The UK betting and gaming market: estimating price elasticities of demand and understanding the use of promotions

A REPORT PREPARED FOR HM REVENUE AND CUSTOMS

June 2014

Her Majesty's Revenue and Customs Research Report 313

The views in this report are the author's own and do not necessarily reflect those of HM Revenue & Customs.

Published by HM Revenue and Customs, June 2014

www.hmrc.gov.uk

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Glossary

Table 1. Glossary of acronyms and terms

Term	Definition
2SLS	Two-stage least squares (estimation approach for instrumental variables)
EBITDA	Earnings before interest, tax, depreciation and amortization, widely used measure of company performance
FIML	Full information maximum likelihood, estimation method used in particular when data are missing
FOBT	Fixed odds betting terminal, machine offering fixed odds bets (e.g. casino games) usually found in bookmaker shops
GBD	General Betting Duty
GDP	Gross Domestic Product
GGY	Gross Gaming Yield, measure of gross operator win from gambling (stakes less payouts)
GC	Gambling Commission
HMRC	Her Majesty's Revenue and Customs
IV	Instrumental Variables, estimation technique when a variable is believed to be endogenous (determined within the model)
OLS	Ordinary Least Squares, common econometric estimation technique
Parimutuel	Pools-based betting where payouts depend on total stakes
ROI	Return on Investment
Remote gambling	Gambling conducted online or by telephone or other interactive means (e.g. interactive TV)
SWP	Skills With Prizes, type of machine-based gamble where prizes can be won (e.g. quiz machines)
Terrestrial gambling	Gambling conducted at a specific location (e.g. in a bookmaker, casino or bingo club).

Executive Summary

Introduction

HMRC commissioned Frontier Economics to undertake research to produce price elasticity estimates for specific sectors of the UK gambling market, including both terrestrial (land-based) and remote (online) gambling. Specifically, we were asked to estimate own- and cross-price elasticities for eight sectors of the gambling market:

- Terrestrial betting;
- National Lottery (main-draw, scratchcards, online instants);
- Terrestrial gaming;
- Gaming machines;
- Terrestrial bingo;
- Pools;
- Remote betting; and
- Remote gaming.

HMRC also commissioned Frontier Economics to analyse the types of promotions used by gambling companies, why these promotions are used, and how changes in gambling duties impact on gambling companies' strategies regarding player promotions.

Study objectives

There were two main objectives of the study. First, to refresh HMRC's UK gambling model which is used to cost policy measures and facilitate policy development related to the gambling market. The model was previously based on elasticity estimates from a 2005 study. Since then, the economic environment has changed, and there have been a number of legislative and tax changes that have affected the gambling industry. There has also been a significant shift in the popularity of different forms of gambling, including the move to remote gambling. These changes suggested that an update of the elasticity estimates was required.

Second, the study aimed to understand better how and why promotions (special offers, discounts and other similar inducements) are used in the gambling market, and how businesses apply changes in costs to various activities including the use of promotions. There was particular interest in these issues for remote gambling.

Approach to elasticity estimation

To estimate price elasticities of demand, we conducted econometric analysis of primary data collected from 13 firms across different sectors of the UK gambling market. These data were supplemented with other data provided by the Gambling Commission, HMRC and online sources.

We used sector-level time series methods based on a combined dataset compiled from these sources. A significant amount of effort was devoted to finding the best data and modelling approach that could be used for each sector.

There were two main challenges for the econometric work. First, we were unable to obtain reliable data on gambling prices and quantities in all of the sectors required for the analysis (in particular pools and machine-based gambling). Second, where we were able to obtain data, the econometric estimates were largely based on ordinary least squares (OLS) models relating quantity to price (and other factors). Owing to concerns about measurement error and the potential endogeneity of the price variable in demand models, it is more common to use instrumental variables to identify the impact of price on quantity demanded. In previous studies, instruments have usually been based on tax or regulatory reforms. However, our data span the period from the early 2000s onwards. Over this period there have been very few significant changes to UK gambling duties, and while there was a significant regulatory reform from the 2005 Gambling Act, we found no evidence that it was a reliable instrument for price. The use of OLS can lead to biases in the estimates, though the accuracy of these estimates can in principle be tested after changes to price and the consequent reaction of the market have been observed.

As a result, we produced final preferred elasticity estimates not only on the basis of the econometric modelling, but also drawing on evidence from a detailed literature review and insights from economic theory. The literature review highlighted that previous evidence on UK gambling elasticities has focused quite heavily on the National Lottery, with little evidence from other sectors, and very little evidence exists on cross-price elasticities between different sectors of the gambling market.

Given this lack of previous evidence, this study breaks new ground which provide significant new insights, but further evidence would still be useful to build the evidence base, especially given recent significant changes to the market (such as the growth of online and machine-based gambling).

Approach to understanding the use of promotions

We drew on nine semi-structured qualitative interviews conducted with eight different gambling companies to discuss their pricing and promotional strategies. A topic guide was developed to help conduct the interviews and gather the evidence. The interview findings were then subject to a thematic analysis and the

key messages synthesised to draw out similarities and differences in the responses.

Key conclusions: price elasticities

Our preferred own- and cross-price elasticity estimates for each sector are presented in **Figure 1**.

Figure 1. Preferred elasticity estimates

		Change in quantity								
		Lottery (draws)	Lottery (scratchcards)	Terrestrial betting	Pools	Terrestrial bingo	Terrestrial gaming	Gaming machines	Remote betting	Remote gaming
Change in price	Lottery (draws)	**-1.08**	+0.10	+0.10						
	Lottery (scratchcards)	+0.10	**-1.30**							
	Terrestrial betting	+0.10		**-1.00**						
	Pools				**-0.485**					
	Terrestrial bingo					**-1.00**				
	Terrestrial gaming						**-0.50**			
	Gaming machines							**-0.60**		
	Remote betting								**-0.50**	
	Remote gaming									**-1.50**

Source: Frontier Economics

We find that demand is most price sensitive for remote gaming, lottery main-draw products and scratchcards. Demand for terrestrial betting and bingo is unit elastic (i.e. a 1% increase in price leads to a 1% fall in the quantity demanded). Our work suggests that demand is less sensitive to price changes for pools, terrestrial gaming, gaming machines and remote betting.

We find some evidence of substitution between lottery (main-draw) and betting, and lottery (main-draw) and scratchcards. We find no consistent evidence in the literature or in our estimation work of substitution or complementarity between the remaining sectors.

Key conclusions: the role of promotions

Types of promotions and their effectiveness

For the firms we interviewed, promotions are an integral part of broader marketing in the gambling market. Promotions are used for customer acquisition, customer retention and customer re-activation. A range of different types of promotion are used to achieve these goals. The most commonly described types of promotions included various forms of 'freeplays' (offering bonus deposits to customer accounts or free opportunities to bet or game with the company) and

'cashbacks' (offering customers some or all of their losses back, either as cash or as restricted bonus funds which can only be used for further gambling).

Firms were able to assess the effectiveness of promotions, though how this was done varied by company. Some firms employed very sophisticated methods – using control groups and randomising offers. These firms try to calculate a return on investment figure for each promotion. Other firms argued that evaluating promotions was more about judgement than measurement, so took a more holistic approach. Promotions evolve: most firms we spoke to said that they discard promotions that are ineffective and enhance and develop promotions that meet their customer-focused objectives.

Promotions and customer behaviour

For the remote gambling companies we spoke to, most believed that promotions affect customer choices of which company to gamble with, and all said that offering competitive promotions was a vital part of the industry. In most cases, interviewees felt that consumers are increasingly coming to expect promotions as part of the offering from online betting and gaming companies, and that consumers were becoming more 'sophisticated' in how they compared the offerings from different companies. For example, there was argued to be an increasing use of sites comparing odds offered by remote betting companies, and the bonuses being offered by different remote gaming companies.

Cost and duty changes and use of promotions

Most of the companies we spoke to argued that in the event of an increase in costs (whether through tax changes or other changes in overheads), the promotions and marketing budget would be vulnerable to being cut. This was particularly true for online gambling companies, and for longer-term cost shocks. In some cases, companies noted that short-run cost shocks could be absorbed without any particular impact on the use of promotions, often because marketing budgets are fixed for some period of time.

Acknowledgements

We are grateful to the project steering group from HMRC and HM Treasury who provided valuable comments and insights throughout the preparation of this report. We are also grateful to all those within gambling companies and the Gambling Commission who helped with this work by providing data for the analysis, and company representatives who were interviewed as part of the work. Useful advice and information was also provided from representatives of a number of trade associations.

We are also extremely grateful to Professor Ian Walker of Lancaster University Management School for advice, comments and support throughout this project, and to Dr. Suzanne King for helping to prepare for and conduct the interviews with companies.

1 Introduction

1.1 Background

HMRC commissioned Frontier Economics in September 2013 to conduct an econometric analysis to estimate own- and cross-price elasticities of demand for the UK betting and gaming market. This included a focus on a number of sectors, divided between terrestrial gambling (where the gamble takes place in licensed premises such as a bookmaker shop, bingo club or casino) and remote gambling (online, phone-based or television-based gambling). The sectors of interest were:

- Terrestrial betting: including fixed odds bets placed in betting shops, and pools (Tote) betting on horse/dog racing;
- National Lottery: including main-draw based games, scratchcards and online instants;
- Terrestrial gaming: including land based casino games;
- Gaming machines: including fixed odds betting terminals (FOBTs), machine-based casino games and skills with prizes (SWP) machines;
- Terrestrial bingo: including land-based bingo games;
- Pools: including football and other pools betting;
- Remote betting: including online and phone-based betting;
- Remote gaming: including online casino and poker games and online bingo.

HMRC were also interested in understanding better the use of promotions (special offers, discounts and other similar inducements) in the industry, and how changes to costs (including gambling duties) might affect the use of promotions or other price responses in the industry. There was particular interest in these issues for the remote gambling market where the use of promotions is expected to be more prominent.

The elasticity estimates will inform HMRC's gambling model which is used, among other things, to cost policy measures. HMRC's current estimates are based on previous modelling work from 2005 which drew on a range of data sources to estimate elasticities.[1] However, since then, the gambling market and related policy environment has changed significantly: certain regulatory and tax

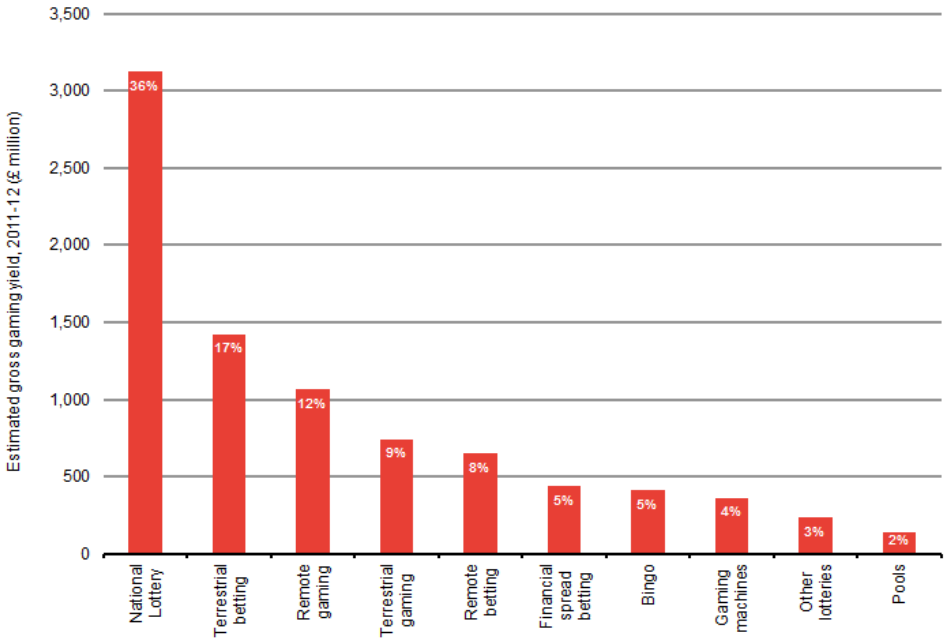
[1] Paton, D. and L. Vaughan Williams (2005), *Modelling the UK Gambling Market*, HMRC and DCMS

reforms have been implemented, and some sectors have grown significantly in popularity. The aim of this analysis is therefore to provide an updated set of own- and cross-price elasticities which reflect those changes and make use of more current evidence.

For example, the 2005 Gambling Act introduced a new regulator in the Gambling Commission, which also recently took regulatory responsibility for the National Lottery by merging with the National Lottery Commission.

