Energy market investigation

Cost pass-through

23 February 2015

This is one of a series of consultative working papers which will be published during the course of the investigation. This paper should be read alongside the updated issues statement and the other working papers which accompany it. These papers do not form the inquiry group's provisional findings. The group is carrying forward its information-gathering and analysis work and will proceed to prepare its provisional findings, which are currently scheduled for publication in May 2015, taking into consideration responses to the consultation on the updated issues statement and the working papers. Parties wishing to comment on this paper should send their comments to energymarket@cma.gsi.gov.uk by 18 March 2015.

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Descriptive analysis of the evolution of retail prices and costs (cost pass-through)

Introduction

- This presentation summarises graphically the data we have collected to date on price and cost changes in the domestic energy market in the period between 2004 and 2014.
- Please see the methodology paper that follows for a detailed description of the data and methodology used to construct the indices addressed in this presentation.
- The purpose of this exercise is to understand in what way changes in energy prices have been reflective of changes in costs.
- We stress at the outset that this analysis is focused on the relative movements of costs and prices. The levels of the cost and price indices presented here should not be interpreted as estimates of actual levels of revenues and costs, or margins.
- We note that in instances where we refer to costs, we mean the expected cost of supplying energy to a typical domestic consumer over the next year, unless otherwise specified. Please refer to the methodology paper for reasons of using this type of cost measure.

Industry cost indices

Measures of industry costs: energy (1)

Ofgem's Supply Market Indicator (SMI)

- We focus on the version of Ofgem's SMI that assumes an 18-month hedging strategy.
- The index is a forward-looking measure of the expected cost of gas and electricity for a domestic consumer over the next year. Ofgem construct the measure for an average (mean) consumption household. We have adjusted the measure to reflect a typical ('median') consumption household.
- Expected energy costs are based on:
  - an assumption about part of the expected costs already incurred through an 18-month stylised hedging strategy (other stylised strategies are also sometimes used, but not presented here); and
  - the forward-looking view of expected costs based on prices of forward products traded in the market.
- We have adjusted the SMI to only include cost items that are also included in other benchmarks we use (see below).
- Please see Ofgem's methodology for details on how the SMI is constructed.

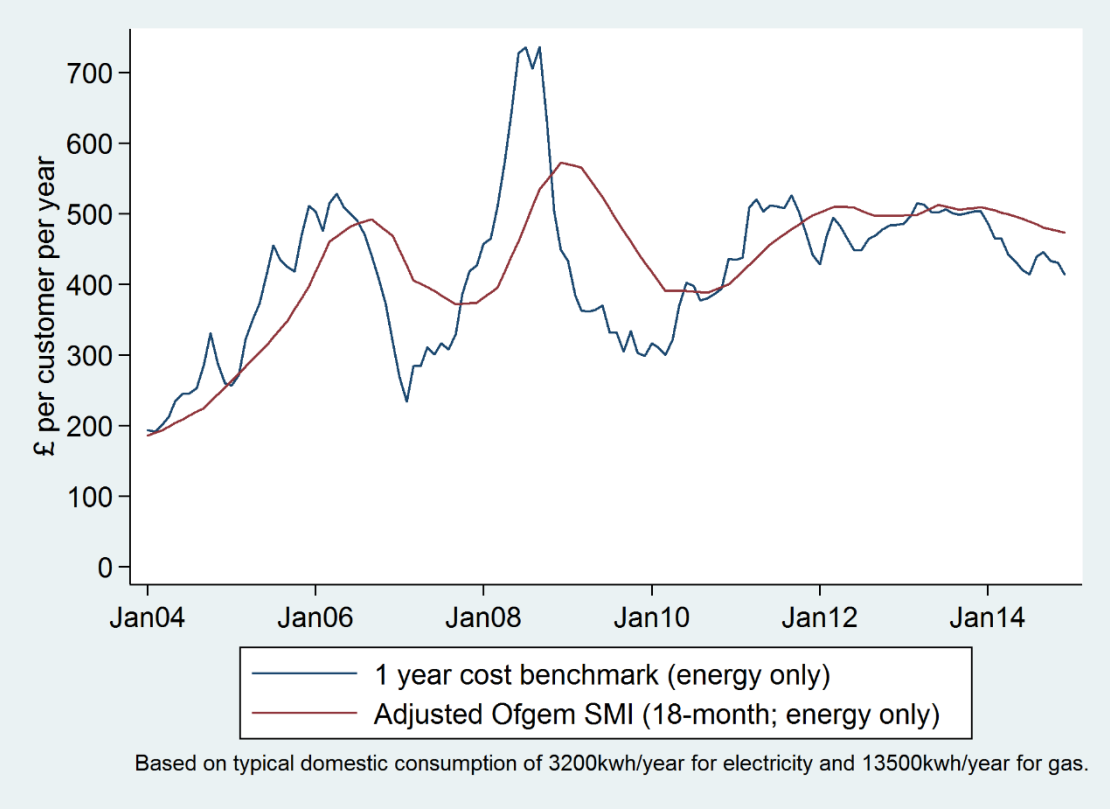
Measures of industry costs: energy (2)

- We have constructed an industry expected cost benchmark (referred to as the 'one-year cost benchmark' in the graphs below), which is a forward-looking view of the expected costs of gas and electricity for a typical consumer over the next year.
- The benchmark is an index of forward prices which tells us, at each month, how much it would cost an energy supplier to purchase energy to satisfy a typical consumer's energy needs throughout the next year, if the supplier were to buy all of that energy at the prevailing forward energy prices during that month in the market.
- By definition, this index does not assume any purchasing strategy (in contrast to the Ofgem SMI). We consider it to be a benchmark for the industry marginal cost.
- We have considered alternative forward-looking cost benchmarks. These are described in the accompanying methodology paper.

Measures of industry costs: energy (3)

The figure below plots the two indices (expressed as the expected gas and electricity cost for a typical dual fuel consumer) on a monthly basis from January 2004 to December 2014. We observe that:

- the one-year cost benchmark is more volatile than the Ofgem SMI; and
- changes in forward costs are transmitted into the Ofgem SMI with a lag, as expected, because of the assumed hedging strategy.

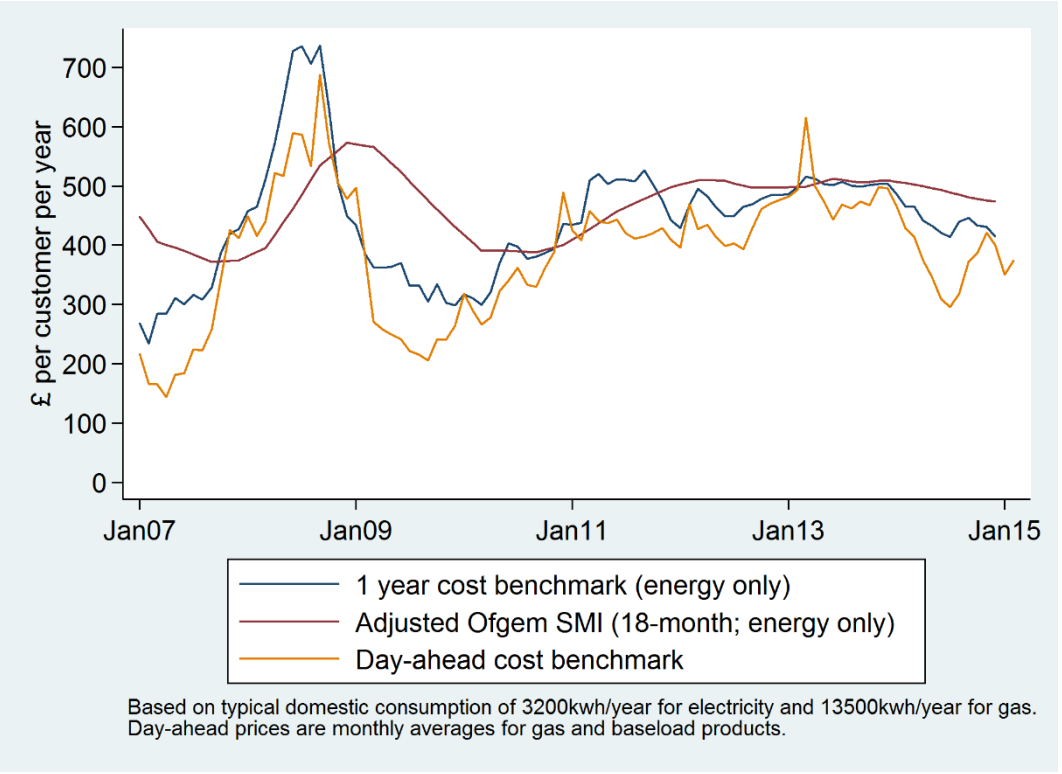


Source: CMA analysis of data collected from Ofgem and ICIS.

Measures of industry costs: energy (4)

The graph below shows an alternative benchmark for expected wholesale costs – an index tracking the day-ahead energy price. The index is constructed using the Heren UK Day-Ahead Index (weighted average) for electricity and the Heren NBP Day-Ahead Index (weighted average), aggregated to monthly frequency and applied to typical domestic consumption values.

