Simulating the effects of remedies to address a secondary market monopoly—methodology

Introduction

1. As part of our analysis of a possible waterbed effect, and the implications of waterbed effects for consumer welfare, we constructed a number of Excel-based economic models of the markets for credit and PPI in order to simulate the likely effects of remedy options on prices and volumes of credit and PPI sold and also on the welfare of the consumers and firms that participate in the PPI and credit markets.

2. In our provisional findings, we provisionally concluded that distributors of PPI at the credit point of sale enjoyed a monopoly over the sale of PPI to their own credit customers. However, because PPI is a secondary market, changes in the secondary market for PPI may affect conditions in the primary market for credit. This complicates our assessment of the effects on consumers of the features we have identified, and any potential remedies to address those features. We therefore developed a series of Excel-based models to address the welfare implications of so-called waterbed effects.

3. This appendix sets out the basic methodology and the key assumptions used in order to construct the models. One feature of a secondary market monopoly is that it is difficult to describe the consumer welfare effects of a secondary market monopoly in the abstract. This is because remedies can not only affect outcomes in the primary and secondary markets, but also can affect the nature of the interrelationship between the primary and secondary markets. As a result, in order to analyse the effects of a secondary market monopoly on consumers, some consideration of the type of intervention is necessary.

4. There are two distinct categories of remedy option available to us. First, there are remedies which alter the extent to which consumers shop around for PPI prior to the point of sale. The purpose of these types of remedy is to try to encourage competition for the 'system' of PPI and credit. The clearest example of this type of remedy is option 1 in the Remedies Notice, which encourages PPI advertising and mandates the provision of clearer information regarding the cost of the combined PPI and credit bundle. We refer to remedies that increase the proportion of customers that anticipate secondary market conditions as 'system remedies'.

5. Second, there are remedies which address the lack of competition for PPI without changing the extent to which consumers shop around for PPI prior to the point of sale, or the extent to which customers consider the cost of the bundle when choosing their loan. The purpose of these remedies is either to increase competition for PPI, or to control market outcomes, in the secondary market. The only pure example of this type of remedy is option 11—a price cap on PPI, which controls outcomes in the secondary (PPI) market, without changing the extent to which consumers shop around on the bundle prior to the point of sale. In this appendix, we refer to remedies that do not affect the extent to which consumers anticipate secondary market conditions as 'non-system remedies'.

6. The majority of our remedy options are neither pure system remedies nor pure non-system remedies; and the outcome in practice of most remedies may be a mixture of both of these effects. For example, remedies designed to drive secondary market (as opposed to system) competition will also be likely to result in some increase in advertising of PPI. This will in turn increase the proportion of customers shopping around for PPI prior to the point of sale, leading to a 'system remedy' effect.

7. System and non-system remedies are therefore best thought of as two extremes of a spectrum of possible remedy packages. However, each of these types of remedy has a very different effect on the way in which markets will operate after remedies have been imposed. We therefore take a different approach to modelling each type of remedy.

8. Finally, it is important to note that we take no account of the differing effectiveness or cost of various remedy options in this analysis. For the purposes of this analysis we assume that both system and non-system remedies are fully effective, are costless and drive the level of 'excess' PPI profits to zero in each case.

Modelling the effects of non-system remedies

9. In our provisional findings we found that PPI distributors enjoyed a monopoly position over the sale of PPI to their credit customers. As such, the majority of consumers do not 'full life cost', in that, when choosing their credit product, they do not consider the subsequent price of PPI.

10. This aspect of consumer behaviour drives our modelling methodology. The basic approach is to use observations regarding current prices, volumes and elasticities of demand to extrapolate a PPI demand function. We then test the effects of interventions which do not change this basic aspect of consumer behaviour, to predict the likely impact on prices and volumes and finally measure the welfare consequences.

11. In our basic model we make the following simplifying assumptions:

(a) There are 'n' identical firms which compete in the markets for credit but are monopolists over PPI sales to their respective credit customers.[1]

(b) Only those customers who have taken out credit go on to observe PPI prices (ie PPI information is provided at the credit point of sale).[2]

(c) In our base case, competition for credit customers is vigorous such that firms make no profits overall over the 'system' of PPI and credit.