Recent years have also seen strong growth in remote gambling and in machine-based gaming. **Figure 2** below draws on a number of sources (including the Gambling Commission, gamblingdata.com and the IG Index Annual report) to estimate the landscape of the UK gambling market in 2011-12, the most recent year for which consistent data across the market can be compiled. It shows the size of different sectors of the market as measured by the Gross Gaming Yield (GGY), a measure of gross profit.

Figure 2. Estimated UK gambling market by sector (GGY)



Source: Gambling Commission, gamblingdata.com, IG Index, Frontier Economics

We estimate the total market size that year to be around £8.6 billion, of which just over a third comes from the National Lottery (draw-based games and scratchcards) and 17% from terrestrial betting (betting in betting shops). Terrestrial gaming (casino gambling) makes up just under 10% of the market. The remote sector made up an estimated 20% of the market (12% gaming and 8% betting) and gaming machines around 4%, though both are likely to have grown since 2011-12.

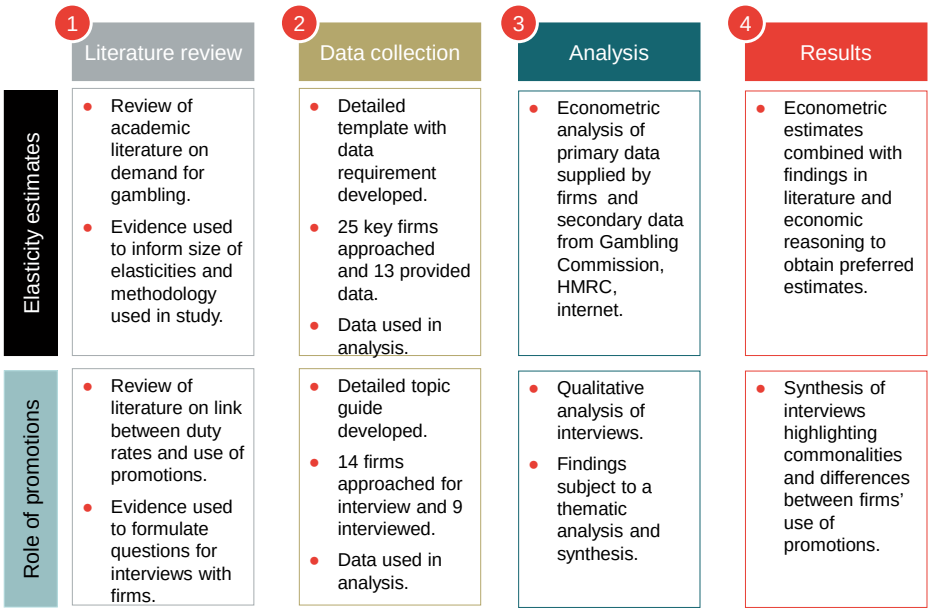
Introduction

1.2 Project methodology

We drew on primary data (quantitative and qualitative) collected from gambling companies over the period November 2013 to February 2014 to address the key questions in this study.

Our overall approach to the project is illustrated in **Figure 3**.

Figure 3. Summary of project approach



Source: Frontier Economics

For both work streams (elasticity estimation and the use of promotions), the work involved four steps.

Step 1: Literature review. The purpose of this part of the project was to identify relevant existing research focusing on both work streams. Our objective was not to conduct a full meta-analysis but rather to summarise as much existing evidence as we could to inform this study. The review provided valuable background to the study as it helped us to formulate our methodology, to interpret our econometric analysis in the context of existing research, and to develop a set of hypotheses around the use of promotions.

The literature review highlighted the elasticities previously estimated by researchers as well as the methods and data commonly used in the literature.

Step 2: Data collection. Following the review of the evidence, we developed an econometric methodology for the study, including scoping the data required and possible data sources. We collected data directly from gambling firms. This was supplemented by obtaining aggregate sector-level tax receipt data from HMRC, and further data from the Gambling Commission and online sources.

For the elasticity estimation we developed a detailed data template clearly setting out what information we required. The data template was shared with participating firms together with background information on the project. This ensured the data we received were consistent. In total we contacted 25 firms of whom 13 supplied us with data.

For the role of promotions we developed a detailed topic guide which we used when conducting semi-structured interviews with representatives of firms with responsibility for the use of promotions. A number of firms were contacted and 14 firms were invited to participate in the interview. In total we conducted nine interviews with eight different firms. The focus was online gambling companies but interviews were also conducted with terrestrial gambling companies to provide some basis for comparison.

Step 3: Analysis. For the elasticity estimation empirical models were developed which made best use of the data collected from the various sources. Our results are based on sector-level single equation estimates using both Ordinary Least Squares (OLS) and, where possible, Instrumental Variables (IV) approaches. A large number of robustness checks and alternative modelling approaches were carried out. The detail of our approach and the rationale for the empirical methods used is set out in more detail in Section 3.

For the role of promotions, each interview was written up and agreed with the interviewees who were able to check for factual inaccuracies in the interview summary.

Step 4: Results. Drawing on data we collected, we estimated sector-by-sector time series models of demand to calculate price elasticities. We used the econometric estimates in combination with existing research from the literature review and economic reasoning to arrive at our preferred set of estimates.

Having conducted and written up the interviews on the role of promotions, the findings were subject to a thematic analysis and synthesis. We were interested not only in summarising the findings across the interviews, but also in looking at any differences in the responses across different types of firm or gambling (e.g. by size, across remote and terrestrial gambling, across betting and gaming services).

1.3 Structure of the report

This report details our approach to the study and our findings. We begin in Section 2 with a summary of the literature review looking at price elasticities of

demand for gambling and the use of promotions.[2] In Section 3 we set out our approach to providing new econometric estimates of elasticities for the UK gambling market, including how data were obtained and the modelling approach used. We then set out the econometric results and our best judgement (using a combination of evidence from the econometric modelling, previous literature and economic theory) on an appropriate set of own- and cross-price elasticities to reflect the UK gambling market.[3] In Section 4, we describe our approach to gathering evidence on use of promotions and the main findings.[4] Finally, Section 5 concludes.

[2] The full review can be found in Appendix A.

[3] Appendix B gives key descriptive statistics from the data collected, and Appendix C the full econometric results from our preferred specifications.

[4] Appendix D outlines the topic guide used to guide the semi-structured interviews in the qualitative work, and Appendix E gives a short summary of seven of the nine interviews conducted.

2 Literature review

2.1 Approach to the review

We reviewed the existing literature which estimates own- and cross-price elasticities of demand in different sectors of the gambling market. The aim of the review was to provide information on:

- The methodologies typically used in studies estimating gambling market elasticities and the factors which influence elasticities;
- Previous findings which could be used to provide context to the figures emerging from the original econometric work in this study, and to help reach an evidence-based judgement about the final elasticity estimates.

Our objective was not to conduct a full meta-analysis but rather to summarise as much existing evidence as we could to inform this study.

We examined a number of academic papers covering the UK, USA and other countries spanning the last three decades. A number of well-established databases were searched such as Econlit, JSTOR, Science Direct, ABI Inform, Emerald Fulltext Management Extra, Business Source Complete, Wiley Online Library and Google Scholar. We also conducted searches of the grey literature using the Google search engine.

The following search terms were used both individually and in various combinations: gambling, elasticity, gaming, demand, elasticity, casino gambling, remote gambling, online gambling, lottery, betting, bingo, pools, own price-elasticity of demand for gambling, cross-price elasticity of demand for gambling, are gambling products substitutes, substitutability in gambling, the sensitivity of gambling demand to changes in price.

Our strategy was to subject each paper identified as possibly relevant to the study to an initial abstract sift. We then selected those which appeared relevant and conducted a review of the introduction and conclusions to ascertain whether or not the paper estimated own- and/or cross-price elasticities of demand for a sector or sectors of the gambling market. Those which did were reviewed in full to extract information on methodology and the key findings which were summarised into a common framework. The focus was on papers looking at elasticities for particular market sectors, rather than overall elasticities for gambling. We also focused on price elasticities rather than income elasticities.

For lottery, betting, gaming machines and casino gaming we were able to find a reasonably good evidence base on own-price elasticities. For bingo, pools and remote gambling the literature appears to be relatively sparse. We also found

relatively few papers which looked at cross-price elasticities between different sectors of the gambling market.

HMRC were also interested in the use of promotions in the gambling market and how changes in costs (including gambling duties) might affect prices or promotions. To examine this, we extended the scope of the literature search (using the same sources outlined earlier) to include combinations of the following terms: gambling, gaming, casinos, bingo, lottery, tax, incidence, promotions, pass-through, discounts, special offers, pricing strategies, marketing.

We were unable to find any published evidence which looked explicitly at how gambling taxes or cost shocks affected the use of promotions, and only very limited information from other related markets. We therefore looked at literature which addressed related issues which inform the question of interest:

- How important are promotions in different gambling sectors?
- How do promotions in the gambling market affect gambling behaviour and firm outcomes (profit, turnover)?
- Why would firms in the gambling market offer promotions?
- How in theory might promotions respond to changes in gambling excise duties, or other cost shocks?

The evidence on elasticities is summarised in Sections 2.2 (own-price elasticities) and 2.3 (cross-price elasticities). The evidence relating to promotions is summarised in Section 2.4.

The detailed results of the literature review are available in Appendix A.

2.2 Own-price elasticities of demand

Overall, we found that the existing literature on own-price elasticities is limited for many of the sectors of interest (and particularly so if we restrict attention to evidence from the UK). The most-studied sector is lottery gambling. In a number of other sectors such as terrestrial bingo and pools, the only evidence comes from the study underlying the current HMRC model (Paton and Vaughn Williams, 2005). For remote betting and remote gaming we found no existing evidence at all.

Another general theme emerging from the literature review was that in models of gambling demand, the 'price' is not always straightforward to calculate. In general, economic analysis assumes that the price of gambling is the proportion of the total amount staked which is not returned to the gambler. The higher this proportion (the more of the stake which is retained by the operator), the higher is the price. Another way to think about this is that the gambler is assumed to

respond to the expected return from their gambling: the greater the expected return, the lower the price. Of course, gamblers may be motivated by other parts of the price distribution in their decision; in particular very large (but highly unlikely) jackpots may affect gambling demand over and above their impact on the expected return (Forrest et al., 2002).

In modelling the impact of price on demand, another issue to emerge strongly is the need for credible instruments for price. Price is rarely exogenous:[5] instead it is endogenously determined by the interaction between supply and demand in the wider gambling market. The data available to econometricians typically takes the form of the observed equilibrium price and quantity in a given period, rather than the necessary data to estimate separate demand and supply equations. Correlating observed prices and quantities as a way of estimating demand elasticities could generate biased estimates depending on what drives observed changes in price and quantity. For example, if the demand curve shifts between periods (reflecting changes in preferences for different types of gambling, say) while market supply remains unchanged, we would observe positively correlated price and quantity, in effect tracing out the supply curve rather than the demand curve.[6]

Another reason why prices are often instrumented is measurement error. Price data may be based only on a subset of the whole market, or may be misreported. Measurement error is likely to generate attenuation bias,[7] driving elasticity estimates towards zero.

2.2.1 Draw-based lottery games

We identified 15 studies examining own-price elasticities of demand for lottery draws (see Appendix A for details). The studies cover five different countries and most use data from the 1990s and 2000s. Seven studies are based on UK data (though are mostly now based on quite outdated information). We were unable to find any studies which produced own-price elasticities of demand for other lottery products such as scratchcards on the basis of econometric analysis.

Most of the literature looking at draw-based lottery games (particularly in the US and UK) finds an own price elasticity of around -1, though some international studies suggest demand is slightly less price elastic. Some studies find significantly more elastic estimates (e.g. Farrell and Walker, 1999; Forrest et al., 2004), but appear to be picking up substitution across different draws over time or across

[5] Exogenous means externally determined. Endogenous is the opposite - a variable is endogenous in a model if it is a function of other parameters and variables in a model.

[6] This is true if we assume a downward sloping demand curve and upward sloping supply curve in line with economic theory.

[7] Attenuation bias occurs when the independent variable in a regression model is measured with error and the error is uncorrelated with the *true* values of the variable in question. Under these circumstances, ordinary least squares estimates are biased towards zero.

different draw-based games, rather than picking up the demand for lottery draws as a whole.

2.2.2 Terrestrial gaming

Evidence on the own-price elasticities for casino gaming is relatively sparse, and estimates span a range from relatively inelastic to relatively elastic. We identified only three clearly relevant papers (as we note below, many US studies of 'gaming' elasticities are in fact estimates of price elasticities for machine-based games) and only one UK estimate (Paton and Vaughn Williams, 2005). This gave an own price elasticity for casino gaming of around -1.2.