We observe that the movements in the day-ahead price index are comparable to the movements of the one-year cost benchmark; however, the day-ahead price appears to be more volatile.



Source: CMA analysis of data collected from Ofgem and ICIS.

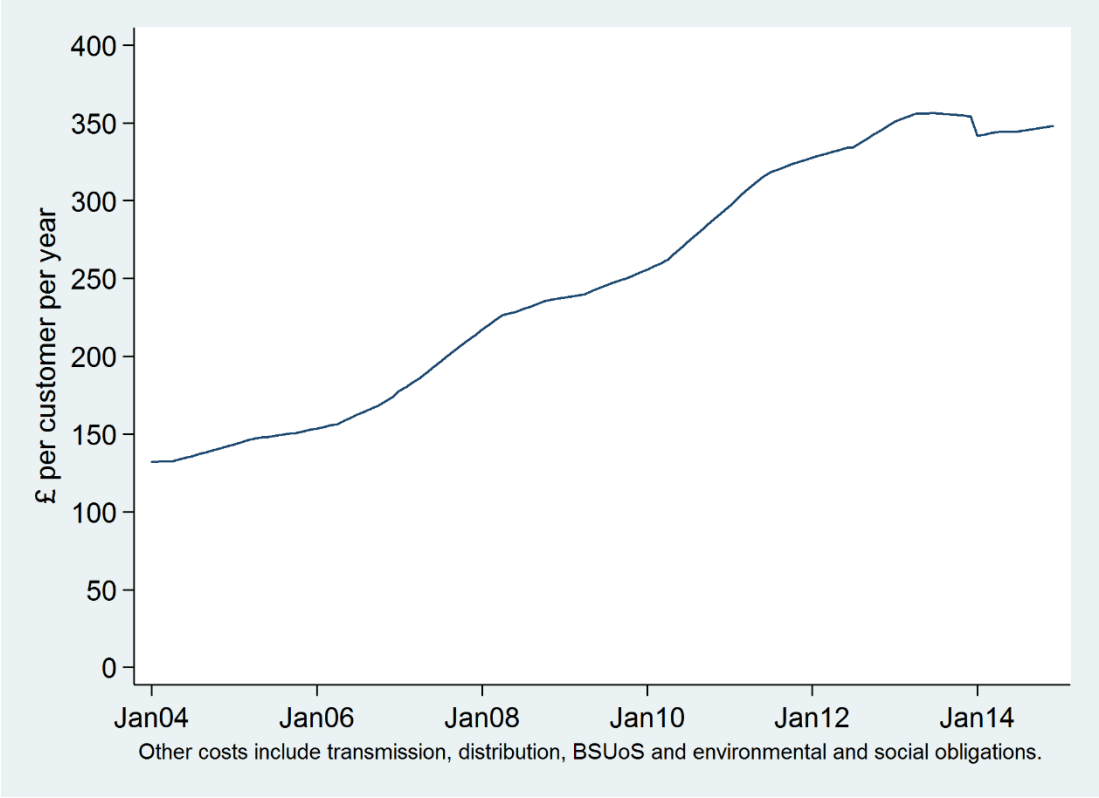
Measures of industry costs: other costs (1)

- Ofgem constructs measures of the expectations of other costs for the SMI. To measure the evolution of these cost components over time, we use Ofgem's measures throughout this preliminary analysis.
- The other costs included in this preliminary analysis are as follows.
- Network costs:
  - Transmission.
  - Distribution.
  - Balancing services use of system (BSUoS) (electricity only).
- Policy costs (environmental and social obligations):
  - Renewables Obligation Certificates (ROCs).
  - Feed-in tariffs (FiTs).
  - Energy Companies Obligation (ECO).
  - Warm Home Discount (WHD).
- We do not include operating (indirect) costs in this initial analysis, as these costs are not considered to be a marginal cost.

Measures of industry costs: other costs (2)

The figure below plots the evolution of other costs for a typical dual fuel domestic consumer between January 2004 and December 2014.

We observe that these costs have been increasing steadily over the last 11 years, with the only exception of January 2014.



Source: CMA analysis of data supplied by Ofgem.

Evolution of costs and standard variable tariff prices

Standard variable tariff

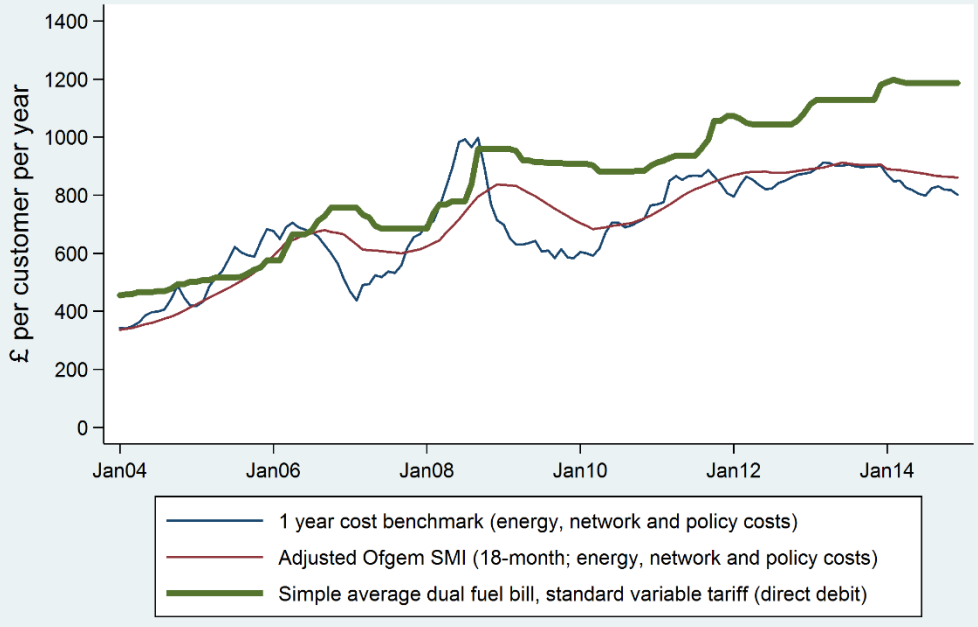
- We are interested in how the standard variable tariff (SVT) price changes have been explained by changes in expected costs.
- We calculate a simple average (across regions and the suppliers) of the dual fuel bill for a typical consumer paying by direct debit.
- We consider a simple average of a typical bill to be a relevant measure because the movement of this measure over time reflects genuine price changes implemented by the suppliers in response to changes in costs or other factors relevant to pricing (such as competitive conditions in the market).
- A weighted average of prices (weighted by market shares), or a price index reflecting changing levels of consumption, could change over time because of changes in the mix of customer types or market shares, even if suppliers do not change the prices they charge. We consider such price indices to be less informative for the purpose of assessing pass-through of cost changes to prices.

Evolution of standard variable prices and costs

The figure below illustrates how the two expected cost indices and the standard variable price index changed in the period between January 2004 and December 2014.

We emphasise that the gap between the price index and cost benchmarks should not be interpreted as an estimate of profits. First, this is because the price index reflects a typical bill for a representative consumer (rather than average revenues). Second, the cost benchmarks do not include all direct cost items (the direct cost items excluded from the index did not change over time). Third, the cost measures are forecasts rather than measures of actual costs incurred by the suppliers.

We observe that while there have been two periods of steep reductions in costs, prices were not reduced during those periods to the same degree. We also observe that both price increases and price reductions lag behind the corresponding movements in the one-year cost benchmark.



Bill is an average across regions and six large energy firms, for a typical consumer. Direct costs are not those actually incurred by firms, but forward-looking expectations. Indirect costs are not shown.

Source: CMA analysis of data collected from Ofgem and ICIS.

Evolution of costs and non-standard tariff prices

Non-standard tariffs

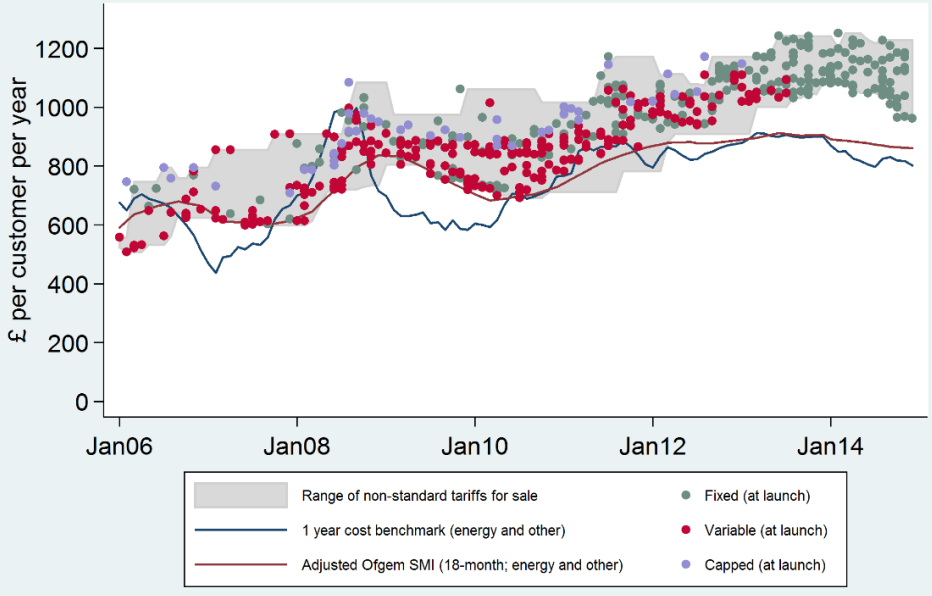
- We currently have data on the non-standard tariffs and corresponding bills (for a typical consumer paying by direct debit) for five of the Six Large Energy Firms (the dataset currently excludes Centrica). This includes non-standard variable, capped and fixed tariffs offered from 2006.
- Of interest is the relationship between movements in expected costs and prices of non-standard products at launch, as well as throughout the sales period (that is, until the product was withdrawn from the market).

