas (Centrica), for example, owning around 1.7GW of generating capacity (OFGEM 2002a, p.4). In the gas market, Centrica is also vertically integrated with the upstream as the owner of the Morecombe Bay gas fields and, most recently, through the purchase of the UK’s largest gas storage facility (the Rough depleted reservoir).

The anti-competitive nature of this emerging industrial structure has already provoked controversy in both gas and electricity markets. In the gas market, February 2003 saw Energywatch condemned the increase in Centrica’s profits from £19million in 2001 to £218million in 2002, an increase which it claimed was due
to the 10% increase in prices by Centrica’s British Gas business. “Unfortunately, the two-thirds of consumers who get their gas supplied by British Gas have suffered price increases to generate these profits” (Energywatch 2003). In the electricity market, a National Audit Office report was highly critical of the fact that the now vertically-reintegrated electricity generator/suppliers had not been passing on the substantial reductions in wholesale electricity prices achieved under the New Electricity Trading Arrangements (NETA) to domestic consumers (National Audit Office 2003, p.3).

The Cost of Competition: Supply Costs Rise as Regulated Costs Fall

The available evidence, both direct and indirect, suggests that the introduction of supply competition has raised supply costs. The direct evidence comes from OFGAS and OFGEM: in 1995, before the introduction of supply competition, OFGAS (1995, Vol 1, p.9) estimated the supply margin at 10%. while by 2002 a new estimate (OFGEM 2002b) showed that it had risen to 17%. Moreover, this is not in any way surprising given that the average cost of ‘winning’ a new gas customer was estimated at £200 in 1997 (Financial Times 2/6/97) - which, using a 10% discount rate and assuming that suppliers would wish to recoup it over 5 years would have represented 16% of the final price of gas to a domestic consumer in 1997.

In addition to this direct evidence associating supply competition with increasing costs, we can also draw indirect evidence from Figures 9 and 10 above. Figure 9 shows declining transportation charges, with those for Centrica showing that the domestic market should also have benefitted from this. On the other hand, Figure 10 shows that the margin over beach prices for the domestic market actually increased between 1996 and 1999. This in turn implies that the reduction in transportation costs which the regulator was bringing about were not being passed on to consumers, but rather absorbed by supply costs and profits. It also means that supply competition created an illusion that it was reducing final prices when in fact the source was the Regulator and suppliers were actually taking some of the potential benefits away from consumers.

4. Conclusions

Two broad conclusions may now be drawn. First of all, in the industrial contract market, it was not liberalisation per se which delivered price reductions for industrial and commercial consumers. Rather, immediately after privatisation, gas prices were driven by a sharply reducing oil price. Subsequently, in the mid-nineties, it was overproduction of gas in the UK North Sea which drove prices downwards. Secondly, in the domestic market, it was the impact of tightening regulation of transportation charges plus the behaviour of upstream gas prices which produced price reductions for consumers. In contrast, the impact of downstream supply competition raised the proportion of final price represented by supply costs.
The overall outcome is shown to be a market which has become increasingly reliant on domestic margins as margins in the industrial market were either sharply reduced or disappeared altogether.

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