Technical paper

Sustainability first

Energy supply prices – issues and solutions

This Technical paper is a very welcome expert contribution and 'explainer' from Dr Chris Harris. It sets out basic economic considerations in energy supplier hedging and discusses how these may interact with energy volumes, wholesale prices and the price-cap in a period of major uncertainty. Chris raises important and urgent questions about our near-term readiness and resilience for a cold winter and he stresses the short and longer-term imperative for energy saving. We hope this piece will be of help to policy and regulatory colleagues currently wrestling with how best to address the energy price-shock to customers in ways that are fundamentally fair and sustainable for customers and market actors alike.

Background

Global gas prices have increased significantly, with a knock on to electricity prices. At the same time, in Great Britain, we have the issue of energy suppliers exiting in default. This incurs the associated problem of socialisation of the defaulted debts and obligations, and the need to find suppliers to take on the service of the customers of failed suppliers. Affected by both of these we have the effects of the energy tariff caps in gas and power. Finally, we have the ongoing challenges of fuel poverty and the urgent need to decarbonise. All these come together and there is a maelstrom of opinion surrounding this.

What is happening to wholesale prices?

Virtually all energy events can be characterised in similar terms, as being a dominant central event in an energy system somewhat sensitised by a number of independent supply chain events. The current crisis is no exception, with the dominant central cause being "increased global demand for energy at large, and gas in particular, linked to the recovery[1]".

We can view the price effects in terms of the standard economics of supply and demand. This is shown in the figure. This shows a single energy "vector" of gas.

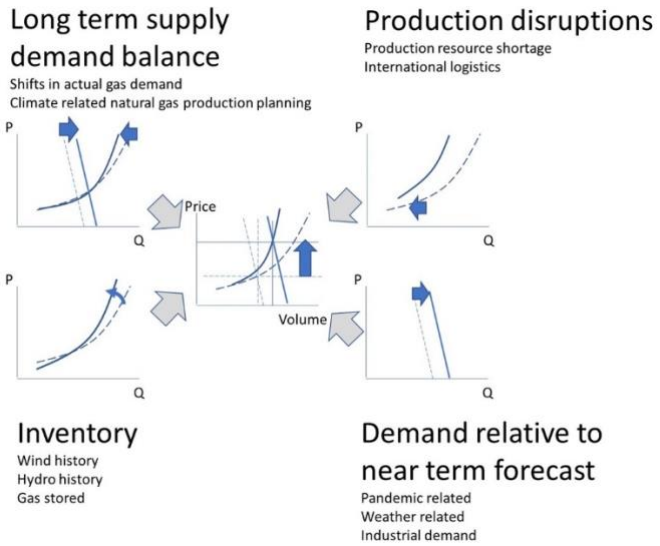


Figure 1 Viewing the gas price rise through the standard economics of supply and demand

Electricity is very closely connected due largely to the role of gas fired power generation.

A very important point from the UK perspective is that current and projected winter demands for gas are not high. If we have a cold winter, the system is highly exposed to further price excursions. Indeed, thinking about this is the key driver for this paper. Energy saving can ameliorate the crisis even in a normal winter. In a cold winter it would be essential.

The tariff caps and supplier hedge costs

Suppliers must buy the energy that they sell. To reduce their risks, they do this not just by buying hand-to-mouth in the spot market but at fixed price for future delivery in the forward markets. This is called hedging.

The figure on the next page shows the hedge basics for energy supply, (much!) simplified[2] for illustration, not showing the multiple adjustments applied in practice. In (A) we see the standard supplier hedge for Standard Variable Tariff (no end date, with periodic changes to the rate) in circumstances without the cap. The focal point of an 18-month duration was generally optimal for both

[1] EU commission 13 Oct 2021 Commission Communication on Energy Prices

[2] Some of the simplifications are; (A) normal market conditions, (B) ignoring the risk of customer departure and the "rollover" risk after contract end, (C) ignoring the prior period hedge and the terminal hedge for 6 months after the end of the cap, and assuming certainty of the existence of the cap to the end of 2023 at least

suppliers and consumers and was published by Ofgem as a reference average. In (B) we see a Fixed Term Contract, so the supplier hedges 100% of the FTC volume until the end of the contract. In (C) we have the hedge for the next cap period, before the beginning of the observation period defined by Ofgem. In (D) we see the development of the hedge as we pass through the observation period. By the end of the period, we are 100% hedged for the next cap period.