Evolution of non-standard tariff prices and costs

The figure below illustrates how the two expected cost indices and the prices of non-standard tariffs on offer changed between January 2006 and December 2014. The dots represent dual fuel bills of each tariff at launch, and the shaded area marks the range of all non-standard tariffs available for subscription at the point in time (that is, all live tariffs).

We observe that non-standard tariffs have been offered at a wide range of prices and that:

- the lowest-priced tariffs have followed movements in the one-year industry cost benchmark with a lag; and
- the movements in the launch prices of the cheapest non-standard tariffs have followed the movements of the Ofgem SMI closely until around 2012. However, from 2012 non-standard tariff prices kept increasing until mid-2014, whereas the costs remained relatively unchanged.

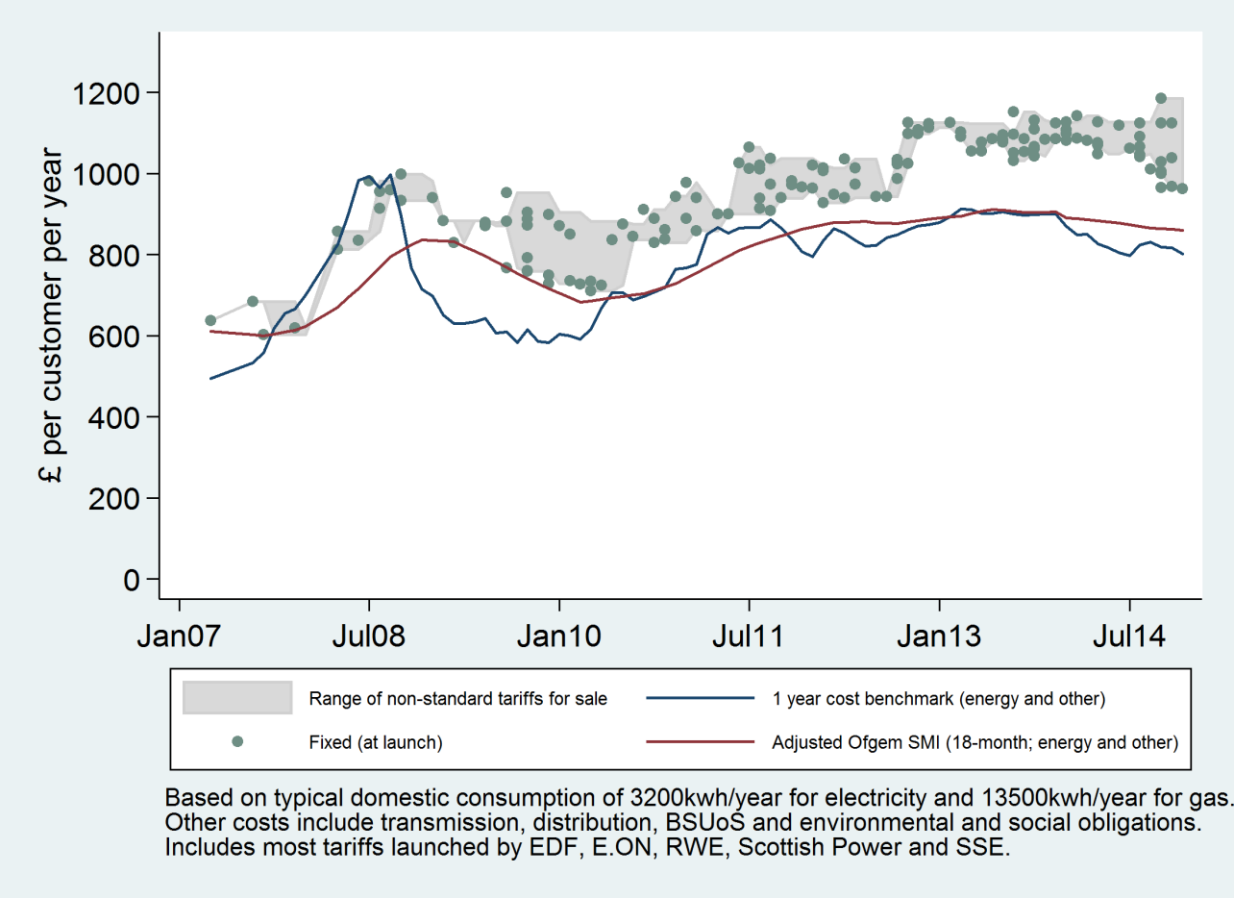


Based on typical domestic consumption of 3200kwh/year for electricity and 13500kwh/year for gas.
Other costs include transmission, distribution, BSUoS and environmental and social obligations.
Includes most tariffs launched by EDF, E.ON, RWE, Scottish Power and SSE.

Source: CMA analysis of data collected from Ofgem, ICIS and five of the Six Large Energy Firms.

One-year fixed tariffs

The figure below illustrates how the two expected cost indices and the prices of one-year fixed tariffs on offer changed between January 2006 and December 2014. The graph is constructed as explained on the previous slide.



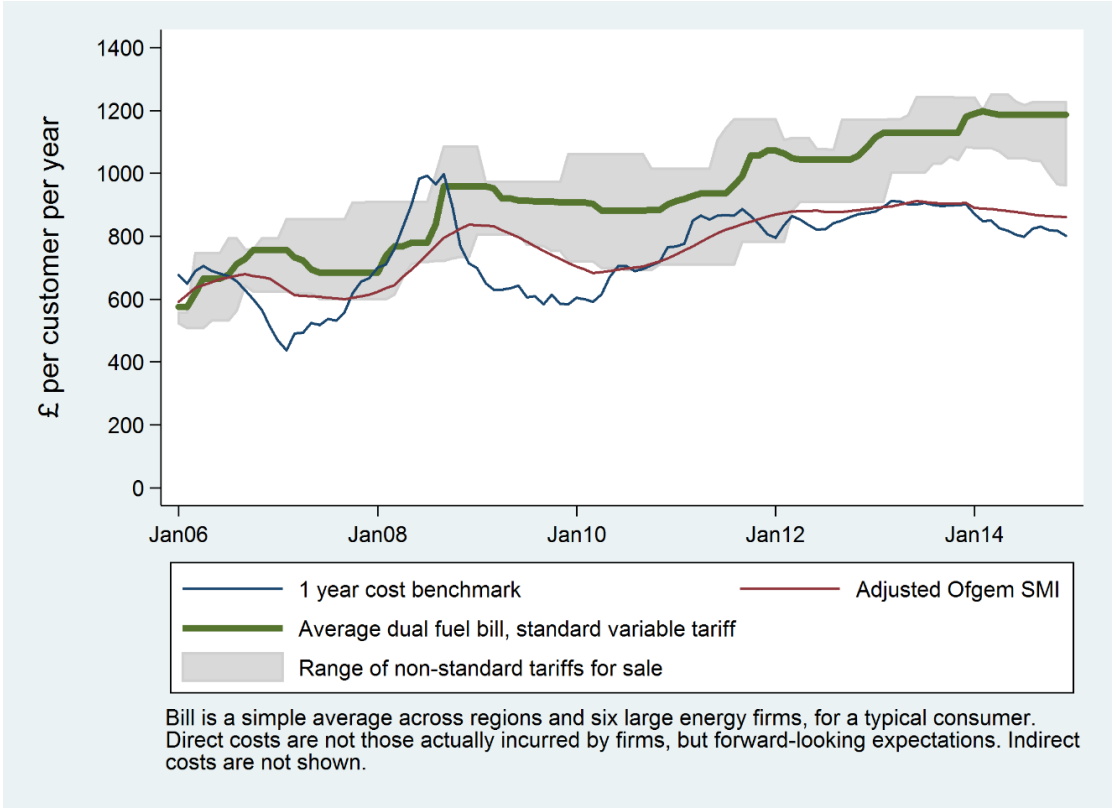
Source: CMA analysis of data collected from Ofgem, ICIS and five of the Six Large Energy Firms.