2.2.3 Gaming machines

A number of studies have examined own-price elasticities of demand for machine-based gaming. We identified five separate studies, of which three were US-based. These US studies are based on slot machine gaming in regional casinos, but often refer to the estimates as 'casino' elasticities, since machine gaming dominates casino wagering in their samples.

US-based estimates looking at machines in regional casinos suggest an own price elasticity of demand of around -1. Evidence from the UK is scarce. The sole paper we identified is research carried out by Paton and Vaughan Williams (2005) which implies that the demand for FOBTs is price inelastic (around -0.4) whereas the demand for other gaming machines has an elasticity of around -0.9 in the long run with respect to the tax rate on machines (which can be interpreted as a price elasticity under an assumption of full pass through).

2.2.4 Terrestrial betting

We identified nine studies of the US parimutuel (pools) horseracing market and four UK studies on UK bookmaker betting. The US studies are now somewhat out of date and often rely on quite historical data. These studies use total amount wagered and amount retained to construct quantity and price measures, typically finding highly price elastic estimates. However these are often at the level of a particular track or type of racing. Market level elasticities tend to be somewhat lower, but still price elastic (around -1.3). This is similar to relatively recent estimates based on UK bookmaker betting (Paton and Vaughn Williams (2005) estimate an own-price elasticity of around -1.2; Paton et al. (2004) estimate an elasticity of around -1.6).

2.2.5 Pools

We identified one study (Paton and Vaughan Williams, 2005) which estimates the price elasticity of demand for pools betting in the UK. The study uses government stakes estimates and price data from a large pools operator to estimate a demand model. Price is instrumented using effective tax rates relative

to turnover in the market. The long-run pools betting elasticity is -0.49, and is not significantly different from zero.

2.2.6 Terrestrial bingo

There is little empirical evidence on the price elasticity of bingo demand. Only one paper was identified (Paton and Vaughan Williams, 2005) who use monthly quantity data (total stakes) and price data (proportion retained) from a single operator between 1996 and 2004 to estimate a demand model. They find a long-run price elasticity of -0.42.

2.2.7 Remote gambling

We found no published evidence on price elasticities for remote betting or gaming.

2.3 Cross price elasticities of demand

There is a relatively limited literature estimating how demand for one form of gambling is affected by the price of other forms: few papers analyse data across multiple different sectors of the gambling market. As a result, direct evidence on cross-price elasticities is relatively sparse.

The most consistent evidence that exists tends to suggest that:

- There is substitution (positive cross-price elasticities) between lottery and terrestrial betting;
- There is substitution between lottery and terrestrial gaming;
- Some US-based evidence suggests that the demand for terrestrial betting is reduced by nearby casino availability suggesting substitution (negative cross-price elasticities) between terrestrial betting and gaming;
- Increases in bingo prices appear to be associated with increased demand in a number of other sectors (lottery, casinos and FOBTs), suggesting substitution from bingo to these sectors.

However, overall the evidence base is sparse, little of it relates directly to the UK and, as noted, few papers estimate cross-price elasticities directly though some infer substitution or complementarity based on other measures.

2.3.1 Lottery and terrestrial betting

In general the literature suggests that betting and lottery are substitutes, with cross-price terms in the order of +0.1 to +0.4 (Paton and Vaughn Williams, 2005; Paton et al., 2004). Other studies find indirect evidence of substitution across the sectors (e.g. Forrest et al., 2010). However this result is not consistent

across all papers. For example, although Paton and Vaughn Williams (2005) find that increases in the price of betting increase lottery demand, they also find that increases in the price of lottery reduce betting demand, suggesting complementarity between the sectors. Walker and Jackson (2008) find no significant cross-price relationship between lottery and terrestrial betting.

2.3.2 Lottery and terrestrial gaming

Most of the evidence points to a degree of substitutability between lottery and gaming products (both casinos and gaming machines). Few studies estimate price elasticities directly but they tend to be positive though vary in magnitude (Paton and Vaughn Williams (2005) find that a 1% rise in terrestrial gaming prices increases the demand for lottery by 0.04%, and a 1% rise in lottery prices increases FOBT demand by 1.28%). Indirect evidence from the US looking at how the demand for or tax revenues from gaming are affected by the presence or introduction of state lotteries also suggests that the two are substitutes.

2.3.3 Terrestrial betting/pools betting and terrestrial gaming

There is evidence from the US that casino availability is associated with reduced betting demand, suggesting substitution between the sectors (e.g. Ali and Thalheimer, 1997). Cross-price elasticities of demand between betting and gaming of different forms from a UK study (Paton and Vaughn Williams, 2005) have been estimated to be positive (also suggesting substitution) but are not statistically significant. There is evidence of substitution across forms of betting in the UK (pools and bookmaker) and complementarity between forms of gaming (casinos and FOBTs).

2.3.4 Betting and bingo

Overall there is relatively little compelling evidence for complementarity between these sectors on the basis of estimated cross-price elasticities. One UK study (Paton et al., 2004) finds a positive relationship between bingo demand and betting demand, though they did not have any price data on bingo which would have allowed them to estimate a cross-price elasticity directly. They also find that the statistical significance of this relationship is sensitive to the time period chosen. Paton and Vaughan Williams (2005) do have price data from betting and bingo, and do not find any significant cross-price effects.

2.3.5 Terrestrial and remote gaming

There is relatively little empirical evidence on the degree to which terrestrial and remote gaming are complements or substitutes, and no estimates at all which try to estimate cross-price elasticities between these sectors directly.

Philander (2011) examines the degree of substitutability between online casino gaming and terrestrial casino gaming using US data on sales for both sectors

between 1999 and 2006. He finds evidence of substitution: a $1 increase in online gaming is associated with a $0.28 reduction in commercial casino revenue. However, Philander and Feidler (2012) find that online gaming (specifically poker) is complementary with terrestrial casino gambling. Their evidence is based on state- and province-level demand for the two sectors in the US and Canada. The size of the effect is relatively small: a $1,000,000 increase in terrestrial gaming revenue increases demand for online poker by around $2,500. However the effect is relatively robust to the model specification chosen. It may be that there is a different relationship between terrestrial gaming and online poker compared to other forms of online gaming, but the sparse literature means it is hard to draw any firm conclusions.

2.3.6 Other evidence on cross-price elasticities

As noted above, few papers gather evidence on quantity and price across multiple gambling sectors allowing for robust estimation of cross-price terms. Paton and Vaughan Williams (2005) is the only example we found which was able to estimate cross price effects across a number of sectors. This paper identified various substitutes with a 1% rise in bingo prices associated with a 0.4% rise in lottery demand, 0.44% rise in casino demand and a 2.89% rise in FOBT demand, although the authors argue these estimates are likely to be upwardly biased. Gaming machines and scratchcards are also found to be substitutes (a 1% rise in scratchcard prices is associated with a 0.1% reduction in machine revenue); this is a revenue elasticity rather than a demand elasticity.

2.4 Promotions in the betting and gaming market

2.4.1 Economic rationale for promotions

At a very basic level, any company using promotional offers would do so in the belief that it raises long-run profits. Economic theory outlines a number of avenues through which promotions could raise profits (summarised in Appendix A). Importantly, promotions could increase profits even without raising the overall demand for gambling (e.g. through price discrimination or increased market power).

2.4.2 Importance of promotions over time and sector

There was little published evidence on trends in gambling promotions over time or across sectors, and none at all for the UK. In the Atlantic City casino industry, Marfels (2010) shows that spending on 'complimentaries' (including free play coupons and cashback) rose from 11.1% of revenues in 1980 to 36.2% in 2009.

Some evidence suggests that advertising spend by gambling firms has been increasing in the UK and other jurisdictions (Monaghan et al., 2008). Microsoft Advertising (2011) show total advertising spend by gambling operators in the UK

rising from less than £100 million in 2006 to almost £140 million in 2010. To the extent that spending on advertising and promotions are positively correlated this suggests that promotions are more common now than in the past, though detailed data on this are lacking.

2.4.3 Impact of promotions on gambling behaviour

Some studies have explored whether promotions appear to affect consumer decisions about whether, how much and with whom to gamble. However the literature is fairly limited and not very systematic. Evidence includes a combination of self-reported evidence from gamblers (which may be subject to misreporting) and observational behaviour of specific promotions (which may miss wider or long-term impacts, and are hard to generalise). In general though there is at best mixed evidence that promotions increase the amount gambled.

Most of the evidence is focused on the terrestrial gaming sector in the US and Australia. There is some UK survey evidence suggesting that promotions are a key driver of decisions over which *online* casino to gamble with (Microsoft Advertising, 2011) although this does not shed light on the impact on the aggregate level of gambling.

2.4.4 Impact of promotions on profits

Even if promotions raise the demand for gambling they may not be profitable for firms once the discounted price or costs of running the promotions are taken into account. Empirical evidence is limited to the US casino industry and somewhat mixed in its conclusions.

2.4.5 Impact of tax changes on use of promotions

Standard economic theory suggests that changes in gambling excise duties would ultimately be borne by the less elastic side of the market (supply or demand). If regulation or other restrictions limit how supply could respond to a tax change, then we might expect most of the incidence of a tax change to be borne by the industry (in particular returns to labour, capital or shareholders) rather than consumers. However the degree of regulation on supply responses could vary across sectors. In addition, there are a number of ways in which operators can change aspects of the price of gambling (including promotions), and the 'pass-through' of a tax shock to these different prices could vary. Finally, the standard analysis only applies to competitive sectors; many gambling sectors are better characterised as oligopolies where the theory of pass-through is not clear.

There is little direct empirical evidence on pass-through rates or the impact of tax changes on promotions from the gambling market. Evidence from the alcohol market suggests that tax changes can be more than fully passed through into consumer prices (e.g. Kenkel, 2005). Evidence from the tobacco market (Chaloupka et al., 2002) suggests that promotional offers can (at least initially) be

increased in the face of excise tax increases, as a defensive and strategic advertising response by industry.

Literature review

3 Econometric estimates of elasticities

3.1 Introduction

Having reviewed the existing evidence on price elasticities of demand in the betting and gaming market, we now proceed to estimate a new set of elasticities for the UK, estimating a series of demand models for different market sectors based on a unique dataset collected from a number of sources. This includes a significant amount of data collected from companies operating in the UK gambling market, supplied to us on a confidential basis for this study.

In the following sections we discuss our data sources, the econometric methods used to estimate own- and cross-price elasticities of demand, and the results. We then describe a preferred matrix of elasticities, based in part on the econometric estimates as well as information from previous studies and economic judgement.

3.2 Data

The data we have used come from four sources:

- Gambling companies;
- HMRC tax return data;
- The Gambling Commission;
- Data from online, publicly-available sources (lotto.merseyworld.com and www.national-lottery.co.uk).

We use data supplied by gambling companies in all sectors except those where data were not made available to us,[8] or where we did not have sufficient coverage of the market from the supplied data to be confident in the robustness of our results.[9] In some cases, although data were supplied by the industry, we were not able to use them for econometric analysis.[10]

The key variables required to estimate price elasticities are measures of quantity and price. We follow the convention in previous literature, and define them as follows:

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[8] National Lottery products.

[9] We obtained data from only one pools gambling company; our pools model is based on HMRC data.

[10] For gaming machines although data were supplied by companies these were not used due to certain features of the data discussed in detail in Section 3.4.8.

- **Quantity** is defined as a measure of gross stakes, or amount wagered; and
- **Price** is defined as the proportion of stakes retained by the gambling company. In other words, price is not the physical amount paid by individuals to participate in a game of chance, but rather the expected loss of participation per £1 spent.

3.2.1 Data collected from companies in the UK betting and gaming market

One of the key objectives of this project was to collect up-to-date information from gambling companies to inform the econometric work. As part of the project we contacted a large number of firms active in the eight sectors of the gambling market we were commissioned to study. The general response by firms was very positive and we were able to collect, over a period of several months, considerable amounts of data giving us sufficient coverage to allow us to study most of the sectors of interest.

The project focused on the key firms within each gambling sector. We identified the largest firms in each of the relevant sectors based on various data sources.[11] In consultation with HMRC, a list of 25 firms to approach was drawn up in Autumn 2013. Key contact points were identified in each company, and a letter was sent to explain the purpose of the research. This was followed up by email and telephone contact to enquire about firms' willingness to participate in the study by providing us with data. Those who were willing to participate were sent a detailed data template outlining the data required for the study, and were also asked about their willingness to be interviewed about their use of promotions.

Of the 25 firms we approached, 19 responded to our initial contact and 13 ultimately provided data. There was a particularly good response in terms of data provision from remote betting and gaming firms. Of the 12 firms who did not respond or did not supply data, there was no particular pattern in terms of sector or firm size. In **Table 2** we show the overall number of datasets received from individual betting and gaming companies.