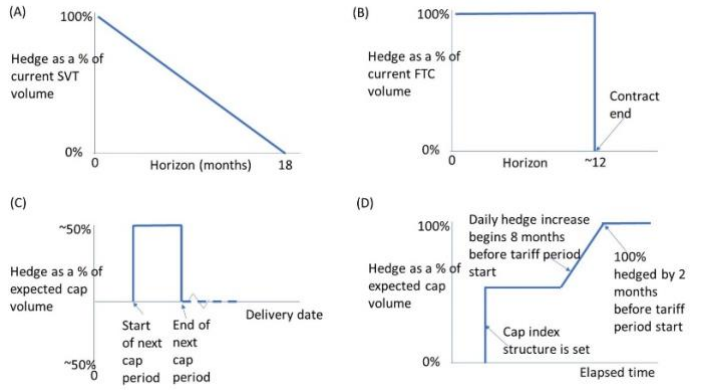


Figure 2 Schematics of hedging. (A) normal SVT, (B) normal FTC, (C) next cap before observation period begins, (D) daily cap hedge increase during observation period

So far so good! With certainty of volume and the (far) end date of the cap and ignoring "details" that are actually very important, suppliers can in theory hedge their risk.

Neither hedging nor indexation change the *average* amount paid by consumers over time, but they *smooth* the price changes. There are six factors that smooth the changes for consumers. These are; i) early start of observation period of the market price of the forward reference contract, ii) long duration of observation period, iii) long period between cap resets, iv) long period between the middle of the cap period and the forward reference contract, v) long reference contract and vi) whole year (i.e. four season) reference contract.

For each of these there is a balance. Any lengthening of a period or increased lag increases the differential between the administered reference price (the cap index) and the prevailing spot wholesale price at the time of supply. The larger and more sustained the differential, the greater the arbitrage relative to the competitive price based on prevailing wholesale rates. This arbitrage distorts the market. Where the cap is cheaper, competition is undermined. Where the prevailing wholesale market is cheaper than the cap index, competitive tariffs can take advantage of this, but the products are sophisticated, more amenable for consumers with more choice resources, and hence can have an overall regressive effect. The secondary consideration of balance is the degree to which consumers should be "protected" from market volatility (with no protection on *average* price paid) or enfranchised by the ability to participate in the opportunities of a volatile wholesale market.

Looking back at the wholesale and cap evolution, whilst it is easy with the benefit of hindsight to pick apart any of the six elements, it seems that overall, they acted broadly as intended. Changing the index time formulae cannot change the past or bring money into the energy complex, and there would be a great deal of risk in doing so.

However, there has arisen a risk that was broadly considered in the cap consultations but turned out far above what was anticipated in the final cap decision. This risk is **volume risk**.

There are three main standard elements to volume risk; i) national demand (mainly pandemic and weather), ii) internal switching between FTC and SVT, iii) switching between suppliers. This risk is particularly pernicious to suppliers because it is a "convex" risk that cannot be hedged in the forward markets. This convexity arises from the correlation between price and volume. If volume rises, then suppliers must buy more at higher prices and if volume falls then suppliers must sell hedges back at a loss. This effect was recognised in the cap consultation but only factored into the cap level to a limited degree.

Other volume risks barely featured at all in the consultation. For example; i) the duty to offer terms to new customers, ii) the risk for end of FTC term, in circumstances where the cap falls below hedgeable FTC prices, iii) moral hazard causing under-hedge of individual suppliers and the supply market overall, iv) the energy position of the Supplier of Last Resort, v) the effect of uncertainty of the cap end date.

When we put all these risks together, even the "basic" cap hedge volumes become highly uncertain. In general, the higher the uncertainty, the lesser the optimal hedge for a supplier.

The next figure is a *highly* schematic representation of some of the volume issues. In (A) we see a normal position of a supplier with stable supply volume and approximately half of customers on SVT and half on FTC. In (B) we see the hedge sensitivity to the level of the cap. A high cap does not "bite" and hence the capped volume hedge is just an SVT hedge. A medium level cap is hedged much like an FTC.

With a very low-level cap, the FTC customers will not leave or roll to a new FTC, and new customers may arrive with suppliers' duty to offer terms[3]. We can see that the hedge in theory can exceed the current supply volume. (C) represents the theoretical hedge for a very low cap (there are a number of reasons why this may not happen in practice). (D) shows the overall outcome – an aggregate hedge shortfall in the market, and therefore national high exposure to wholesale price rises.