Comparison of the evolution of standard variable and non-standard tariff prices and costs

SVT and all non-standard tariffs and costs

The figure below compares the evolution of standard variable and non-standard tariff prices and the two cost indices.

We observe that the prices of non-standard tariffs for sale have been both lower and higher than the standard variable price. However, we acknowledge that this presentation of prices does not attach different weights to tariffs that may have been more or less successful.

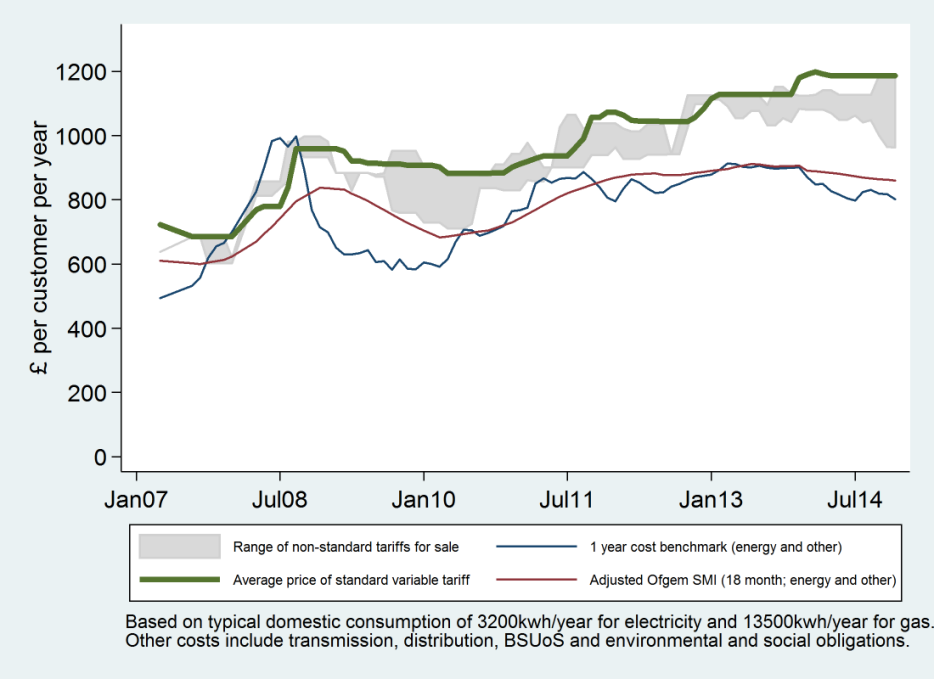


Source: CMA analysis of data collected from Ofgem, ICIS and five of the Six Large Energy Firms.

SVT and one-year fixed tariffs and costs

The figure below compares the evolution of standard variable and one-year fixed tariff prices and the two cost indices. We note that this subset of non-standard tariffs may provide a more robust way of observing the evolution of non-standard prices over time, since it excludes tariffs that may have been marketed as specific niche products (for example, fixed term tariffs with a particularly long contract). In that context we consider that one-year fixed tariffs are a relatively homogenous group of products.

We observe that one-year fixed tariffs (including the upper range of tariffs on sale) tend to be cheaper than the SVT throughout the period with only a few exceptions.



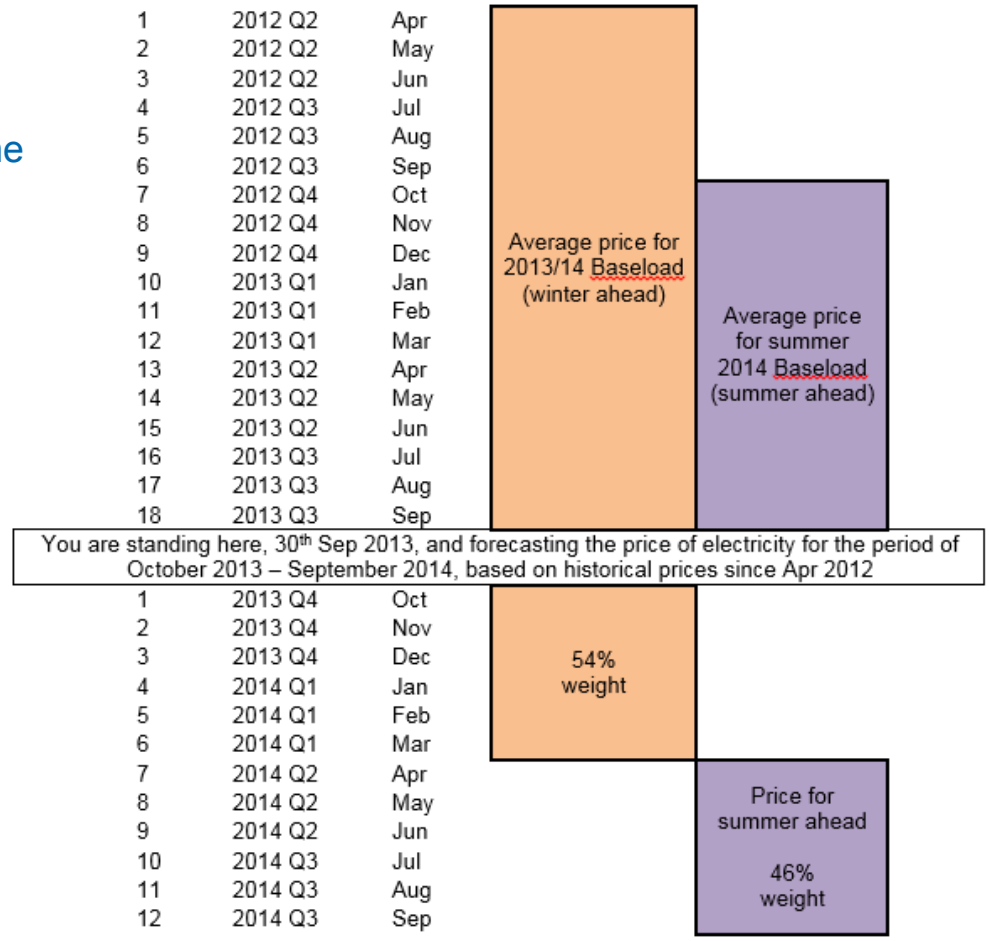
Source: CMA analysis of data collected from Ofgem, ICIS and five of the Six Large Energy Firms.

Annex A: a comparison of the methodologies for forward-looking energy cost indices

Calculation of the Ofgem SMI (electricity Baseload)

The diagram on the right illustrates how the electricity Baseload part of the SMI energy component is calculated.

The Baseload portion constitutes 70% of the energy cost in the SMI. The other 30% is informed by Peak product prices, using the same method.



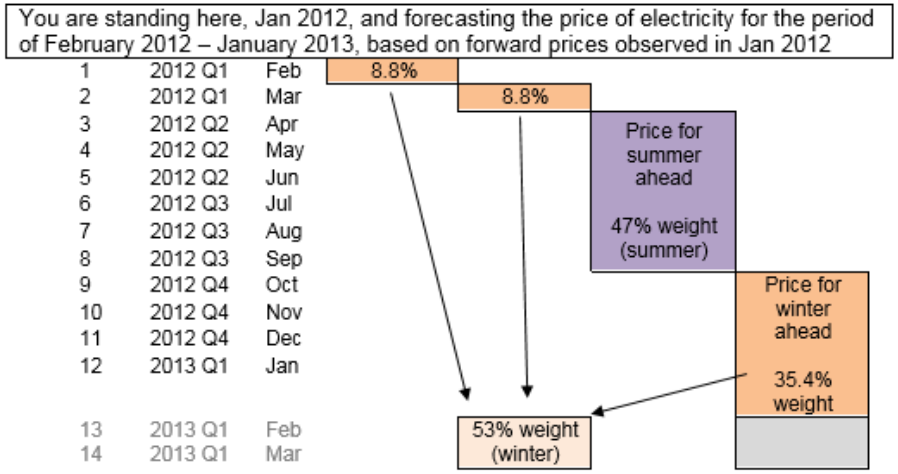
Source: CMA's illustration of Ofgem's methodology.

Calculation of the one-year cost benchmark (electricity)

The diagrams below show two examples how the one-year forward-looking cost benchmark was calculated for the Baseload portion of the benchmark. The Peak product portion of the benchmark was calculated in the same way. The benchmark is then a weighted average of the Baseload (70%) and Peak (30%) product benchmarks. As shown, the calculation does not take into account historical prices.

Example 1

Example 2



Source: CMA.

Methodology

Contents

Introduction

1. This paper sets out our framework for analysing the relationship between retail domestic energy prices and costs. With this analysis, we seek to understand the way in which domestic energy price changes are reflective of changes in costs, and whether this is consistent with competition. The approach to conduct this analysis has been informed by our understanding to date of how domestic energy suppliers set the prices of their products.

2. This paper is structured as follows:

   (a) We first explain the relevant concepts and definitions (paragraphs 1 to 8).

   (b) We set out the economic theory behind our initial thinking (paragraphs 9 to 13).