[11] Gambling Commission industry statistics report (June 2013), Mintel report (April 2013), HMRC.

Table 2. Response by gambling companies

Firms in original contact list	25
Firms successfully contacted and responded	19 (76%)
Of which	
Provided data	13
Data not received	2
Refused	4
Firms with no response or contact	6 (24%)
Of which	
No contact	2
No response	4

Source: Frontier Economics

We asked companies to provide monthly information on the variables of interest (stakes and pay-outs) covering as long a period as possible. We asked as far as possible for companies to supply data to be consistent with the tax treatment of stakes and payouts in that sector.

For companies operating in multiple sectors, we asked them to disaggregate the data across the sectors of interest. Where companies operate in multiple national markets, we asked them to supply data relating to UK players only. All of the companies were able to disaggregate the data in this way.

In order to ensure that the data provided by companies were as consistent as possible we developed a clearly labelled data template specifying the exact information required for this study. Where necessary we engaged with companies directly to understand whether their interpretation of the template was consistent with that of other companies.

We conducted some checks of the data received to look for outliers or inconsistencies, and where possible asked the companies to try and account for them. We also carried out some data cleaning to try and ensure that data from individual companies could be aggregated consistently (for example, aligning the accounting period where companies provided data on a 4- or 5-weekly basis rather than a calendar month basis). We aggregated the company data to the calendar month level in constructing the quantity and price variables required for the estimation.

The data collected from companies covers seven of the eight sectors of interest in this study.[12] Overall, the quality of the data received was high. Further, the good response rate from gambling companies gives us confidence that the data are representative of the market segments we study – for the sectors where company data were used, the data accounted for a significant proportion of the overall market, typically in excess of 50%. Finally, the data cover a reasonably long time period (see **Figure 4** for details) which gives us sufficient observations to model the relationship between quantity and price well. The exact length of the period covered varies by sector, but is in excess of six years for most sectors.

3.2.2 HMRC tax return data

For three sectors (terrestrial betting, terrestrial bingo and pools) we received tax return data from HMRC. These data contain aggregate (market level) information on the key variables of interest. The data are monthly and span the last decade.

These data have been used to construct the quantity and price measures where company information was unavailable or did not have sufficient market coverage. In the end, we used HMRC data only for the pools sector. We had very good market coverage in the terrestrial bingo and terrestrial betting sectors from the company data and found the HMRC data in these sectors less suitable for the analysis.

3.2.3 Other data sources

Gambling Commission

For two of the sectors of interest (terrestrial gaming, gaming machines) we obtained information from the Gambling Commission. These data contain aggregate (market level) information on the key variables of interest. Terrestrial gaming data are monthly (and included information on the number of casinos and disaggregated information into 'high-end London', 'other London' and 'other' casinos). Gaming machines data are on a financial year basis.

We also obtained annual (financial year) level data on scratchcard sales and payouts from this source.

The gaming data were used as robustness checks for our results based on company data, and the machines and scratchcard data used to try and infer something about price elasticities for these sectors where we did not have sufficient data from other sources disaggregated into shorter periods.

[12] Company data covered all sectors except the National Lottery (draws and scratchcards).

Econometric estimates of elasticities

Merseyworld and www.national-lottery.com

We obtained draw by draw National Lottery draw data (for Wednesday and Saturday Lotto and Euromillions) from two websites.[13] The datasets cover the full period during which the games have been in existence: Lotto data start in 1994 and Euromillions data start in 2004. The datasets contain all the information required to construct the quantity and price variables needed for the econometric work (ticket sales, size of jackpot, value of rollover and superdraws), following the methodology of Farrell et al. (1999).

3.3 Estimation data set overview

The data set used to estimate elasticities was constructed using the various data sources outlined above. In Figure 4 we show for each of the sectors in scope for this study the data sources used and the time period covered by the data. In summary, we used data collected from gambling companies for most sectors including:

- Terrestrial betting;
- Terrestrial gaming;
- Terrestrial bingo;
- Remote gaming; and
- Remote betting.

As is clear from **Figure 4**, the span of data we received varied in length from company to company. We therefore had to decide whether to use the longest time series possible, thereby relying on individual company data to construct market measures of price and quantity for some time periods, or to restrict the sample to a period of time where all company data overlap. The advantage of the former approach is that it gives us a longer time series and therefore more data points to exploit to estimate the elasticity, at a risk of including periods of data from a limited number of companies which may not be fully representative of the market in those periods and so introducing significant measurement error. On the other hand, focusing only on the period where all company data overlap gives a more representative measure of the market but reduces the sample and hence reduces the precision of the estimates.

We took a pragmatic approach, striking a balance between these issues. We restricted the analysis to the period where data from at least half of the number of responding companies in a sector were available. This approach was used in all sectors where company data was used.

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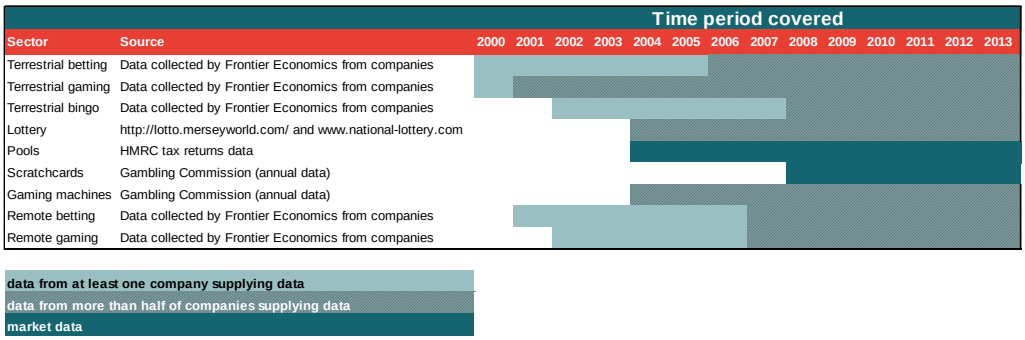
[13] http://lotto.merseyworld.com/ and http://www.national-lottery.com.

It is worth noting that the time period used in our econometric work is determined not only by overlaps in company data, but also overlaps in the aggregate sector data. Given we are seeking to estimate own- and cross-price elasticities for a set of gambling sectors, we are restricted to time periods where data on cross prices from all sectors are available. In practice this means that the longest possible time series we could use is 2004-2013, as the pools data starts in April 2004.[14]

Figure 4. Summary of estimation data set



Source: Frontier Economics

3.4 Descriptive account of estimation dataset

In this section we describe the data used in each of the sectors of interest, covering:

- Sector definition;
- Data used; and
- Description of key variables.

Because of the commercial sensitivity of the data collected from gambling companies, when describing price and quantity variables over time we only show data where information from at least three companies is aggregated. Descriptive figures for the key variables of interest in each of the sectors we study are provided in Appendix B.

[14] Note that although we construct own-price data using periods where at least half the responding companies in a sector have reported figures, we construct cross-price data drawing on data from all companies to ensure the longest possible period of analysis.

3.4.1 Terrestrial betting

We collected data from several companies providing terrestrial betting services in the UK. The market coverage of the collected data is very good so we consider the data to be representative of the market - the combined market share of the companies providing data is over 50%.[15]

For the terrestrial betting sector, our sample selection leaves just over seven years of data covering the period 2006 to 2013, or 87 data points comprising:

Quantity is the total amount staked in a given month, including the value of any free bets offered by gambling companies.

Payouts are the total amount won by in a given month including winnings resulting from free bets.

Price is the proportion of bets wagered not returned to customers, or (Quantity-Payouts)/Quantity.

Monthly stakes in our dataset average around £500m. There are clear seasonal patterns (e.g. stakes appear lower in the winter months), and a slight upward trend over time (see **Figure 9**).

The proportion of stakes retained by companies (price) averages around 16%-17%. There is no clear trend in price over time.

3.4.2 Terrestrial gaming

We collected data from several companies providing terrestrial gaming services in the UK. The market coverage of the collected data is very good so we consider the data to be representative of the market - the combined market share of the companies providing data is over 50%.[16]

Our sample selection gives a data period covering 12 years (2001 to 2013), though our analysis is restricted to the 2004 to 2013 period due to the shorter time series of the pools data. The data are described in **Figure 10**.

Quantity is the amount of money exchanged for chips in a casino in a given month also known as the 'drop'. The company data covers table games and includes gross profits from player vs. player games (such as poker). This is in contrast to the Gambling Commission data which focuses on table games only.[17]

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[15] Market share is calculated in terms of gross profit for 2012. Market data was provided by the Association of British Bookmakers (ABB) for over the counter bookmakers in GB (excludes Tote and online).

[16] Market share calculated in terms of 'drop' for 2013 (January- September). Market data provided by the Gambling Commission.

[17] We have used the Gambling Commission data in our modelling work to test the robustness of the results obtained using company level data.

Price is defined as the amount of money exchanged for chips retained by the casino in a given month (known as the 'win'), such that price is defined as (win/drop).[18]

Monthly drop averages around £200m between 2006 and 2011. In the last two years the average has increased to close to £300m. There is no clear seasonal trend but the data displays signs of volatility – monthly drop can fluctuate by as much as 40% from month to month.

The price averages around 17%, though again this can be volatile. There is no clear trend in price over time. Given that most casino games have fixed odds, variation in the price variable in this sector is likely to be driven by promotions, changes in the mix of games offered, and the random nature of the games.[19] Further, the sector is becoming more dominated by high-end London casinos over time. The volatility in the quantity data may be driven by surges/drops in activity of high wealth individuals. High-end London casinos have more volatile drop than casinos in the other regions.

3.4.3 Terrestrial bingo

We collected data from several companies providing terrestrial bingo in the UK. The market coverage of the collected data is very good so we consider the data to be representative of the market.

Our sample selection leaves around five years of own-price data covering the period 2008-2013. We do not provide descriptive information for this sector due to the potentially disclosive nature of statistics given the limited number of companies in the sample.

Quantity is 'bingo receipts' as defined for Bingo Duty purposes. This includes participation fees (cost of playing a game of bingo) and stakes (cost of buying a ticket). Note that quantity excludes pure admission fees, membership fees and any other revenue (e.g. food and drink). Revenues from gaming machines in bingo clubs are also excluded.

Payouts include normal and additional prize money, and any payments made to prize funds for combined games.

Price is defined the proportion of bingo receipts retained by bingo operators.

Over the five year period covered by our data, bingo receipts fell by a fifth. Price increased by 17% over the same period.

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[18] For example, if drop is £10m and win is £1m, price is 10%.

[19] Changes in price could also reflect new casinos opening or closing. In practice, certainly over the last few years, the number of casinos has been largely constant, according to the Gambling Commission's website, since there is regulation determining how many casinos can be operated.

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3.4.4 Remote betting

In total we received data from a large number of companies providing remote betting services to UK customers, although in practice we did not use the data from one of the companies.[20] The market coverage of the collected data is very good so we consider the data to be representative of the market - the combined market share of the companies providing data is around 50%.[21]

Our sample selection left us with around seven years of data to construct the own-price series, spanning 2006 to 2013, or 94 data points (see **Figure 14**).

Quantity in this sector is defined as the value of total bets placed by UK customers in a given month, including free bets.

Payouts are winnings paid in each period to UK customers, including winnings from free bets.

Price is the proportion of bets wagered not returned to bettors, or (Quantity-Payouts)/Quantity.

There is a clear upward trend in monthly stakes; this partly reflects additional company data becoming available but also appears to reflect a genuine upward trend in stakes since growth in monthly stakes continues once the last company enters our sample in January 2010. In 2013, observed monthly stakes averaged around £700m.

The proportion of stakes retained by companies (Price) averages around 6% and has not exhibited any clear trend over time, though is clearly somewhat volatile.

3.4.5 Remote gaming

In total we received data from a large number of companies providing remote gaming services to UK customers. The market coverage of the collected data is very good so we consider the data to be representative of the market. The combined market share of the companies providing data is around 50%.[22]

Our sample selection gave us just over six years of monthly-level own-price data covering the period 2007 to 2013, or 82 data points (see **Figure 15**).

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[20] We were concerned about the quality of the data submitted by one of the smaller online companies as their features were very different to the other companies in the market. We therefore excluded this from the analysis.