(d) We assume that the current prices and volumes of PPI and credit are optimal and that firms are profit maximizing.

(e) Our modelling approach assumes that demand curves are linear.[3]

12. In order to construct a working model, it is necessary to calibrate the model. In our base case we calibrate our model using the same observations used in Appendix 3.9 of our provisional findings, based on the dataset provided to us by the large distributors. However, we also test the sensitivity of our results to different values for these parameters.

13. The analysis proceeds in several steps. The first step is to derive the current (factual) demand curve for PPI. We do this by observing the current price and quantity of PPI demanded and the current elasticity of demand faced by PPI suppliers. From this, we can extrapolate a PPI demand function. This function predicts the quantity of PPI demanded at a given price, all else being equal. Table 1 provides an example from our PLPPI model.

[1]This assumption reflects the market definition in our provisional findings, where we considered that distributors were effectively monopolists over the supply of PPI to their own credit customers.
[2]We use price as shorthand for the competitiveness of the offers firms make to consumers. In practice, this may be some combination of price, quality, service or any other factor. In particular, in the case of credit markets firms may respond by increasing price or by reducing their risk tolerance in the form of raised credit score cut-offs.
[3]We use linear demand for simplicity; however, we do not believe that a different assumption regarding the shape of the demand curves (for example, using constant elasticity demand curves) would yield significantly different results.

TABLE 1 **Factual PPI demand function for PLPPI**

	Parameter	*Notes*
P = a – bQ	0.78	Cost of PPI 78p per month per £100 of loan—analogous to an APR for PPI
Q=(a–P)/b	340000	PPI penetration rate by value of 34% and illustrative total credit sales of £1,000,000
E = (dQ/dP).(P/Q)	–1.54	The elasticity of PPI demand implied by the GFK NOP 2008 survey results*
dQ/dP = E.(Q/P)		
dQ/dP =	–671282	
dP/dQ = b =	1.48969E–06	
a =P+bQ=	1.28649	

Source: CC analysis based on data from the parties and GFK NOP 2008 survey results.

*In order to satisfy assumption *(d)*, that current prices are optimal, we take the estimate of elasticity closest to the profitability frontier in Appendix 3.9.

14. Using this demand function, we can predict the effect of changes in PPI prices on the volume of PPI sold, all else being equal.

15. The second step in our analysis is to derive the likely 'waterbed effect' on credit prices if the excess profits made on PPI were removed by regulation. In our base case we calculate the 'pricing distortion' in credit using the first and the third of our core assumptions in paragraph 11. If firms make zero 'excess' profits over the system, then the excess profits on PPI must be distributed across the revenue earned in credit. The cumulative value, over 'n' firms, of the excess profits made in PPI therefore results in a discount on credit prices, such that the total value of the 'discount' over all credit sold is equal to those excess profits. Given in our model that all 'n' firms are identical, the value of the credit discount offered by one firm will be equal to its own excess PPI profits also.

16. The 'counterfactual' credit price, in the scenario where there are no longer excess profits in PPI, will be increased to the marginal cost of credit. This increase in prices will lead to a reduction in the level of credit sales.[4] In order to simulate the effect of an increase in prices on sales of credit, it is necessary to make a further assumption

[4]Provided that there is no change in the proportion of consumers that shop for PPI prior to the point of sale, and can therefore anticipate lower secondary market prices. This possibility is assessed in our second model of 'system' remedies.

regarding the elasticity of demand for credit to credit prices. This allows us to extrapolate a demand function for credit in the same way as we did for PPI.