   (c) We explain the data used and the definitions of cost and price indices, including indices that we have already constructed or plan to construct in the next stage of our analysis (paragraphs 14 to 37).

   (d) Finally, we describe the analytical approach we plan to take in addition to the initial descriptive (graphical) analysis already presented above (paragraphs 38 to 47).

   (e) Appendix A contains a summary of assumptions used in the construction of the different cost indices.

Definitions

3. Cost pass-through is a concept that describes the response of the price of a good or service to a change in input costs. In the context of this investigation, we are interested in the response of retail domestic energy prices to relevant movements in energy costs, as well as other relevant costs of supplying energy to households.[1]

4. The concept of 'cost movements' (or changes, shocks) refers to changes in costs over time. When referring to industry-level cost movements we mean such cost movements that are believed to affect all firms in the industry.

[1] See paragraph 11 for an explanation of what we consider to be relevant costs and cost movements.

5. We will primarily look at two types of cost pass-through in the domestic retail energy market:

   (a) Pass-through of industry-level cost movements to standard variable tariff (SVT) prices – the change in standard variable prices as a response to relevant cost movements that affect all firms in the industry.

   (b) Pass-through of industry-level cost movements to non-standard tariff[2] prices – the change in fixed tariff prices as a response to relevant cost movements that affect all firms in the industry.

6. We consider that pricing strategies and therefore pass-through may be different for SVT prices, which are changed infrequently, and non-standard tariffs, which tend to be relatively frequently introduced and withdrawn at different prices throughout the year. For this reason we assess cost pass-through to standard and non-standard tariffs separately.

7. We consider two dimensions of each type of cost pass-through:

   (a) Degree of pass-through – the size of a price change relative to the size of a cost change. A 100% pass-through would refer to a situation where a change in input costs is followed by a change in price of an equal amount.

   (b) Speed of pass-through – the time it takes for a change in input costs to have an impact in retail prices.

8. With respect to the speed of pass-through, we will also consider whether there are any asymmetries in the observed relationship between cost and price movements over time. Asymmetric pass-through occurs when prices rise relatively fast in response to increasing costs, but fall slowly when costs decrease. In paragraphs 40 to 42 we discuss our current view of how the presence of this phenomenon can be assessed in the domestic energy market.

Economic theory

9. Economic theory predicts that the degree of pass-through of marginal costs to prices in a market will depend on the model of competition as well as the shapes of the demand and supply curves. An estimate of the degree of pass-

[2] 'Non-standard tariffs' is the term used throughout this paper to refer to products other than the standard variable tariff that were offered for limited periods of time. These products typically included variable, fixed-term, fixed-price, and capped price tariffs. Within fixed-term products, we also distinguish between products of different contract lengths.

through must therefore be interpreted along with some information about the other relevant parameters characterising demand and supply in the market.

10. In general, however, cost pass-through of relevant industry-level cost movements is thought to be higher in more competitive markets. Intuitively, this is because in a competitive market, margins are low and firms must adjust prices immediately when costs change in order to remain competitive.

11. The word *'relevant'* above is important. First, only costs that are considered to be marginal are relevant in this context.[3] Second, relevant cost movements would be those that firms can be expected to take into account in their pricing decisions. For example, week-to-week (or month-to-month) cost fluctuations may not be relevant if firms cannot realistically adjust their prices weekly (or monthly), as is the case, for example, with SVT.

12. We note that the pass-through of short-run industry-level cost movements to SVT prices may be very low because, for example:

    (a) firms may be (efficiently) absorbing short-run cost movements that risk-averse consumers do not like; and

    (b) there may be significant menu costs (costs of changing prices, such as the costs of updating the billing systems, informing customers, or reputational costs).

13. The measurement of relevant cost movements should therefore take account of the relevant aggregation of cost changes over time. We consider that this may be different when considering SVT prices (which are typically changed no more than twice a year) and non-standard tariff prices (which can be updated frequently by withdrawing one tariff and introducing another tariff to the market).

Cost and price indices

14. This section describes the data we consider to be relevant and have collected for the purpose of this analysis, and the methodologies for constructing cost and price indices. The data we have collected was informed by our understanding of costs that are, or should be (in a competitive market), important to pricing decisions in the domestic energy market. This is explained in more detail below.

[3] Only marginal costs are thought to be relevant to price setting.

Measures of energy costs

15. We understand that decisions to change prices or launch new tariffs at certain prices are primarily informed by a supplier's expectations of future costs (both energy and other direct costs, such as transmission or policy). Intuitively, this is because a price quoted in a contract today will apply to energy delivered to a customer over a period of time (until the customer switches, until the price is changed, or until a contract expires).[4] For this reason we focus in our preliminary analysis on measures of cost expectations rather than on actual (incurred) costs, which can be different (and may not be fully known, for example, until the settlement procedure is finalised). We comment on the relevant length of expectations in paragraph 20.

16. We understand that an energy supplier's expectations of its costs of delivering a certain amount of energy at a point in time in the future consist of:

    (a) the cost that the supplier has already incurred for future delivery by purchasing some of the expected volume in advance (the 'closed' position); and

    (b) the cost that the supplier expects to incur in purchasing the remaining expected volume (the 'open' position). These expectations are informed by forward prices of future products.

17. In pure economic terms, only the energy cost in *(b)* should matter to a profit maximising supplier when setting its prices, regardless of the cost of the energy that has already been purchased (although the cost in *(a)* will affect its profits).[5] In particular, we consider that forward prices of future energy products are a benchmark of the expected marginal cost:

    (a) Forward gas and electricity prices measure the expected cost of supplying energy to a newly acquired domestic customer in the future.

    (b) Forward prices also measure the expected value, at a point in time, of the energy the supplier already procured in the past for future delivery. That is, if a supplier lost a domestic customer and had to sell the energy it previously purchased for that customer back to the market, the price at

[4] We also note that a price change for the SVT can only be implemented a month after it was announced. This means that the current (spot) price of energy should have no relevance to the pricing decision at a point in time. This is to some extent also true for non-standard tariffs, as switching to a non-standard tariff will typically not take effect instantaneously.

[5] See, for example, E. Nakamura and D. Zerom (2010) *Accounting for Incomplete Pass-Through*, who discuss the irrelevance of hedging contracts to marginal costs in the context of the coffee market.

which this energy could be sold is the forward price. In other words, this is the opportunity cost.

Forward-looking cost benchmarks

18. For the reasons set out above, we consider forward electricity and gas prices to be a relevant benchmark of the marginal energy costs to retail energy suppliers at any point in time.

19. To summarise the movements in forward prices, we have constructed forward-looking industry cost benchmarks for the period between 2004 and 2014. The benchmarks use daily electricity and gas forward price assessments or indices from ICIS[6] for future energy products traded for delivery in the next day, month(s), quarter(s) and season(s). We have constructed three versions of this benchmark:

    (a) A one-year cost benchmark. This is an index that, on each day, evaluates the expected cost of delivering gas and electricity for a dual fuel domestic consumer with typical consumption[7] over the next year. The index is a weighted average of the prices of the relevant future products (Month(s), Quarter(s) and Season(s))[8] that cover the next one year of delivery. Each product's prices are weighted by the length of the period that product covers within the year (for example, the price of the Season-ahead product determines one half of next year's cost).[9] Additionally, we apply seasonal consumption weights (winter and summer); this means that prices for Winter products carry a larger weight in the index than prices for Summer products.[10] For our preliminary analysis we aggregate the daily index to monthly values, taking a simple average of all daily index values within a month.

    (b) A two-year cost benchmark. This index is constructed similarly to *(a)* but covers the next two years of delivery.

    (c) A day-ahead benchmark. This benchmark is constructed by applying the day-ahead electricity and gas prices (sourced from the ICIS Heren Day-ahead index[11]) to the typical domestic consumption values, and

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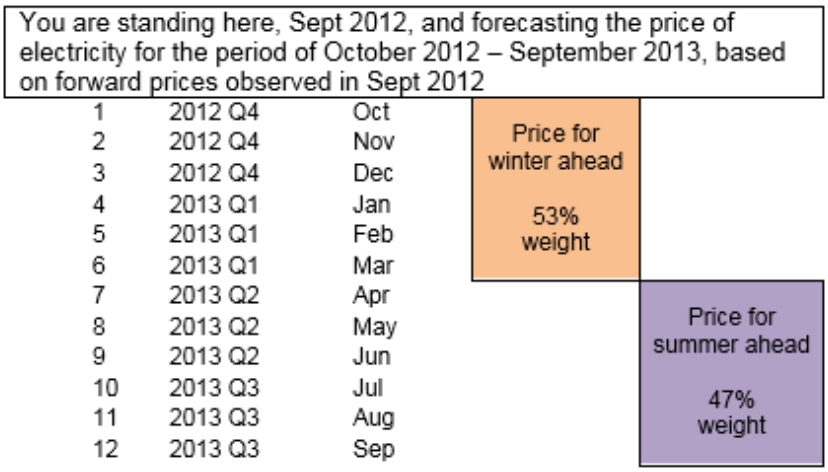
[6] ICIS is a market information provider.
[7] As per Ofgem's current definition of a typical ('medium') consumer. See Ofgem's decision letter.
[8] We use the ICIS price assessments for the each of the products.
[9] For electricity, we construct this index for Baseload and Peak product prices separately, and then compute a weighted average electricity index (assuming that 70% of the electricity consumed is Baseload, and 30% are Peak products).
[10] Winter and summer products are both six-month seasonal products. We use fixed seasonal consumption weights throughout the period. The weights are based on energy consumption figures between 2004 and 2014, as published by DECC. See DECC's publication page.
[11] The Heren Day-ahead index is an average of day-ahead trade prices, weighted by the trading volume.

aggregated monthly.[12] In other words, in each month this is the average cost of buying all of a typical customer's demanded energy one day ahead of consumption (expressed in annual consumption values for the purpose of comparison with the other benchmarks). We do not currently make any adjustments for seasonal differences in consumption in this index.