[21] Market shares calculated on the basis of gross gaming yield for the year 2012. Market size data was obtained from "European Regulated Online Markets Report" available here: http://www.gamblingdata.com/files/EuropeanRegulatedMarketsJuly2012_0.pdf

[22] Market shares calculated on the basis of gross gaming yield for the year 2012. Market size data was obtained from "European Regulated Online Markets Report" available here: http://www.gamblingdata.com/files/EuropeanRegulatedMarketsJuly2012_0.pdf

Quantity in this sector is defined as the value of total stakes placed by UK customers in a given month. Firms were asked to supply stakes data excluding bonus funds such as matched deposits and free plays.

Payouts are winnings paid in each period to UK customers. This includes the value of any bonus funds or winnings from promotional offers paid to players by gambling companies such as matched deposits, free plays etc.

Price is the proportion of bets wagered not returned to customers, or (Quantity-Payouts)/Quantity.

There is a clear upward trend in monthly stakes, although in earlier years this is at least partly driven by more companies' data becoming available. However, the trend growth in monthly stakes continues in the period where all companies are part of our sample dataset (post-July 2011). In 2013 monthly stakes averaged around £1,400m.

The proportion of stakes retained by companies (price) averages around 4% and has not changed noticeably over time.

3.4.6 Pools

For this sector we used HMRC tax returns data to estimate price elasticities. We only obtained data from one company in the market, and for a relatively short sample period. As a result we preferred to use the HMRC data for this sector.

The data cover the period 2004 to 2013 and capture the whole (duty paying) pools market.[23]

The data were reported on a four- or five-weekly basis often spanning different calendar months. Since all other data we collected is monthly (i.e. calendar months) we converted the HRMC data into calendar months. The approach we took was to calculate average daily stakes for each month, and in cases where reporting periods span two months, reallocate the relevant amounts of daily stakes to the correct month.

We do not provide descriptive statistics for this sector due to the confidential nature of the underlying data.

Quantity is the value of total stakes placed in a given period.

Payouts are winnings paid in each period.

Price is defined the proportion of stakes retained by pools operators.

The pools market is very small compared to the other segments of the gambling market considered in this study. Pools stakes were declining between 2004 and

[23] Note that pools betting excludes Tote (pools betting on horses and greyhounds) betting which is included as part of the terrestrial betting sector, since this is how it is treated for duty purposes.

2010, but measured stakes then rose significantly owing to new entrants to the duty-paying market. Since then the market expanded, due to entry by new providers, and has remained stable. Price has generally declined and become more volatile over time.

3.4.7 National Lottery products

Draw-based lottery games

We obtained draw-level data on the two largest games (the Saturday and Wednesday Lotto draws, and Euromillions).

For Lotto we obtained data from http://lotto.merseyworld.com. For each draw since the launch of Lotto in 1994, the website contains information on:

- Ticket sales;
- Jackpot size;
- Amount of cash rolled over from previous draws;
- Amount of cash added to jackpot fund in superdraws; and
- An indicator variable showing if a draw is a superdraw.

For Euromillions, launched in 2004, we collected draw-level sales data from the http://lotto.merseyworld.com website. Data on jackpot size and amounts of cash rolled over were collected from www.national-lottery.com.

Data are aggregated to a monthly level for consistency with the other sectors.

Quantity in this sector is defined as the combined monthly Lotto and Euromillions ticket sales in the UK.

Price is defined as the sales-weighted average price of Lotto and Euromillions in a given month. We first calculate a price specific to each draw by taking the approach recommended in the academic literature (Farrell et al. 1999).[24] For each draw we calculate the amount per £1 spent that a player expects to lose at the time of purchase. Given that the odds of winning the different prizes in lottery games are changed only irregularly, variation in price is largely driven by the value of jackpots and hence rollovers.[25]

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[24] Price in this context is the proportion of the value of a lottery ticket that one expects to lose upon purchase. For example if the expected value of a Lotto ticket is 0.45 and the price of a Lotto ticket is £1 (as was the case until October 2013), the price is 0.55. The expected value of a lottery ticket depends on three things: the probability of matching a set of numbers (3,4,5,5+1,6); the prize pool in each winning category; and the expected number of other winners in each winning category.

[25] We have taken into account changes in the games over time. For example, the rules and prize structure of Euromillions changed in 2011 making rollovers more likely to occur. The rules of Lotto changed in October 2013 but this is not captured in our analysis as our data for other sectors stops before then.

Lottery quantity and price are described in **Figure 11**. Lottery sales have approximately doubled since the turn of the millennium. However, all of the increase in sales has been due to the emergence of Euromillions. Lotto sales have steadily declined over the period, by 55% in cash terms.

Other Lottery products

We were asked to estimate price elasticities for scratchcards and online instants. Online instants are such a small portion of the market they are unlikely to affect the elasticity estimates. In order to analyse scratchards we obtained annual data from the Gambling Commission on scratchcard sales and payouts covering the last four financial years and the first half of the current financial year (see **Figure 12**). Monthly data were not available for this product.

3.4.8 Terrestrial gaming machines

Gaming machines include Fixed Odds Betting Terminals (FOBTs) largely found in bookmaker shops, as well as other machines in bookmakers and casinos.

For FOBTs, bookmakers who supplied data were able to provide estimates of stakes and payouts, from which we were able to calculate a price of FOBT gambling. However, over the period of data at our disposal there was essentially no variation in the price. The lack of variation was largely due to the overwhelming popularity of certain FOBT games such as roulette which has fixed odds. As a result, we were unable to use time series variation in these data to estimate price elasticities.

For other machines, only data on gross profits (total stakes net of payouts), or the "cash in the box" figure, are available. We therefore had no clear measure of price or quantity which could be used to estimate price elasticities.

We were able to draw on aggregate data from the Gambling Commission recording the number of machines of different types each financial year, the total gross profits from machines and the tax rates charged for different machines to construct measures of average tax and gross profit per machine category over time (see **Figure 13** for an example). Gross profit per machine has increased for FOBTs since 2008; because of the fixed nature of payouts in the dominant roulette game this would suggest that total stakes have increased as well assuming the relative popularity of games has not changed. The average duty per machine has also increased, but at a slower rate than the gross profit such that the implicit tax rate per machine has fallen over time.

The Gambling Commission were not able to supply machines data on a more disaggregated basis (e.g. by month), and we did not receive information from the companies regarding the number of machines in their establishments on a monthly basis. As a result there is a very limited amount of data on which we can

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draw to estimate machine elasticities; our preferred estimates are made on the basis of existing evidence and economic reasoning as described below.

3.5 Econometric approach

3.5.1 General approach

We estimate sector-by-sector time series models of demand to calculate price elasticities.

Our basic approach is to estimate variants of the following demand equation using ordinary least squares (OLS) for each gambling sector:

$$\log Q_{it} = \alpha + \gamma \log Q_{it-1} + \beta_1 \log P_{it} + \beta_2 Y_t + \sum \beta_j \log P_{jt} + \beta_3 Z_{it} + \text{Trend} + \varepsilon_{it}$$

where:

$\mathbf{Q}_{it}$ = demand (gross revenue) for gambling sector *i* in month *t*, deflated (using the Consumer Price Index)[26] to the latest time period in the data;

$\mathbf{P}_{it}$ = price in gambling sector *i* during month *t*;

$\mathbf{Y}_t$ = aggregate economic income (real GDP);

$\mathbf{Z}_{it}$ = a vector of other factors that may be expected to influence demand (such as macroeconomic conditions, major sporting events and number of weekends in a month);

$\mathbf{P}_{jt}$ = a vector of prices in the other relevant gambling sectors in month *t*, $j \neq i$.[27];

Trend = linear time trend;[28]

ε = a stochastic error or classical disturbance term (normally distributed error term with a zero mean).

Generally an increase in price would be expected to reduce demand ($\beta_1 < 0$). Given the specification above where both quantity and price are entered as logs, the coefficient is the own-price elasticity.

Similarly, β_j is the cross price elasticity of demand in sector *i* with respect to the price of sector *j*. $\beta_j < 0$ implies that sectors *i* and *j* are complements (an increase

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[26] We tried using different inflation measures to deflate the quantity variable such as RPI though this does not materially affect the results.

[27] As noted above, in order to maximise the sample in each model we do not restricted cross-price terms only to periods where most companies' data overlap. In reality all models are limited by the availability of pools and combined lottery draw data which start in 2004.

[28] We used a linear time trend variable to control changes in the quantity variable in line with previous literature. We also tried including squared/cubed time trend terms to account for non-linearity but these tended to be statistically insignificant and so are not reported.

in the price of sector *j* reduces demand for sector *i*); $\beta_j > 0$ implies they are substitutes (an increase in the price of sector *j* increases the demand for sector *i*).

The inclusion of a lagged dependent variable allows us to analyse dynamic factors, and estimate short-run and long-run effects of changes in price on demand.[29] If the short run elasticity is given by β_1, the long run elasticity is estimated by $\beta_1/(1 - \gamma)$, where γ is the coefficient on the lagged dependent variable. Assuming that $1 > \gamma > 0$, the long-run elasticity would be larger (more elastic) than the short run.

The long-run elasticity is probably the most appropriate to use in a model of revenue effects of tax reforms, since the revenue impact will be determined by the new equilibrium demand in the market once the full effects of any resulting price changes have been factored into consumer responses.

Econometric issues

We have run a number of statistical tests[30] to determine if our sample data are susceptible to weaknesses such as non-stationarity, autocorrelation and heteroscedasticity.[31] In general we find no evidence that any of the price series are non-stationary. In some sectors we find evidence of trending in the turnover series, though this should be accounted for in the models by the inclusion of a time trend.

Heteroscedasticity and autocorrelation are present in some models. Where this is the case we use a robust (Newey-West) approach to ensure the standard errors account for these issues.[32]

Endogeneity

We recognise that demand equations suffer from problems of endogeneity of the price variables. Price is determined in each period by an interaction between market supply and demand; we observe only the outcome of that process but not whether variation in price is generated by shifts in the supply curve (which would allow us to trace out the demand curve of interest), or by shifts in the demand

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[29] This assumes a partial adjustment model, where consumers respond to price shocks gradually rather than immediately. In this context the short run effect corresponds to the impact on quantity demanded one month after a change in price, while the long run elasticity corresponds to the impact on quantity demanded more than one month after a change in price.

[30] Such as Dickey-Fuller and Phillips-Perron tests for stationarity, Breusch-Godfrey and Durbin-Watson tests for autocorrelation and Breusch-Pagan/Cook-Weisberg test for heteroscedasticity.

[31] Autocorrelation refers to the correlation of a time series with its own past and future values. Heteroscedasticity refers to a situation in which the variance of the error term varies across the data. Non-stationarity refers to a process whose statistical features (mean, variance) vary over time.

[32] The Newey-West estimator is a variant of OLS which is used to overcome autocorrelation and heteroscedasticity in the error terms in models.

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curve (which would instead lead us to trace out the supply curve). In the latter case, we would expect to see elasticity estimates which are biased towards zero or even positive (since supply increases with price).

Our models may also suffer from measurement error, since we do not observe all companies in each sector in each month therefore the data observed may not be fully representative of the entire market causing erroneous results. If the measurement error in the price variable is random, we would expect this to lead to elasticities which are biased towards zero because of attenuation bias.

The usual approach to dealing with endogeneity issues is to find instruments (variables which are correlated with price but not directly correlated with the outcome of interest, in this case quantity in each sector). Supply-side shocks are most often employed as instruments: for example, in previous literature looking at the gambling market (for example, Paton and Vaughan Williams, 2005), changes in tax rates or regulations are used as instruments.

With a few exceptions (notably the Gambling Act 2005), recent years spanning our data period have seen few changes in tax rates or significant regulatory reforms. We tested the validity of a large number of candidate instruments, including:

- The introduction and announcement of the Gambling Act;
- The introduction and announcement of relevant tax reforms such as changes to Bingo Duty;
- The introduction of the smoking ban;
- Different order lags of the own price variable; and
- Changes in the minimum wage rate.

We find that none of these changes meet the rank and order conditions necessary for credible instruments.[33]

As a result, most of our analysis (other than for the Lottery, see below) is conducted using ordinary least squares (OLS) estimation of the baseline regression model for each sector. The precise magnitude of any bias from OLS estimation relative to instrumental variables (IV) estimation is unclear, though as outlined above in general we would expect the bias to be towards zero.[34] We consider this in recommending our preferred elasticity estimates below.

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[33] We attempted both single instruments and combinations of multiple instruments, the latter in a Generalised Method of Moments (GMM) estimation approach.

[34] If the bias were entirely driven by measurement error, and we had good estimates of the signal to noise ratio in each sector (e.g. based on some measure of the 'true' and 'observed' price in a sector each month), we could try to adjust for the bias. However as outlined above, simultaneous equation bias is also likely to be important in our modelling, and in most cases we do not have any good measure

3.5.2 Robustness checks

Firm-level approach

Our baseline results in each sector are based on a log-log time series specification which relies entirely on variation over time in the own- and cross-price variables to identify the elasticities.