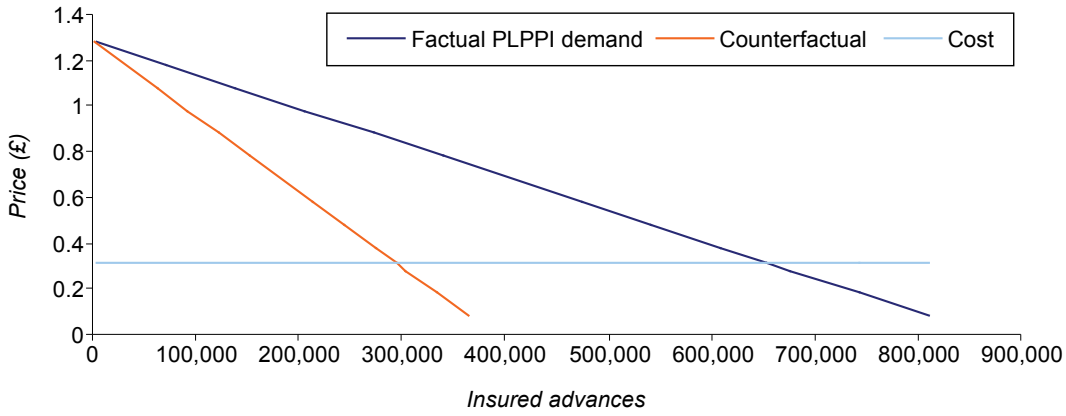
17. We do not have sufficient information directly to observe the market elasticity of credit demand to credit prices (the market elasticity of demand for credit). In our base case we therefore assume that the market elasticity of demand for credit is the same as the elasticity of demand faced by a monopolist for PPI. This symmetry in demand elasticities means that our results are not driven by assumed differences in the responsiveness of demand for PPI and credit. This assumption is generous (to the non-intervention view), as there are good economic reasons to believe that the market responsiveness of credit demand to changes in credit prices is lower than that of PPI demand, in the context of high PPI prices and excessively low credit prices. We therefore treat this estimate as an upper bound to the elasticity of credit demand, and test the sensitivity of our results to lower values of this assumption.

18. Given that there has been, in this scenario, a waterbed effect on credit prices, and as a consequence of this there are fewer credit sales, we would also expect sales of PPI to fall, as fewer customers are passing through the point of sale. This means that the demand curve for PPI will shift inwards. In order to calculate this demand shift, we make a further simplifying assumption. We assume that at a given PPI price, the penetration rate will be the same. The effect of a decrease in credit sales under this assumption will be that, for a 10 per cent reduction in credit sales, we would expect 10 per cent fewer PPI sales at a given PPI price. The demand curve for PPI will therefore pivot inwards as shown in Figure 1.[5]

[5]Some of the parties commented that this assumption was optimistic since PPI customers were more heavily distributed towards higher credit risk segments. It is in these higher-risk segments that credit pricing is most heavily distorted. Waterbed effects on credit prices and credit score cut-offs will therefore affect PPI customers more heavily than the average credit customer. This leads to an upward bias in the results of our analysis of the effects of non-system remedies on consumer welfare. We acknowledge that this is a valid criticism of our approach to pure non-system remedies, and that therefore the results of our non-system models overestimate the positive effects, or underestimate the negative effects of a pure non-system remedy on total consumer welfare. However, as there is insufficient information available to model effects within risk bands, we are unable to quantify the likely scale of this bias.

FIGURE 1

The effects of a PLPPI price cap



Source: CC analysis.

19. This allows us to calculate the 'counterfactual' level of PPI sales, taking into account the effect of higher credit prices on PPI volumes.

20. The final stage of our analysis of non-system remedies is to assess the welfare implications of the market changes that we have calculated. We do this as set out in Appendices 6 and 7, using the factual and counterfactual prices, and the factual and counterfactual demand functions. We then compare the level of total and consumer welfare post intervention (the counterfactual) with the level of total and consumer welfare that prevailed before intervention (the factual).