20. Appendix A includes a summary of other assumptions used in the construction of these benchmarks. The diagrams below show two examples of how the one-year benchmark was calculated for Baseload electricity at two different points in time. The gas index was calculated similarly; however, we have used quarterly gas products rather than seasonal. We note that our electricity benchmark is constructed using the same method for Baseload and Peak product prices.

FIGURE 1

Illustration of the method for calculating the one-year forward-looking cost benchmark for September

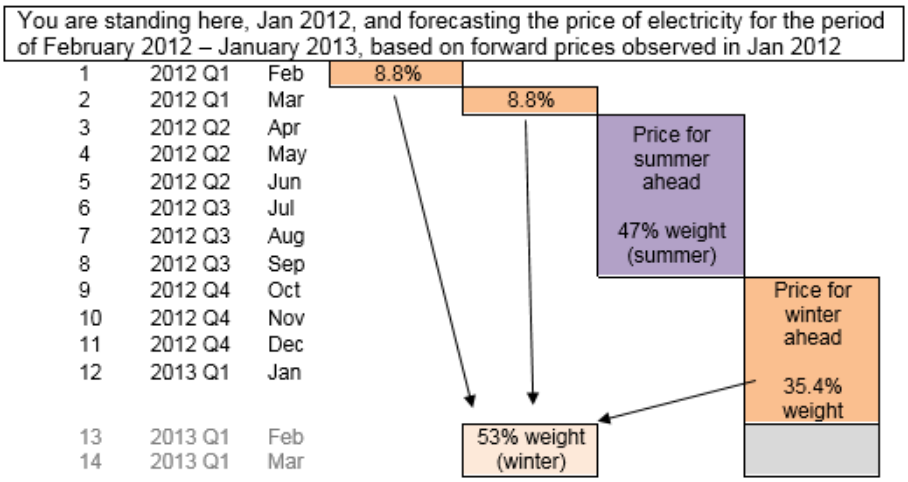


Source: CMA analysis.

[12] Historical data is currently available from 2007 for gas and electricity Baseload indices, and from 2011 for the Peak index. This is reflected in the benchmarks shown in Figure 1, where we show a Baseload-only benchmark for the period from 2007 to 2014, and a weighted average Baseload and Peak benchmark for the period from 2011 to 2014.

FIGURE 2

Illustration of the method for calculating the one-year forward-looking cost benchmark for January



Source: CMA analysis.

21. We have focused primarily on the one-year expected cost benchmark in our initial descriptive analysis. We consider that this benchmark is directly relevant for an analysis of pass-through to tariffs with a one-year fixed price contract. We also consider it to be a relevant benchmark for analysis of SVT prices because:

    (a) we consider that domestic customers are not typically expected to switch more frequently than this period. Infrequent switching may be caused, for example, by switching costs or weak consumer engagement;

    (b) we understand that the Six Large Energy Firms take account of energy cost forecasts of at least such length when setting their SVT prices; and

    (c) we consider that the forecast period firms take into account when setting prices may sometimes be longer or shorter and differ between the suppliers. However, the benchmarks of different forecast periods are not materially different from the one-year benchmark. For example, we observe that the movements of a two-year index are not materially different from the movements of the one-year index (see Figure 3 below). For this reason we consider that the one-year index is a sufficiently precise cost benchmark for SVT tariffs (or fixed-term tariffs with other contract lengths).

22. With regards to the day-ahead benchmark, we observe, from Figure 3, that the cost trends measured by the day-ahead and longer period forward price indices are similar. We consider that day-ahead prices are impacted more

profoundly by short-term shocks (for example, weather conditions) which we do not consider to be relevant for this analysis. For this reason, we do not present the day-ahead benchmark in most of our initial descriptive analysis.

Ofgem's Supply Market Indicator

23. Ofgem constructs a forward-looking expected cost measure (the Supply Market Indicator, or SMI) which additionally assumes a certain purchasing (hedging) strategy.[13] That is, while our industry cost benchmark tracks the expected cost of supplying energy to a typical domestic consumer for each month if the supplier were to purchase all of the following year's expected volume for that consumer in that month, the SMI tracks the expected cost by assuming that the supplier already purchased some of that expected volume in the past through a stylised hedging strategy.[14] We have adjusted the SMI to include only such cost items that are also included in the cost benchmarks above.

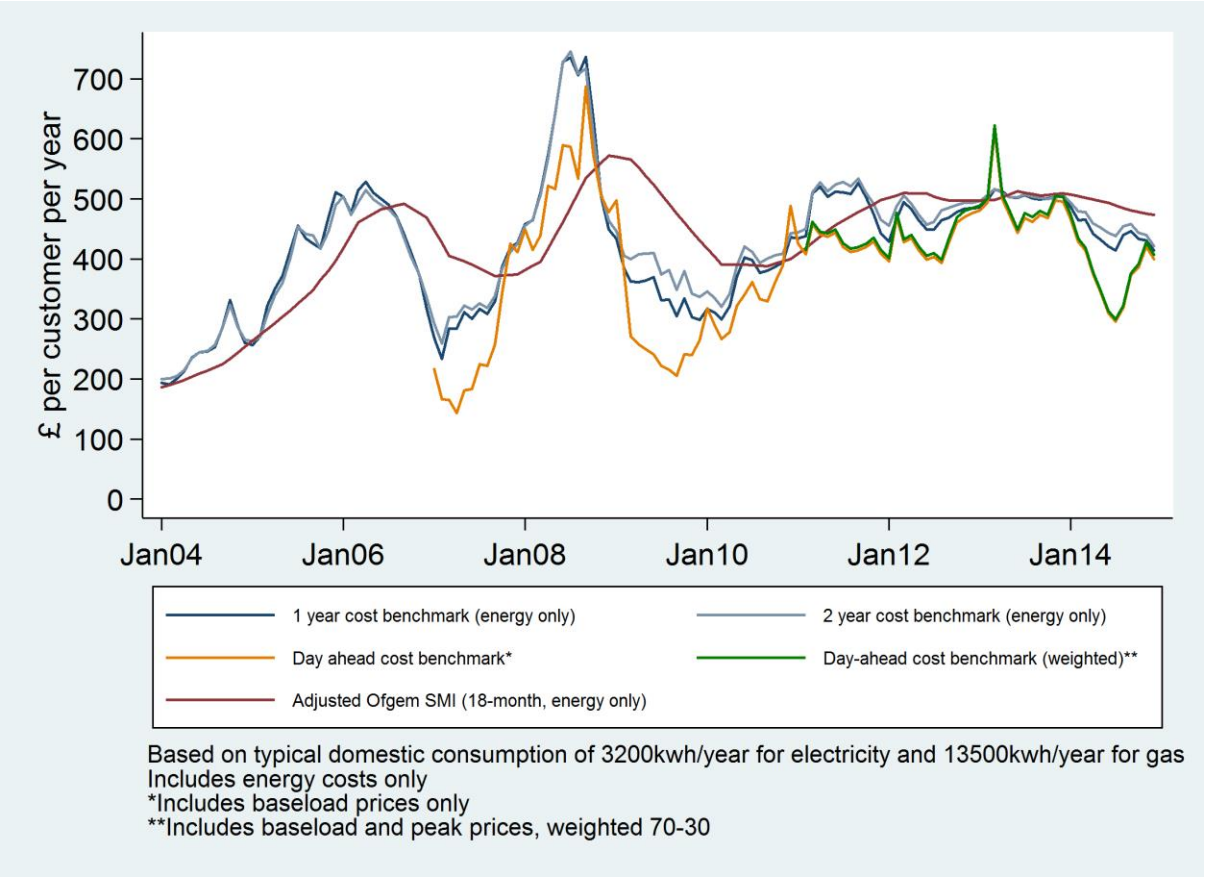
24. We emphasise that both the SMI and the forward-looking benchmarks are cost forecasts (expectations). The difference between the two types of measures is in the information that is used to construct the forecast: the one-year cost benchmark uses only the information available in the month when the forecast is made, whereas the SMI uses historical information to make the forecast.

25. Figure 3 illustrates the movements of the industry cost benchmarks and the Ofgem SMI in the period between January 2004 and December 2014.