Given that in a number of sectors we have data from several companies, we can also estimate a panel model of demand which would also allow us to exploit cross-sectional variation in price across companies as a way to estimate the own-price elasticity.

This panel model is also attractive as it allows us to use company-specific fixed effects as a way of picking up unobserved (but time constant) factors which might determine the demand for a company's gambling services and be correlated with price (for example, if some companies are perceived to be "high quality" firms offering a good customer service at a higher price, we could capture this through company fixed effects). This could mitigate potential omitted variable biases.

The basic estimating equation in the firm-level approach follows the same structure as the sector-level equation. The difference is that we estimate an own-price elasticity of demand for each firm, cross-price elasticities with respect to prices of other firms in the same sector, and cross-price elasticities with respect to the (common to all firms) price in other sectors.[35]

Note that this model will recover estimates of firm-level own price elasticities. The elasticity of demand for a given firm within a sector is likely to be higher (more elastic) than demand for the sector as a whole, because consumers can substitute to other firms in the sector which will probably be seen as relatively close substitutes. For each firm, therefore, we need to calculate the total impact on demand from a marginal increase in price *by all firms in the sector* as a way to estimate the "sector" price elasticity of demand. In this specification, this is simply given by the sum of own- and cross-price terms. The intuition is straightforward: if prices in the sector rise by 1%, then a firm would expect its

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of the "market" price which we could use to anchor estimates of the signal to noise ratio. As a result, we were not able to take this more formulaic approach to adjusting our modelled elasticities for the use of OLS rather than IV. Instead, we used a wider judgement for each sector, looking at factors such as the market share captured in our data, the degree to which we expected demand shocks to be driving observed prices, and evidence from previous literature.

[35] This cross-sector price is included as a common, time-varying term in each company's individual equation. In principle, we could estimate a model with a separate equation for every company in every sector and estimate a full set of own- and cross-price elasticities; however this would be infeasible to implement given the number of covariates involved.

demand to change by the loss of its own custom and the gain in custom it gets from switching from the other firm.

We are able to estimate this company-level panel model for the following sectors: remote gaming, remote betting, terrestrial gaming and terrestrial betting. However, as we describe below, we do not find substantially different elasticity estimates from this approach compared to the aggregate, sector-level approach in our baseline specification. This suggests that unobserved factors are not significant influences on the demand for a particular firm's product.

Data samples used

As previously discussed, we have received data from different sources. For some sectors, we have information based on company responses as well as market level data from HMRC and the Gambling Commission. Where this is the case we have run our model on both data sets..

In sectors where data are obtained by aggregating company level data, we have run the model on different samples of data to determine the extent to which using different time periods (given company data overlaps) affects the results.

Outliers

We have been careful to ensure that our estimates are representative of the sample we have used and are not driven by a small number of outlying observations. Our approach to outliers has been to identify observations which are different from the rest of the sample and test the extent to which they influence the results from our modelling. We have used standard econometric techniques to identify influential observations, such as Cook's distance and standardised residuals. We have excluded observations whose standardised residual's absolute value exceeds two.[36]

3.6 Model results

In this section we present the econometric estimates for each of the sectors of interest. We first show a summary of the results before going into the detailed results on a sector by sector basis.

[36] Residuals are assumed to follow a normal distribution so standardised residuals are assumed to have a standard normal distribution. This implies that 95% of standardised residuals would be expected to be within +/-2, so observations outside that value are treated as suspicious. In practice, applying this criterion to our models resulted in few (typically two or three and a maximum of five) observations being excluded from each model.

3.6.1 Summary

In **Figure 5** we show the estimated own- and cross-price elasticities from our preferred specifications. We show both the short- and long-run elasticity estimates. The short-run elasticity captures the immediate demand response to changes in price. The long-run elasticity is derived from a partial adjustment model, where consumers respond to price shocks gradually rather than immediately.[37] As previously discussed the long-run elasticity is probably the most appropriate to use in a model of revenue effects of tax reforms.

Own-price estimates which are not statistically significant (at the conventional 5% level) are shown in red. We only report cross-price terms which are statistically significant.

Detailed tables with full model results for each sector are shown in Appendix C.

Overall our econometric estimates indicate that demand is elastic for:

- Draw-based lottery games;
- Terrestrial bingo (though the result is not statistically significant); and
- Remote gaming.

The estimates suggest that terrestrial betting has an own-price elasticity of around -1 in the long-run. Demand is found to be relatively inelastic in terrestrial gaming and remote betting, although both of these results are statistically insignificant. For pools the econometric estimates suggest a positive but insignificant relationship between price and quantity.

Cross price terms are statistically insignificant in most models. We find some evidence that the demand for terrestrial gaming increases in the price of bingo, remote betting and remote gaming, suggesting some substitution in those sectors.

[37] We have used the 'nlcom' command in Stata to compute the standard errors, significance levels and confidence intervals for the long-run elasticities.

Figure 5. Summary of estimated own- and cross-price elasticities

		Change in quantity						
		Lottery (draws)	Terrestrial betting	Pools	Terrestrial bingo	Terrestrial gaming	Remote betting	Remote gaming
Change in price	Lottery (draws)	**-0.87 (SR) -1.08 (LR)**	-	-	-	-	-	-
	Terrestrial betting	-	**-0.46 (SR) -0.79 (LR)**	-	-	-	-	-
	Pools	-	-	**+0.18 (SR) +0.36 (LR)**	-	-	-	-
	Terrestrial bingo	-	-	-	**-0.54 (SR) -1.07 (LR)**	+1.90	-	-
	Terrestrial gaming	-	-	-	-	**-0.12 (SR) -0.15 (LR)**	-	-
	Remote betting	-	-	-	-	+0.22	**-0.05 (SR) -0.12 (LR)**	-
	Remote gaming	-	-	-	-	+0.67	-	**-0.88 (SR) -1.80 (LR)**

Source: Frontier Economics estimates. Insignificant coefficients in red. Only significant cross-price coefficients are reported.

3.6.2 Results by sector

In this section we describe the main results and robustness checks carried out in each sector covering:

- The variables included in the models; and
- Any sector-specific econometric issues and robustness checks.

Econometric work

We run the basic regression model specified in. in each of the sectors. The log of monthly stakes (in real terms) is regressed on:

- the log of monthly gambling price;
- the log of monthly stakes (in real terms) lagged one period;
- the log of all monthly cross prices;
- time trend;
- month dummy variables to control for seasonality;

- controls for months in which major sports events occur (summer Olympics, football World Cups and European Championships);[38]
- the log of real GDP;
- the unemployment rate;
- the number of Saturdays in a month;
- dummies for the companies are included in the data in each period.[39]

As a first step we run an OLS regression and conduct a number of tests to establish:

- whether regression results are influenced by a small number of influential observations (outliers);
- whether regression results are susceptible to autocorrelation and heteroscedasticity; and
- whether the quantity and price variables are non-stationary.

For each sector we experiment with the use of IV, using the list of instruments outlined in Section 3.5. However, since IV works well only in the Lottery model, for the other sectors we report results from OLS or Newey-West regressions as appropriate.

Terrestrial betting

We identify three outliers which are removed from the estimation data set. The statistical tests we run find no evidence of heteroscedasticity, autocorrelation and non-stationarity. We therefore report the results from an OLS regression with no adjustments to standard errors. Full results are in **Figure 16**.

All instruments are weak and IV does not work satisfactorily. Therefore our preferred estimates for this sector come from the OLS regression.

The short-run own-price elasticity in this model is estimated to be -0.46, and is significant at the 1% level. The long-run elasticity is also statistically significant and equal to -0.79 with a confidence interval of -0.20 to -1.37.

All cross-price terms in the betting equation are insignificant indicating that terrestrial betting demand is not responsive to changes in the price of other forms of gambling.

[38] Note that regular annual sporting events which take place in the same month each year, such as the Grand National, should be captured by seasonal dummies.

[39] The purpose of this is to control for the fact that as more companies' data becomes available gross revenue will increase.

Robustness checks

We have run a number of robustness checks to test the sensitivity of the main result such as running the model on different data samples (i.e. not restricting to period where most company data overlaps) and running the company panel model described in 3.5.2. The results from these additional analyses are consistent with the result from the main model.

Terrestrial gaming

We identify four outliers which are removed from the estimation data set. The statistical tests we run find no evidence of heteroscedasticity, autocorrelation and non-stationarity. We therefore report the results from an OLS regression with no adjustments to standard errors. All instruments are weak and IV does not work satisfactorily.

The short-run own-price elasticity of demand is estimated to be -0.12, which is not significant at any conventional statistical level. The long-run elasticity is equal to -0.15 and is also not statistically different from zero (with confidence interval ranging from -0.61 to +0.30). Full results are in **Figure 17**.

Three cross-price terms are significant in the main model indicating that bingo, remote betting and remote gaming may be substitutes for terrestrial gaming.

Robustness checks

We have run a number of robustness checks to test the sensitivity of the main result. These include:

- Running the model on sub-sets of the data, splitting high-end London casinos and other casinos;
- Running the model on a different data set obtained from the Gambling Commission, and within that splitting high-end London casinos and other casinos;
- Running the company panel model described in 3.5.2.

All models confirm the finding that the short-run elasticity is not significantly different from zero. The findings on the cross-price terms from our baseline specification are not robust to these alternative models: for example, the model using Gambling Commission data shows no evidence of substitution or complementarity with other sectors.[40]

[40] It is not clear what drives this difference in results although we note that the Gambling Commission time series data are shorter so one potential reason for the failure to identify significant cross-price terms could be due to the smaller sample size.

Terrestrial gaming machines

We have not been able to conduct any econometric analysis in this sector due to the limited data we have available. We have used economic reasoning in combination with evidence in the literature to produce an elasticity estimate (see Section 3.7 for details).

Terrestrial bingo

We identify one outlier which is removed from the estimation data set. The statistical tests we run find no evidence of heteroscedasticity, autocorrelation and non-stationarity. We therefore report the results from an OLS regression with no adjustments to standard errors. All instruments we experimented with are weak and IV does not work satisfactorily. Therefore our preferred estimates for this sector come from the OLS regression.

We estimate a short run elasticity of demand for terrestrial bingo of -0.54. The coefficient is statistically insignificant at conventional levels. The long-run elasticity is equal to -1.07 and is not statistically different from zero. It has a confidence interval of -2.73 to +0.59. Full results are in **Figure 18**.

Based on our econometric analysis we find no evidence of substitution or complementarity of bingo and other forms of gambling.

Pools

As previously discussed, we have used HMRC tax returns data for this sector. Recent market expansion in this sector shifted gross revenue significantly in 2010. We therefore include in this model a dummy variable to capture this shift. We further include an interaction term between this dummy variable and price to allow for the effect of price on quantity to vary over time.

We identify two outliers which are removed from the estimation data set. The statistical tests we run find no evidence of heteroscedasticity and non-stationarity but do detect autocorrelation. We therefore report the results from an OLS regression with Newey-West robust standard errors. These are our preferred estimates as IV does not work satisfactorily in this sector.

We estimate a short run own-elasticity of demand for pools of +0.18. While a positive own-price elasticity is unexpected, the coefficient is statistically insignificant at conventional levels (1%, 5% and 10%). The long-run elasticity is equal to +0.36 and is not statistically different from zero. In other words, our econometric estimate suggests that demand for pools betting is not responsive to the price of pools betting. Full results are in **Figure 19**.

We find no evidence from our econometric analysis of substitution or complementarity of pools betting with any other forms of gambling.

Econometric estimates of elasticities

Draw-based Lottery products

We identify five outliers which are removed from the estimation data set. We find evidence of heteroscedasticity and autocorrelation in the pooled regression model. Our preferred estimates for this sector come from an IV 2SLS[41] model where we instrument lottery price by the incidence of rollovers and superdraws, and the cash amount[42] added to the jackpot fund by rollovers and superdraws in every month.

The data are based on the Lotto and Euromillions games so we use rollover and superdraw information for both games, aggregated at a monthly level.

In addition to the standard control variables used in the other models we control for the launch of the Health Lottery in October 2011 using dummy variables for months after the launch which may have affected the demand for the National Lottery, although we find this variable to be insignificant.

We find a short-run elasticity for lottery games of -0.87. The coefficient is statistically significant at the 1% level. The estimated long run elasticity is -1.08 and is statistically significant. Full results are in **Figure 20**.

Overall our econometric estimates suggest that demand for lottery draw based games is very slightly price-elastic.

We find no evidence from our econometric analysis of substitution or complementarity with other gambling sectors.