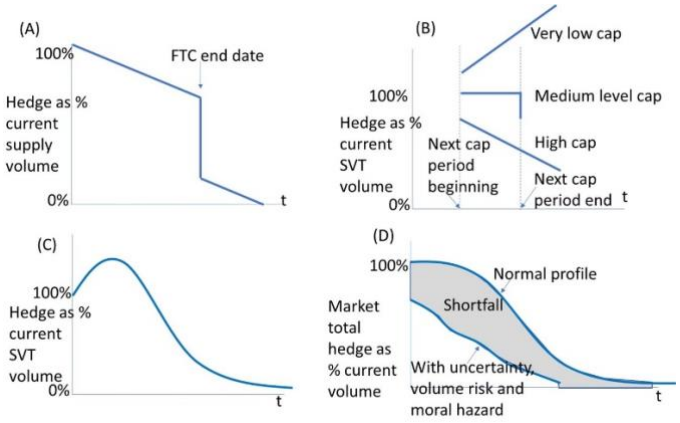


Figure 3 Schematic representation of volume risks. (A) simplified normal situation, (B) relationship between cap level and theoretical hedge volume, (C) theoretical supplier hedge in excess of supplied volume, (D) market hedge shortfall

The volume problem has become Pandora's box. Further articulation of the problem and cap solution are not covered here but indication of the size of the problem does lead directly to a policy requirement for cold winter planning.

Whilst we are looking at wholesale prices we need first to see if there is a pot of gold to claim for the purpose of alleviating consumer hardship.

Where has the money gone and what are the risks?

Since consumers are paying more, it is natural to ask who is making more.

In the next figure for global supply and demand, we see the two extremes. If all producers hedged, and this was done with consumers (via suppliers), then there are no supranormal producer profits and consumers only paid extra on the extra demand volume at the margin.

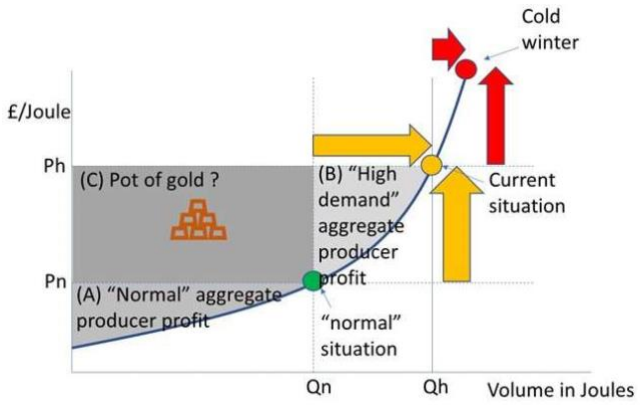


Figure 4 How much producers made, and is lost to suppliers/consumers, depends on what was unhedged (C). Further small volume increase (in red) would cause a large price increase and is not generally hedged

Conversely, if no one hedged, then all producers make more (the pot of gold in region C in the figure) and all consumption pays more.

In addition to the intermediating role of suppliers, there are traders intermediating between producers and suppliers. It may well be that producers sold to traders and traders maintained "long" market positions which they eventually sell at higher prices. Whilst we may assume that enforcement authorities will investigate and may pursue claims where market abuse is proven, this is a parallel activity with an outcome that is long term and uncertain. It should not distract us when considering policy.

Being seen to hunt for this money is naturally a political imperative, in each country and in the EU. However, any implied claim that market forces (and basic supply demand economics) can be controlled, is actively unhelpful because it actively discourages real solutions such as energy saving.

Energy saving

In figure 4, the red arrows show that a small increase in consumption can cause a large increase in price. If the forecasted consumption is unhedged, then the price increase applies to the whole of the consumption. It is easy to see how a 10% increase in consumption can cause a 100% increase in the energy cost. The reverse is also the case - if weather driven demand increase is offset by energy saving, the effect is avoided. Hence the criticality of energy saving.

[3] Suppliers only have to offer one tariff and that need not be evergreen but the gained FTC contracts may roll on to capped SVT and there may be some circumstances where contracts are deemed and thence capped.

It is hardly news that energy saving has always been a cornerstone of energy policy. It is hardly news that improvement of the thermal properties of buildings is the critical enabler to a more efficient energy complex, or that it is the solution to fuel poverty. The suggested fiscal and regulatory incentive solutions, and the funding for energy efficiency solutions, are also not new.

But for at least thirty years, a bolder conversation on in-home energy conservation has been a political no-go territory. Time and again there has not been the perceived urgency to get difficult messages delivered, and electorally challenging policies over the line.

Financial support for energy bills is a fiscal challenge, whether funded by consumers or taxpayers. The Treasury Net Zero Review is clear about the levers that government has, including "compel" energy efficiency. The Review notes the need for "clear, credible and consistent public direction".

At this point, the link has not been clearly and consistently made between energy efficiency, amelioration of the crisis, and fiscal resolution of the regressive outcome of the crisis.

This time we should not waste the urgency of the crisis. There is no other solution than energy saving to the combined problem of an underhedged national position, the wholesale price risk to a cold winter, and the fuel poverty effects of simply not resolving the crisis and spreading the cost of it over many years (passing it on from current to future consumers).