Modelling the effects of system remedies

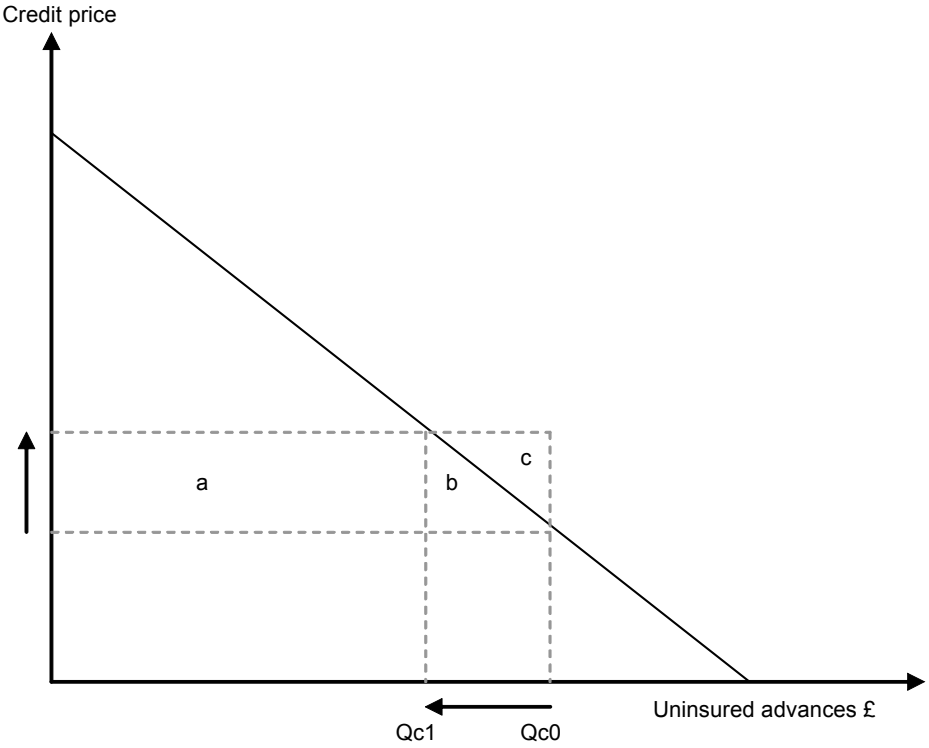
21. We take a different approach to simulating the effects of a 'system remedy'. This is because a system remedy, if effective, will alter customer behaviour. With a fully effective system remedy, consumers can observe and react to secondary market prices, once the remedy is in place.

22. To analyse the effects of a system remedy, we divide credit customers into two groups. The first group consists of those customers that place little value on PPI and

demand credit only. These customers observe that the price of credit has risen (to marginal cost) in the counterfactual. As a result they purchase less credit, and suffer a loss in consumer welfare as a result of higher prices. This is illustrated in Figure 2.

FIGURE 2

The effect of a system remedy on non-PPI credit customers



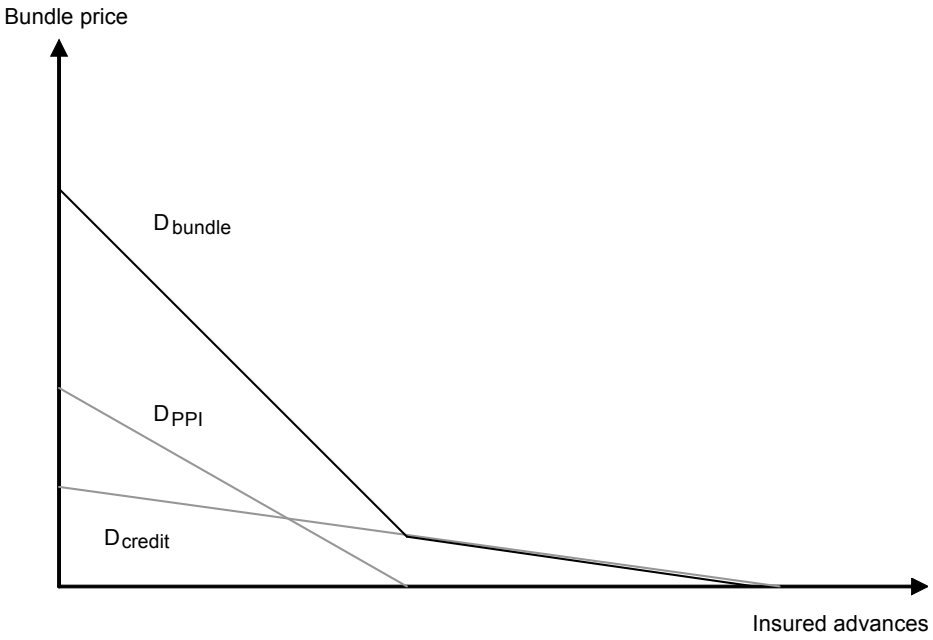
23. The effects of the system remedy on this group of customers are negative. Customers now pay a higher price for the amount Qc1 they had already bought previously, leading to a loss in their consumer surplus equal to area 'a'. Moreover, customers reduce credit purchases by Qc0–Qc1, leading to a loss in their consumer surplus of area 'b'. However, because this amount was previously sold to customers below cost, there is a gain in total welfare and to total consumer welfare of area 'c'.[6]