Robustness checks

The main robustness check for this sector was to check if the elasticity for Lotto is different from the aggregate elasticity, and whether the elasticity for Lotto has changed over time.

We ran a model on a longer time series (1994-2013) using draw by draw Lotto data (i.e. the model is run on draw-level data). This model excludes cross-price terms which are only available post-2004 for most sectors. In this model we control for the emergence of various games over time (e.g. launch of Wednesday draw, introduction of lucky dip, launch of Euromillions etc.) The main finding in this model is that as Lotto sales declined over time, demand for Lotto has become less price-elastic. The long-run elasticity is -0.81 for data pre-2003 and -0.41 for data post-2003. These findings suggest that the relatively elastic estimate for this sector is driven by the Euromillions game.

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[41] Two-stage least squares (2SLS) is a computational method for calculating instrumental variable estimates consisting of two stages. In stage one the endogenous variable is regressed on all exogenous variables in the model and predicted values are obtained. In the second stage, the regression of interest is estimated where the endogenous variable is replaced by the predicted values from the first stage.

[42] This approach is consistent with the significant literature on modelling lottery elasticities.

Remote betting

We identify three outliers which are removed from the estimation data set. We find evidence of autocorrelation in the pooled regression model. There is no evidence of heteroscedasticity in the model or non-stationarity in the price variable. Our preferred estimates for this sector come from an OLS regression with Newey-West robust standard errors accounting for the presence of autocorrelation.

We find a short run elasticity for remote betting of -0.05. The coefficient is statistically insignificant at conventional significance levels. The estimated long run elasticity is -0.12. Again this is statistically insignificant and has a confidence interval ranging between -0.54 to +0.31. Full results are in **Figure 21**.

Overall our econometric estimates suggest that demand for remote betting is price-inelastic.

Based on our econometric analysis, we find no evidence of substitution or complementarity with other gambling sectors.

Robustness checks

The two main robustness checks we did for this sector were to run the main model on different data samples (i.e. with different restrictions on the number of companies in the sample) and to run the company panel level model. The main finding of a very inelastic own-price coefficient is robust to these alternatives.

Remote gaming

We identify three outliers which are removed from the estimation data set. We find evidence of heteroscedasticity in the model but no autocorrelation. The IV estimation does not work well for this sector as we find that all of the instruments we experimented with are weak. Hence our preferred estimates for this sector come from an OLS regression which robust standard errors accounting for the presence of heteroscedasticity.

We find a short-run elasticity for remote gaming of -0.88. The coefficient is statistically significant at the 1% level. The estimated long run elasticity is -1.80 and is statistically significant, with a confidence interval of -0.35 to -3.26. Overall our econometric estimates suggest that demand for remote gaming is highly price-elastic. Full results are in **Figure 22**.

Based on our econometric analysis we find no evidence of substitution or complementarity with other gambling sectors.

Robustness checks

The main robustness checks we did for this sector were to run a company level panel model, and to run the main model on different data samples (changing the

requirements as to the number of companies required to report data in a given month).

We also investigated how sensitive the main result is to the inclusion or exclusion of 'player vs. player' (PvP) games in the calculation of the quantity and price variables.[43]

Three companies provided us with disaggregated information allowing us to calculate the quantity and price variables including and excluding player vs. player games and to estimate the main model on both subsets of the data for these companies. The long-run elasticity for the three companies is similar with (-1.10) and without (-1.15) PvP games. The less elastic estimate relative to the baseline result therefore appears to be driven by the more limited selection of companies in the dataset, rather than whether or not the price and quantity variables include or exclude PvP games. We therefore assume that the main findings are relatively robust to whether or not PvP games are included.

The other additional analyses we ran did not change the main finding that demand for this form of gambling is highly price-elastic.

3.7 Preferred elasticity estimates

In this section we present our preferred elasticity estimates for each of the sectors in scope for this study. We have based our preferred elasticity estimates on three things:

- The results from our econometric work;
- Findings in the academic literature; and
- Economic reasoning.

3.7.1 Summary

Overall we feel that estimates based on OLS are likely to be biased towards zero due to measurement error and the possibility that some of the price variation could be picking up shifts in the demand curve. Therefore our general approach is to correct the coefficients (in sectors relying on OLS estimates) away from zero, i.e. to increase the absolute value of the coefficients. However, this correction is not applied mechanistically. Rather, we have considered each sector

[43] Gross revenue in this sector includes profits from player vs. player (PvP) games such as poker as well as stakes from player vs. house g (PvH). This means that gross revenue is imperfectly measured. Ideally we would want to include stakes from PvP games in gross revenue. However, the firms supplying us with data for this study did not routinely collect information on stakes and payouts from PvP games to allow us to make that distinction.

separately and used evidence in literature and economic reasoning to inform the direction and magnitude of the adjustments we have made.

Our preferred own- and cross-price elasticity estimates for each sector, including scratchcards and gaming machines, are presented in **Figure 6**.

Figure 6. Preferred elasticity estimates

		Change in quantity								
		Lottery (draws)	Lottery (scratchcards)	Terrestrial betting	Pools	Terrestrial bingo	Terrestrial gaming	Gaming machines	Remote betting	Remote gaming
Change in price	Lottery (draws)	**-1.08**	+0.10	+0.10						
	Lottery (scratchcards)	+0.10	**-1.30**							
	Terrestrial betting	+0.10		**-1.00**						
	Pools				**-0.485**					
	Terrestrial bingo					**-1.00**				
	Terrestrial gaming						**-0.50**			
	Gaming machines							**-0.60**		
	Remote betting								**-0.50**	
	Remote gaming									**-1.50**

Source: Frontier Economics

3.7.2 Results by sector

We discuss below how we have arrived at our preferred estimates for each sector.

Terrestrial betting

Our estimated long run elasticity for terrestrial betting is -0.79. We recommend an own-price elasticity of -1 is used for this sector for several reasons:

- First, our estimated elasticity is not statistically significantly different from -1.
- Second, as argued above, in general we might believe that OLS estimates are biased towards zero because of endogeneity problems and measurement error. The adjustment we recommend is relatively small: measurement error is likely to be limited since the data obtained provided very good coverage of the market..
- Third, previous research has also tended to suggest that the elasticity for terrestrial betting is greater than -1.

Paton and Vaughan Williams (2005) estimate an elasticity of -1.18, slightly higher than our estimate. However, this is based on data from the 1990s and early 2000s. There have been significant changes in the market since then, notably the advent of online betting which has overtaken terrestrial betting in terms of

revenue. We believe that a modest fall in the magnitude of the elasticity over time is not implausible if those who continue to prefer to gamble in betting shops rather than online are slightly less price sensitive.

We argue for a modest degree of substitution between terrestrial betting and Lottery draws; we return to this in the discussion of our preferred Lottery estimates below.

Terrestrial gaming

Our econometric work in this sector shows that demand for casino gaming is not particularly responsive to changes in the price of gaming. Our long run elasticity estimate is -0.15, but the coefficient is not precisely estimated and has a wide confidence interval.

Previous research in this sector is scarce and is not conclusive – some studies find slightly inelastic demand while others indicate elastic demand. The only UK estimate we are aware of is -1.18 (Paton and Vaughan Williams, 2005). This is based on data which is more than 10 years old and focuses on provincial casinos. From the perspective of the entire gaming market and the revenue implications of tax reform it would seem preferable to base the elasticities as far as possible on the entire market. If high-end London casinos exhibited less price sensitivity than provincial casinos (perhaps because they attract high-roller players) this might explain some of the reason for our less elastic estimate, though as noted above, our robustness checking revealed no compelling evidence of different elasticities when we looked only at provincial casinos.

Our results appear to be out of line with previous estimates in finding such an inelastic result, though our judgement is that it is not unreasonable to assume that the demand for table-based casino gaming is relatively unresponsive to price. There is a strong social aspect to casino gaming suggesting that price variation is unlikely to have strong demand effects. This is backed up by the evidence cited in Section 2 and Appendix A regarding the influence of promotions on the demand for terrestrial casinos.

We therefore propose an elasticity of -0.50 is used for this sector. This is considerably more elastic than our regression estimate (though within the confidence interval), but accounts for the fact that we are not able to successfully instrument price in our model and that the estimated coefficient is insignificant.

We have seen no consistent evidence of cross price effects for this sector. Our baseline results find that three sectors (terrestrial bingo, remote betting and remote gaming) are substitutes for terrestrial gaming, but these results are not at all robust to alternative models. The previous literature discussed in Section 2 and Appendix A finds some evidence that lottery games and terrestrial gaming are substitutes, but few estimates are based on explicit estimates of cross-price effects, and none of our modelling replicates this result. Nor is there a

particularly compelling economic rationale to see the National Lottery and casino gambling within the same market. We therefore do not propose any cross-price relationships be included for terrestrial gaming.

Gaming machines

We have not been able to conduct any econometric analysis in this sector due to the limited data for gaming machines as a whole and lack of price variation for FOBTs. We have used economic reasoning in combination with evidence in the literature to produce an elasticity estimate.

Previous research conducted for HMRC (Paton and Vaughan Williams, 2005) found that fixed odds betting terminals have an own price elasticity of -0.398. As our literature review shows, the majority of studies looking at gaming machines (the majority of which focus on slot machines in casinos which tend not to be FOBTs) find price elasticities around -1. In the absence of other evidence, we take a weighted average of these two findings to inform an elasticity for machines. We use Gambling Commission data to estimate the relative market share of FOBTs and other gaming machines.[44] On the basis of this calculation the weighted average elasticity for gaming machines is -0.6. We do not see any compelling reason to deviate from elasticity estimates of around -0.4 and -1.0 for FOBTs and other machines when considered separately.

In terms of cross-price effects, we have considered theory and evidence for whether FOBTs (which dominate the machines market in betting shops) and terrestrial betting may be substitutes or complements. Paton and Vaughn Williams (2005) estimated a cross price elasticity of +0.23 between FOBTs and betting which they took as a preferred estimate, though the coefficient was not itself statistically significant. They argued there was a theoretical case to assume that FOBTs and betting are substitutes, though did not articulate that case fully. In our view, there are theoretical reasons to believe that FOBTs and betting could be substitutes (people now gamble on the machines rather than at the counter), complements (people who are in the shop to use the machines also take the opportunity to gamble at the counter) or unrelated (betting shops have introduced machines in response to an increased preference for machine-based gambling amongst some consumers, but the demand for machines is not directly affected by the price of terrestrial betting or vice-versa).

Similarly, gaming machines are found in casinos and bingo clubs which may point to some cross-price relationship between machines/terrestrial gaming and machines/terrestrial bingo. Paton and Vaughn Williams (2005) did not recommend any cross-price effects between these sectors on the basis of their

[44] Using data for 2012-13 we estimate that B2 machines account for 66% of machine GGY in Betting shops, Casinos, Bingo halls and Arcades so we use this as a weighting factor.

previous evidence. In theory, again, there is no obvious reason why co-locating machines and other forms of gambling in one casino or bingo hall should point towards complementarity or substitution between them. If it became more expensive to bet on machines in a casino, players may switch to table games (substitution), stop gambling at the casino and reduce spend on table games as well as machines (complementarity) or spend less on machines but not change their table game spend at all (no relationship, with the presence of table games and machines in the casino reflecting an attempt to capture different subsets of gamblers with different preferences).

As noted, we do not have any own-price variation for FOBTs, though we conducted some indicative analysis of the demand for FOBTs as a function of non-FOBT gambling prices. We found some evidence of substitution between FOBTs and terrestrial betting (a positive, significant coefficient of +0.27 on the terrestrial betting price). However we also found evidence of significant cross-price effects for pools and the National Lottery, and it is much less clear what the economic case for these cross-price terms would be. We therefore consider this highly tentative evidence at best.

Given this, and the lack of any other published evidence on cross-price elasticities, we do not feel there is a clear case to assume any cross-price effect between gaming machines and other sectors at the moment. We suggest this is a key evidence gap where further qualitative or quantitative evidence would be useful.

Terrestrial bingo

Our econometric work found a long run elasticity of -1.07 though the coefficient is not precisely estimated and has a wide confidence interval. The estimate is not statistically different from -1, which is our preferred elasticity for this sector. In the absence of other studies to guide us, we consider this to be a reasonable elasticity from a theoretical perspective if the market for bingo is relatively local and there tends to be limited competition within local markets. In that case, operators would aim to price at a point in the demand curve where the elasticity is equal to unity. The adjustment we recommend is small. We think that measurement error in this sector is likely to be limited since we have very good coverage of the market.