[13] See Ofgem's SMI methodology for further details.
[14] The central stylised strategy that the SMI uses assumes that energy for delivery in a particular month is bought at equal amounts throughout the 18 months leading up to delivery. Therefore, the calculation of the SMI energy component for the next season is an average of that season product's traded price over the previous 18 months. For the next season after that, the calculation takes account of the last 12 months' traded prices.

FIGURE 3

Expected energy cost for supplying a typical dual-fuel domestic consumer over the next year



Source: CMA analysis of data collected from ICIS and Ofgem.

Firm-level expected cost measures

26. We have collected data on the Six Large Energy Firms' own energy cost forecasts. The data that was available differed between the suppliers with respect to time period,[15] frequency and granularity (for example, availability of cost forecasts by product). For the majority of the Six Large Energy Firms the data we collected takes the form of matrices, where for each month of forecasting we have the expected cost per unit of electricity or gas for each of the 24 months. We have calculated the expected cost as a weighted average of the open and closed (hedged) positions.[16] We have also collected data on volume forecasts in the same format.

[15] This data was available from 2009 for Centrica and from 2012 for Scottish Power. The data for SSE is less granular.
[16] The data also includes the price of the open and closed positions separately. We will consider whether the way this split was constructed in the data allows robust analysis.

27. We use the supplier's cost forecasts (weighted average of open and closed positions) for the next 12 months, each month weighted by the expected volumes in that month relative to the expected volumes for the year, to construct, in each month, an expected cost per unit of electricity and gas over the next year. We then use these figures to calculate an index of an expected cost of supplying energy to a typical dual fuel domestic consumer.

28. We may consider, in the next stage of our investigation, the extent to which firm-level cost forecasts explain each firm's price setting. We will use in this analysis the firm-level cost indices described above.

Measures of other costs

29. We consider the following cost categories to also be relevant to pricing:[17]

    (a) Transmission and distribution costs.

    (b) Balancing services use of system charges (BSUoS) (electricity only).

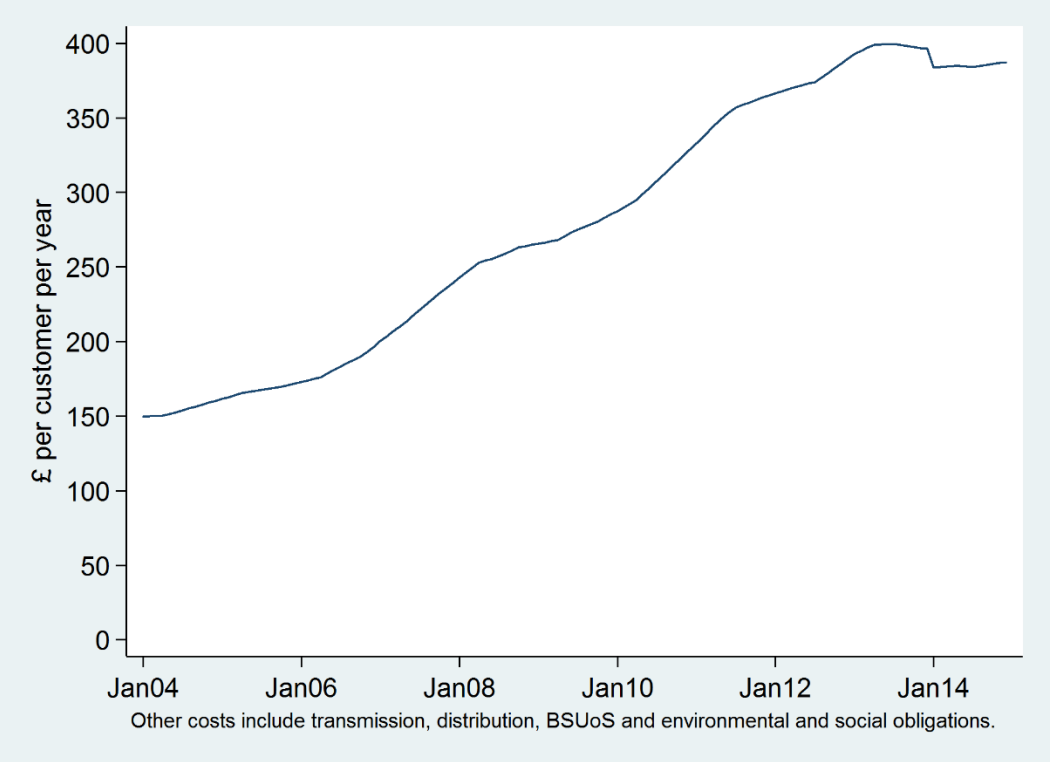
    (c) Environmental and social obligations (or policy costs).

30. Ofgem estimates these costs for the SMI using publicly available information.[18] We have adapted the Ofgem measures to reflect the latest typical domestic consumption values, and we use these measures throughout our analysis (we refer to them as 'other' costs).[19] See Figure 4 for a graphical presentation on how these costs evolved over time. The environmental and social obligation costs included in these measures are Renewables Obligation Certificates (ROCs), Feed-in-Tariffs (FiTs), Energy Companies Obligation (ECO) and Warm Home Discount (WHD). We do not intend to include operational costs in our analysis, as these are indirect costs that should not be relevant to pricing.

[17] While there may be other costs (such as metering) that may be marginal to the number of customer accounts, we understand that these are not material for the purposes of this analysis.
[18] See Ofgem's SMI methodology, which lists the data sources and assumptions used to construct the measures of these costs.
[19] We note that Ofgem flagged that this data may be less reliable, in particular with respect to network costs, prior to 2007.

FIGURE 4

Expected costs of transmission, distribution, BSUoS and environmental and social obligations



Source: CMA analysis of data collected from Ofgem.

31. We have also collected data on the Six Large Energy Firms' own forecasts of the cost items listed in paragraph 29. We may use this data, where possible, to construct more robust indices of each firm's cost forecasts.

Measures of prices

32. We have constructed two sets of price indices: one for SVT and one for non-standard tariffs. Both measures are based on the annual dual fuel bill for a typical (medium) consumer[20] paying by direct debit, on average (simple average) across the regions.

[20] As per Ofgem's current definition of a 'medium' consumer. See Ofgem's decision letter.

Standard variable tariff prices

33. We have considered the following measures of the movements of SVT in the market over time:

    (a) A simple average of the Six Large Energy Firms' SVT bill (for a dual fuel domestic consumer with typical consumption values).

    (b) A weighted average of the Six Large Energy Firms' SVT bills, weighted by market shares.

34. We consider the simple average in *(a)* above to be informative and relevant for our analysis because the movements of this measure over time reflect genuine price changes implemented by the suppliers in response to changes in costs or other factors in the market. In contrast, a weighted average such as the one in *(b)* can change over time because of changes in the mix of customer types or market shares, even if suppliers do not change the prices they charge to each of their domestic customers subscribed to the SVT. We emphasise that these price measures are not measures of realised revenues, and their purpose is to track the Six Large Energy Firms' SVT price setting behaviour over time.

35. We have also considered using the average revenue per unit of energy delivered. However, we consider that this measure could have limitations in the context of this analysis for two reasons. First, unit revenue changes over time will be partly driven by changes in consumption and payment type mix. These composition effects may hide the response of prices to cost movements, which is what we are interested in. Second, the measures of unit revenues available to us are very volatile on a monthly basis.