[6]However, our model does not explicitly calculate this area since this would introduce a risk of double counting. In the factual, this area represents a transfer of welfare from PPI consumers to credit consumers which is lost due to the deadweight loss of pricing credit below cost. This area is therefore more accurately characterized as a proportion of PPI profits which are passed through in the form of low credit prices, but which does not result in increased welfare for credit customers.

24. Second, there are those credit customers that value PPI and therefore demand a 'bundle' consisting of credit and PPI. The demand for the bundle can be obtained by aggregating the demand for credit and PPI as shown in Figure 3.

FIGURE 3

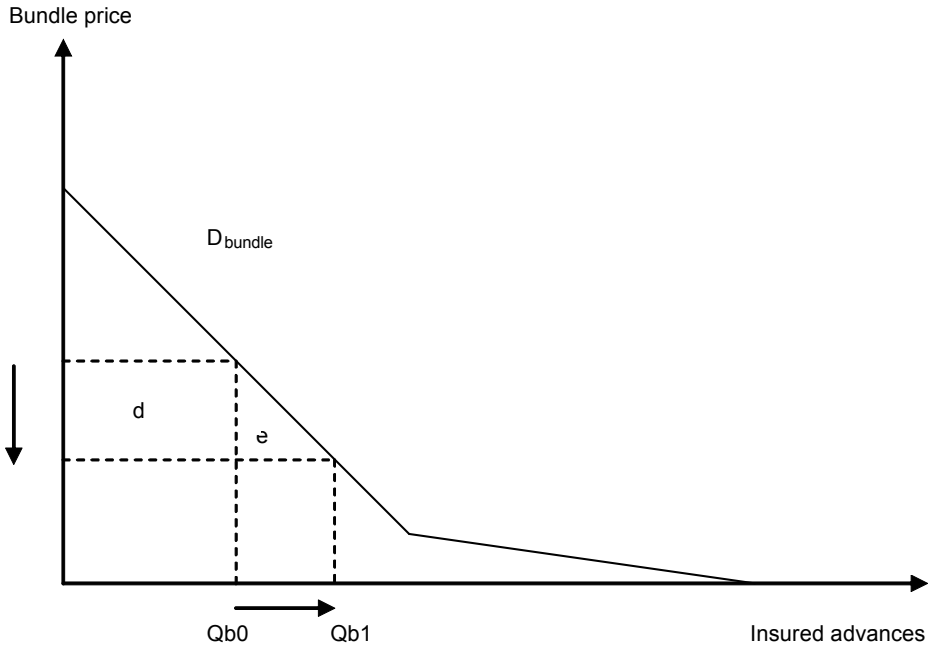
Demand for a bundle consisting of credit and PPI



25. By virtue of the system remedy, these customers now observe that the price of the bundle has fallen and therefore demand more. Figure 4 shows that the effect of a system remedy on PPI customers is to raise their demand, increasing the sales of insured advances from Qb0 to Qb1. There are two effects on consumer welfare. First, since customers have to pay less for the quantity Qb0 which they already bought previously, there is an increase in consumer surplus equal to area 'd'. Secondly, the fall in the price of the bundle leads customers to increase the amount they buy by Qb1–Qb0. This leads to a further gain in consumer surplus of area 'e'. There is therefore a gain in consumer surplus equal to area 'd' plus area 'e' on the diagram.