We need public discourse, constructive media engagement, and cross-party support for the public discussion in the political no-go territory on indoor clothing, heating selected rooms, thermostat reduction for the healthy, civic responsibility of the able-to-pay, firmer messaging on the need to insulate, fiscal incentives (stamp duty, council tax etc.), regulatory incentives (planning permission, building regulations, further landlord requirements, etc.).

There is also a more delicate discussion to be had on connecting receipt of benefits to the responsibility to insulate. Conditioning the receipt of benefits such as the Winter Fuel Payment to getting owner occupied properties insulated goes too far but there are ways to make a stronger link, for example via taxation, and/or following the "lead" of receipt of benefits to the encouragement to insulate.

Solutions: short-term

The most important thing in the short term is to face the facts and to focus. The more we are distracted by looking in the wrong places the less time we spend on looking in the right place. Similarly, vituperative statements ("incompetent" etc.) and irresponsible rhetoric ("rip off" etc.), occlude the facts and prevent the constructive dialogue that we all need. We are all in this together and we need urgently to change the tone of debate.

The short-term risk can be expressed in one word "volume" and the key element of the short-term solution can be expressed in two words "energy saving".

Addressing the individual supplier and aggregate national hedge position and resolving the immediate volume risk to suppliers are very important. Ofgem faces significant challenges in addressing these. These are not covered here – our focus here is in reducing the size of the problem.

Solutions: medium-term

The cap structure and level are entering consultation. The debate will be long and complicated and is not pre-empted here. What is worth saying is that volume risk will undoubtedly feature, both with an ex-post view of what was right at the time and ex ante given the new circumstances. Re-indexation will no doubt also feature but there will be no silver bullet, and any change brings significant risk.

We cannot change the past, and the insulation supply chain can only gear up so fast even if we do manage to achieve a step change in uptake. Households are already struggling even at the current cap level (and those on FTC will experience step changes in tariff when the FTC ends.). Money for consumer support will be needed this winter, but it is important to note that the tariff effects are mainly felt from April 2022 and are likely to sustain for years via smearing the costs forward, possibly via distribution charge uplift levies. There are extra government receipts (VAT, carbon tax) that could be hypothecated, especially noting that both of these are somewhat regressive. However, the carbon tax only sustains for the period of high retail prices and high wholesale prices with fossil plant running, As the Committee on Fuel Poverty has noted, targeting fuel cost benefits is already inadequate, so there is a significant identification challenge.

By delaying the flow through of wholesale prices to retail prices, the effect of price elasticity of demand in reducing

prices increases is thwarted. Indeed, what elasticity there is, acts in the "wrong" period, when retail prices remain high after wholesale prices have fallen. Whilst price elasticity of affluent demand is generally regarded positively, there is very little consensus in relation to citizens on low incomes. What is agreed is that increases in the cost of energy have a disproportionate welfare effect on these citizens. Whilst it may be ideal to use price as a demand lever for the affluent, whilst avoiding it for low-income consumers, this bifurcation is in practice very hard to achieve. Therefore, price driven demand response is largely "off the table" in alleviating the current crisis.

Solutions: long-term

By resolving the short-term, we improve the long-term. Resolving fuel poverty is on the critical path to the transition to the Net Zero Society, and insulation enables the demand side response that enables Variable Renewable Energy. VRE has the double benefit of decarbonisation and reduced exposure to global energy resources and prices.

Over the long term, there seem to be two other main requirements. The first is to deal with the aftermath of necessary expedient policy measures that have been and will be required in 2021 and 2022. For example, legislative normalisation of the Supplier of Last Resort process, review the "too big to fail" Special Administration process if it had to be used, redistributing the falling of the cost of any levies spent on short term support for consumer bills. The second is to revisit the regulatory priorities. The twenty-year intervention and response cycle on two tier tariffs and customer switching has been unsatisfactory. The focus must change and the transition to the Net Zero Society with 'No One Left Behind' must now take precedence. This will require swifter movement on the development of the Supplier Hub market arrangements and working up new solutions for Universal Service which continues to erode.

Conclusions

This is not a short-term problem, and it will not go away. The principal solution is energy saving.

Don't get distracted by non-solutions on cap indexation and the search for the pot of gold to reclaim from the private sector.

Use the crisis to drive the bold discussions on home heating and insulation and gain cross party support to prevent politicisation.

Have plans for very cold weather; a "1 in 5" year and a "1 in 20" average temperature cold winter.

The volume risk issue needs urgent attention.

This paper was written by Chris Harris. Dr. Harris is an Executive Fellow at London Business School. He was previously head of regulation at npower. The views are his own.

Sustainability First is a think tank and charity focused on developing practical approaches to promote social, environmental, and economic wellbeing in essential services.

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