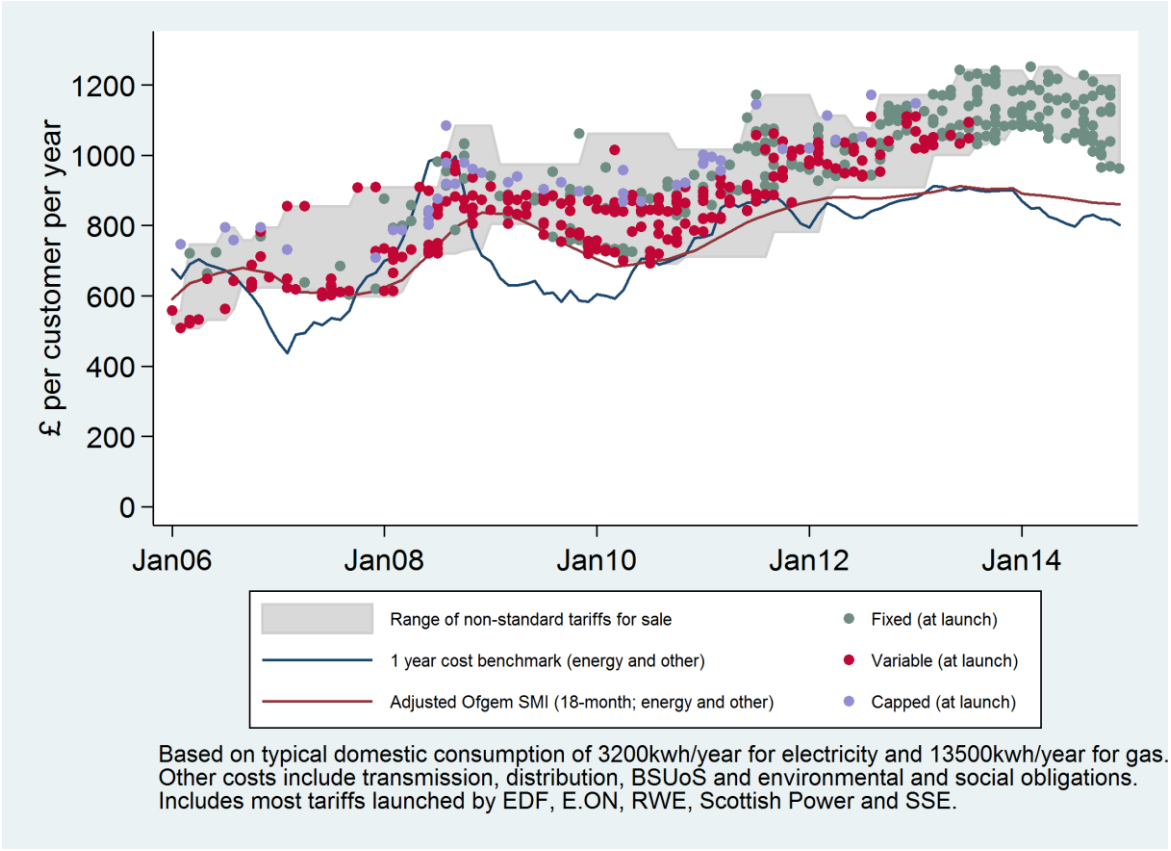
Non-standard tariff prices

36. We are collecting data on non-standard tariff prices. The dataset is a list of non-standard tariffs launched by the Six Large Energy Firms between 2006 and 2014 and, for each tariff, the date the tariff was introduced into the market, the date it was withdrawn, and the dual fuel bill for a domestic consumer with typical consumption at that tariff's prices.

37. Figure 5 plots the non-standard tariffs we have so far collected data on (this includes non-standard tariffs launched offered by EDF Energy, E.ON, RWE npower, Scottish Power and SSE). The dots represent the dual fuel bill of a typical domestic consumer subscribing to the particular non-standard tariff at launch. The grey shaded area includes all non-standard tariffs that are for sale (available for subscription) in a given month. We note that this data is preliminary and is subject to further adjustments and completion.

FIGURE 5

Non-standard tariffs at launch and throughout the sales period



Source: CMA analysis of data collected from five of the Six Large Energy Firms, Ofgem and ICIS.

Analysis of cost pass-through

38. We have described the evolution of costs and prices as measured by the indices set out above. Please see the initial presentation of graphical analysis for our initial observations on the nature of movements of cost and prices between 2004 and 2014.

39. In this section we set out our current thinking on other types of analyses that we will consider in the next stage.

Assessment of asymmetric cost pass-through

40. We will assess qualitatively possible reasons why domestic energy prices were not reduced in periods when costs decreased substantially, as observed from our initial descriptive analysis. In particular, we may consider the Six Large Energy Firms' internal pricing documents to understand how pricing decisions were made in these periods. We will then consider whether the

reasons for asymmetric cost pass-through, if there is any, are inconsistent with competition.

41. We may further produce descriptive statistics, for example:

(a) a comparison of the degree of pass-through when the cost index is rising or falling; and

(b) a comparison of the time it takes for an increase in costs to be followed by a price change and the time it takes for a decrease in costs to be followed by a price change.

42. We may wish to test for the presence of asymmetric cost pass-through econometrically. However, we do not currently consider that econometric analysis is appropriate for assessing the presence of this phenomenon in the SVT prices because there have been few SVT price changes throughout the period. To illustrate, each of the Six Large Energy Firms' SVT prices changed between 15 and 17 times throughout the 11-year (132 month) period of analysis.[21] Because of the different timing of these changes, the average SVT price index changed around 55 times, but only around 15 of these changes were price reductions. We currently consider that this does not constitute sufficient variation to fit an econometric model that would allow to directly test asymmetric cost pass-through (for example, an asymmetric error correction model). We welcome views on this.

Analysis of the degree of industry-level pass-through to SVT and non-standard tariff prices

43. We will consider to what extent the movements in prices of non-standard tariffs differ from the movements in prices of the SVT. In particular, we are considering measuring and comparing the rate of cost pass-through in those two types of tariffs. We welcome views on the approach described below.

44. As set out in paragraphs 9 to 10, the rate of pass-through depends on a number of factors other than the model of competition in the market; in particular, the shapes of supply and demand. To the extent that the characteristics of supply and demand are the same in the SVT and non-standard tariff space, a difference between the pass-through rates to these two types of prices may suggest that the intensity of competition is also different.

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[21] We observe a small number of additional changes in the direct debit dual fuel bill of the SVT of some of the suppliers. These changes are smaller than 2% and we consider them to be attributable to changes in direct debit or similar discounts rather than changes in the headline rate of the tariff.

45. The first part of this analysis would involve estimating the rate of pass-through to the SVT prices. The second part would involve estimating the rate of pass-through to non-standard tariff prices. The appropriate estimation method for these two parts may differ. In principle, as a starting point we will consider the following equation,[22] where *p* denotes the price and *t* denotes month:

$$\Delta \log\ p_t = \alpha_k + \sum_{l=0}^{L} \beta_l \Delta\ cost_{t-l} + \beta_{\mathrm{m}} control\_variables_t + \varepsilon_t$$

We will conduct the standard tests to identify the most appropriate model specification.

46. The precise methodology would then be adapted as appropriate for SVT and non-standard prices. For example, for SVT prices we may wish to adopt a specification similar to Fitzgerald and Haller (2011),[23] who use price change events as observations (and measure the pass-through rate of cumulative changes in costs to prices) rather than monthly series. For non-standard product prices we may be interested in the lower-priced quantiles of the range of non-standard tariffs, and for that purpose we will consider using a quantile regression approach.

Assessment of firm-specific cost pass-through

47. In a competitive market, a firm which, for a period of time, has costs that are higher than other firms' costs should not be able to pass-through its cost shock to the prices it charges. We will consider whether there were any material firm-specific cost shocks measured by the firm cost indices as described in paragraphs 26 to 27, and if so, whether in those cases the individual firms reflected this in their prices.

[22] Similarly to Nakamura and Zerom (2010) *Accounting for Incomplete Pass-through*.
[23] Fitzgerald and Haller (2011) *Pricing-to-Market: Evidence From Plant-Level Prices*.

Appendix A

1. The table below summarises the assumptions used in constructing the forward-looking cost benchmarks, and compares these assumptions to Ofgem's assumptions in the construction of the SMI.

Table 1: Wholesale cost assumptions

Assumption	*Forward-looking cost benchmarks (one-year and two-year)*	*SMI (adjusted by the CMA and presented in our analysis)*	*SMI (as published by Ofgem)*
Wholesale cost	70% Baseload, 30% Peak (current forward prices of future products)	70% Baseload and 30% Peak load (historical forward prices of future products)	70% Baseload and 30% Peak load, hedging
Carbon cost	Embedded in wholesale energy prices	Embedded in wholesale energy prices	Embedded in wholesale energy prices
Transmission / distribution losses (electricity only)	Yes, 8% loss assumed	Yes, 8% loss assumed	Yes, 8% loss assumed
Imbalance (cash-out) costs (electricity)	No	No	Yes, see SMI methodology
Shaping costs	Implemented as the weighted average of Baseload and Peak product prices (see above)	Implemented as the weighted average of Baseload and Peak product prices (see above)	Implemented as the weighted average of Baseload and Peak product prices (see above)
Gas reconciliation by difference cost	No	No	Yes, see SMI methodology
Demand forecast error (gas)	No	No	Yes, see SMI methodology
Unbilled volumes (such as theft, unmetered consumption)	No	No	Yes, see SMI methodology

Source: CMA and Ofgem analysis.

2. The table below summarises the other cost items included in the indices. The assumptions used to construct these cost items are set out in the *Methodology for the Supply Market Indicator* (Ofgem).[24]

Table 2: Wholesale cost assumptions

Cost category	*Forward-looking cost benchmarks (one-year and two-year)*	*SMI (adjusted by the CMA and presented in our analysis)*	*SMI (as published by Ofgem)*
Gas distribution charges	Yes	Yes	Yes
Gas transmission charges	Yes	Yes	Yes
Electricity distribution charges	Yes	Yes	Yes
Electricity transmission charges	Yes	Yes	Yes
Balancing System use of System charges (BSUoS)	Yes	Yes	Yes
Supplier operating costs	No	No	Yes
Smart metering costs	No	No	Yes
Depreciation and amortisation	No	No	Yes
Renewable Obligation Certificates	Yes	Yes	Yes
Feed in Tariffs	Yes	Yes	Yes
Energy Company Obligation	Yes	Yes	Yes
Warm Home Discount	Yes	Yes	Yes
Contracts for Difference	No	No	Yes
Government funded rebate	No	No	Yes

Source: CMA and Ofgem analysis.

[24] See Ofgem's SMI methodology.