FIGURE 4

The effect of a system remedy on PPI customers



26. The net effect on total consumer welfare of a system remedy is therefore given by the sum of the positive effects on PPI customers (area ‘d’ plus area ‘e’ in Figure 4) and the loss of inefficiency associated with below-cost sales of credit (area ‘c’ in Figure 2) less the negative effects on non PPI customers (areas ‘a’ and ‘b’ in Figure 2).

27. We applied this basic conceptual framework in order to simulate the effects of a system remedy on PPI and non-PPI customers. As with modelling an aftermarket remedy, this necessitates some simplifying assumptions.

28. The first computational step in this analysis is to assess the relative sizes of the PPI and non-PPI customer groups. We do this by using the factual PPI penetration rate. This gives us the initial number of PPI and non-PPI customers, and using initial

prices, sales volumes and estimates of elasticities we can extrapolate factual demand functions in the usual way.[7]

29. To simulate the impact of the system remedy, we derive the bundle demand curve by aggregating the demand for credit and PPI of PPI customers (as illustrated in Figure 3).

30. We then apply the change in PPI and credit prices to the counterfactual demand functions to arrive at counterfactual market outcomes.

31. However, we do not model the impact of customers choosing to move between groups as a result of changes in relative prices. It is possible that some customers would become PPI purchasers at the lower post-intervention price. In our model we do not identify these customers and they are treated as non-PPI customers. Our results therefore offer a lower bound on the benefits of a system remedy and an upper bound on the value of the consumer welfare losses, since some of the customers to whom we have attributed a loss may in practice suffer smaller losses, or even a gain, in welfare as a result of the remedy.

The views of the parties on our approach

32. In their responses to our consultation on technical analysis to aid decision-making on remedies, several parties commented that our models were, in their view, simplistic and did not give an accurate reflection of the markets of PPI. In particular, parties commented that there was no explicit modelling of the following:

(a) the effects of adverse selection;

(b) the effects on different risk segments of customers;

(c) the effects of differences in distributors' business models; and

[7]As with our previous model of aftermarket remedies, we assume that the responsiveness of credit demand is equal to the responsiveness of individual firm PPI demand.

(d) the likely effects of each of the individual remedy options outlined in our remedies notice.

33. We consider that our approach is appropriate for the task for which it was designed, namely to assess the implications of possible waterbed effects on our analysis.

34. Although adverse selection is an important feature of credit and insurance markets, we do not believe that adverse selection has a significant bearing on the likely scale of waterbed effects, nor on the effects of those waterbed effects on consumers. Similarly, whilst we recognize that there are differences in distributors' business models, we do not believe that this has any bearing on the size or consumer impact of any waterbed effects.[8]

35. A number of the parties commented that we had not explicitly modelled each of our remedy options. We do not consider that it is necessary to construct a formal economic model of every remedy option under consideration. We consider the effects of our remedies package as a whole in paragraphs 372 to 400 of our provisional decision on remedies.

36. Finally, a number of the parties commented that we had not taken into consideration the possible differences in waterbed effects on different segments of the credit market by risk score. We recognize that there will be differences in the scale and impact of waterbed effects by risk score. In particular, customers in higher-risk segments will be more heavily affected by waterbed effects as outlined in Appendix 3. Given the data available to us, it was not feasible to construct a model that incorporated differences in credit risk between customers. However, we consider that

[8]This is because waterbed effects will show up at the market level in the credit markets. For example, we would expect that distributors will face a similar level of competition in the markets for credit. In this context, it would be difficult to conclude that there could be large differences in the extent of the waterbed effect in terms of the proportion of PPI profits passed through.

our approach, which models the average effect across risk scores, is nonetheless informative.