We do not find consistent and robust evidence of substitution or complementarity of bingo with other gambling sectors and so do not recommend including any cross price effects. It seems fairly likely that bingo customers would not see any other betting or gaming as particular substitutes given the strongly social aspect of the game.

Pools

Our econometric work did not produce satisfactory results for this sector. In line with the literature on gambling we would expect an increase in the price of gambling to have a negative impact on quantity demanded. In the absence of other clear evidence, we recommend the previous estimate obtained by Paton and Vaughan Williams (2005), a long run elasticity -0.485, though we also note that this estimate was not significantly different from zero.

We do not find any compelling evidence for cross-price effects in this sector.

Draw-based Lottery products

Our estimated long run elasticity for lottery draw based games is -1.08. This is our preferred elasticity for this sector. The estimate is based on IV estimation, and is precisely estimated and highly significant. Our preferred estimate is consistent with previous research in the literature which typically finds price elasticity for lottery of around -1. The estimate also concurs with economic theory: a monopolist prices at the point where there the demand elasticity is close to –1, with the extent of departure from this dependent on marginal costs. Since the marginal cost of lottery tickets is likely to be small, an estimate of –1.08 seems very plausible.

We use limited evidence from the literature to inform cross-price terms, the substitution of lottery based games with other forms of gambling. Section 2 and Appendix A highlight a reasonable evidence base suggesting that Lottery draws and terrestrial betting are substitutes. For example, Paton and Vaughan Williams (2005) estimate a cross price elasticity of +0.12 and other studies support this result. However, there are also some studies which suggest that there is little relationship between the two sectors, or indeed that they may be complements. Our judgement is that overall the weight of the evidence points towards a limited degree of substitution between these two sectors and so we propose a low cross price term of +0.1.

Further, Forrest et al. (2004) find evidence that scratchcards and lottery are substitutes. Our dataset does not contain information on scratchcard prices and quantities, though we have conducted some exploratory analysis correlating scratchcard sales which lottery sales.[45] This indicates that increases in lottery sales are associated with reductions in scratchcard sales, a result which supports the findings in Forrest et al. (2004). Our judgement is therefore that modest

[45] We used weekly lottery and scratchcard sales data for the period 1995-1997 as this is the only period we have scratchcard sales data for which can be matched to lotto sales data. We regress the log of scratchcard sales on the log of lottery sales and a time trend. Results from this regression are shown in **Figure 23**.

substitution effects exist for these products and so also propose a cross price term of +0.1

We suggest that the same cross-price elasticities are included symmetrically (that is, a 1% rise in lottery prices affects betting demand in the same way that a 1% rise in betting prices affects lottery demand). Economic theory suggests that compensated (Hicksian) cross-price terms should be symmetric. Our elasticity estimates are based on uncompensated (Marshallian) demand; however, given that gambling is likely to represent a small part of household budgets the income effect is likely to be relatively small such that compensated and uncompensated demands are likely to be similar. There is also no clear *a priori* economic reason to suggest that the cross-price terms would be different.

Scratchcards

Due to data limitations we have not been able to estimate an own-price elasticity for scratchcards explicitly. We therefore rely on evidence from previous research (Paton and Vaughn Williams, 2005) which suggests an elasticity of -1.3.

They based this figure on the assumption that the operator (Camelot) would set the payout rate (the inverse of price) so as to optimise its total revenue from sales. For a monopolist, this would imply an own-price elasticity of -1.

Similar to their reasoning, our analysis of Gambling Commission data shows that average payout rates have increased in recent years (see **Figure 12**). This would imply that current prices are higher than optimal and, hence, elasticity will be in excess of unity. Taking this into account, we believe that it is reasonable to use the own-price elasticity in the region of -1.3.[46] Since scratchcards are much more expensive to produce than lottery tickets it is plausible that the elasticity for scratchcards should exceed that for lottery. Thus an elasticity of -1.3 seems consistent with this.

We further assume symmetry in the substitution effect between lottery and scratchcards based on the evidence from Forrest et al. (2004).

Remote sector (betting and gaming)

No existing research exists for this sector, so we rely on our econometric estimates and economic reasoning to determine what the appropriate elasticities should be. Paton and Vaughan Williams (2005) use economic theory to estimate that the own-price elasticity of demand for 'e-gaming' is around -1.25,[47] based on

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[46] Note that if we simply infer an elasticity based on observed changes in price and quantity in the scratchcard data supplied by the Gambling Commission, the implied elasticities are implausibly high (in the order of -8 to -10). Of course, we are not able to control for any other changes which could be correlated with demand or price for scratchcards over this period.

[47] It is not clear whether this refers just to gaming or to remote betting as well. Note that if we take a sales weighted average of the elasticities we propose for remote betting and remote gaming (taking

the fact that consumers face relatively low transactions costs and information costs and may therefore be relatively sensitive to price.

Remote betting

Our long run econometric estimate for remote betting is -0.12 though this is statistically insignificant and has a wide confidence interval ranging from +0.31 to -0.54.

The remote betting market is competitive and customer switching from one company to another based on temporary promotional incentives, or the use of odds comparison sites, is common (as discussed below in the context of interviews with firms in this sector). However, this is evidence that price is an important influence over the choice of firm, but not necessarily that it matters in terms of the overall market size. Indeed, our results suggest that at the sector level, demand is relatively unresponsive to changes in the price.

This is in contrast to our finding in terrestrial betting which suggests that customers are quite responsive to price changes. Given that the product offered in remote and terrestrial betting is essentially the same, any difference in elasticities is likely to be driven by differences in the customer base of the two sectors. The lower elasticity for remote betting indicates that this market segment attracts relatively less price sensitive consumers, perhaps those who are heavier gamblers, or who are younger or more affluent. Further evidence on the similarity (or dissimilarity) of the customer base for terrestrial and remote betting would be useful.

At the moment, we suggest that an elasticity of -0.5 for remote betting would be reasonable. This is within the range of our confidence interval and accounts for the fact that we are not able to properly instrument price in this sector, which may bias the results towards zero. The relatively high adjustment is also informed by the fact that our estimate is statistically insignificant. Further, the firm data provides relatively lower market coverage for this sector which justifies the larger adjustment due to increased potential for measurement error.

We have seen no consistent evidence of cross-price effects for this sector (in particular our econometric evidence found nothing significant). Again, the product (in terms of the gamble) offered between remote and terrestrial betting is essentially the same, which would point to an economic case for substitution between the two sectors. However, the lack of clear empirical evidence at this stage makes us reluctant to recommend including this in our preferred results

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weights based on sales data from "European Regulated Online Markets Report" available here: http://www.gamblingdata.com/files/EuropeanRegulatedMarketsJuly2012_0.pdf), the result is very close to -1.25.

(and again to suggest further research to provide more evidence on this issue). It could be that other differences between remote and terrestrial betting in terms of how the bet is placed means they are not in fact perceived as particularly substitutable, with quite distinct markets using the two methods. Indeed, although it was not explicitly asked as part of the interviews, none of the firms we spoke to who offered both remote and terrestrial betting services seemed to imply that they considered them as part of the same overall market.

Remote gaming

Our long run econometric estimate is that the own-price elasticity for remote gaming is -1.80.

This is somewhat more elastic than our estimate for remote betting, but given the very different nature of betting and gaming it is not clear that we would have expected them to be similar.

This is also more elastic than our estimate for terrestrial gaming. In our view it is not surprising that the estimated elasticities for terrestrial gaming and remote gaming are different. We consider the two sectors to be quite different because:

- they offer different products – for example remote gaming includes bingo;
- they offer different experiences – as discussed, terrestrial gaming includes a strong social component which led us to believe that price may be relatively unimportant;
- they are likely to attract different customer groups.

We propose that an elasticity of -1.50 is used for this sector. This is within the confidence interval of our long run elasticity. We do not at this stage propose a more elastic figure than our baseline result even though we also use OLS rather than IV in this sector; given the paucity of evidence on elasticities for online gambling we are reluctant to recommend highly elastic estimates.

We have seen no consistent evidence of cross-price effects for this sector. As described above, remote and terrestrial gaming seem like sufficiently distinct products that we would not necessarily expect them to be substitutes. Nor did we find any strong evidence from our interviews with firms in the sector that remote betting and gaming were seen as particularly substitutable (for example, while some firms tried to 'cross-sell' gaming to online bettors using targeted promotions, others actively avoided doing so for fear of alienating customers who only wanted to bet on sports).

4 The use of promotions in the gambling market

4.1 Background

HMRC asked Frontier to research gambling companies' use of promotions. The key issues of interest included:

- The sorts of promotions gambling companies run, why they are run and how effective they are;
- How promotions influence player behaviour, and whether that influence comes through any impact on the 'price' of gambling (the expected return) or through other channels;
- How and why changes in costs (including changes in gambling duties) might affect the use of promotions.

The main interest was in two forms of the most commonly used promotions:

- **Freeplays**: a free opportunity to gamble accorded to a player by an operator, which may simply be offered as an incentive directly or given as a prize from paid gambling, and;
- **Cashbacks**: any scheme (including loyalty schemes) where a player receives some form of cash back for their activity.

The key distinction is that cashback offers are in the form of cash (which can be used by the player to gamble or withdrawn and used for other purposes), whereas freeplay offers can only be used to gamble (though any winnings from these gambles may eventually be converted to cash).

4.2 Approach

This part of the study was based on a number of interviews conducted with current operators in the gambling market to gain insights into the use of promotions. Given the lack of existing evidence in the literature about promotions in the gambling market (see Section 2 and Appendix A), the evidence collected as part of this process was particularly valuable.

A topic guide (see Appendix D) for the interviews was developed with HMRC and a number of firms were contacted and invited to participate in the interview.

Interviews lasted approximately one hour and were conducted in line with the Social Research Association Ethics Guidelines.[48] With permission, the interviews were recorded and the content later written up into a note of the discussion which was agreed by the interviewees, giving them the opportunity to amend anything which they felt was inaccurate or potentially disclosive in nature about the firm or individuals who had participated. A short summary of some of the interviews conducted can be found in Appendix C.[49]

In total, 14 firms were invited to participate. These were the same firms that indicated early on in the project that they would be willing to supply us with data for the study.[50] This included firms who offered only remote gambling services, and firms who offered both terrestrial and remote services. We requested to speak with people who had some responsibility for decisions about promotions within their company, whether across all the gambling services offered or some part of the services.

Interviews were conducted with eight firms in total, though in fact we carried out nine interviews, since for one company we conducted separate interviews about their remote services and their terrestrial services. Eight firms reported on remote gaming, six reported on remote betting and two could provide information for the terrestrial side of the market. **Table 3** summarises information about the interviews which were conducted.

Having conducted and written up the interviews, the findings were subject to a thematic analysis and synthesis which we report in Section 4.3. We were interested not only in summarising the findings across the interviews, but also in looking at any differences in the responses across different types of firm or gambling (e.g. by size, across remote and terrestrial gambling, across betting and gaming services).

Of course, given the relatively small number of interviews conducted, the findings cannot necessarily be generalised to a wider set of respondents, and should therefore be taken only as the views expressed by the participating firms.

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[48] http://the-sra.org.uk/sra_resources/research-ethics/ethics-guidelines/

[49] Of the nine interviews conducted, we obtained permission from seven to include the summary in this report.

[50] Ultimately we received data from 13 firms.

Table 3. Summary information about firms with which interviews conducted

Interview reference	Sectors covered by interview	Approx. years in operation	Approx. size within UK market
1	Remote betting Remote gaming	10+ years	Medium size firm
2	Remote gaming	10+ years	Medium size firm
3a	Terrestrial betting Gaming machines	10+ years	Large firm
3b	Remote betting Remote gaming	0-10 years	Medium size firm
4	Remote betting Remote gaming	0-10 years	Small firm
5	Remote betting Remote gaming	10+ years	Large firm
6	Remote betting Remote gaming	10+ years	Large firm
7	Terrestrial betting Remote betting Remote gaming	10+ years	Large firm
8	Remote gaming	0-10 years	Large firm

Source: Frontier Economics. Note: 3a and 3b represent two interviews with the same company, but looking at different parts of the business.

4.3 Synthesis of findings

4.3.1 Use of promotions, freeplays, cashbacks and promotional strategy

All of the firms we spoke to used promotions as part of their business activity, and were able to describe a broad strategy guiding how promotions were used.

For all of the firms we spoke to about online betting and gaming, the promotional strategy was guided around three issues:

- **Acquisition** of new customers;
- **Retention** of existing customers;
- **Re-activation** of 'lapsed' customers who have stopped gambling with the firm.

These online companies described this as a player 'lifecycle' or customer 'journey'. One online company suggested that around 40% of the overall promotional spend was devoted to acquisition, 40% to retention and 20% to reactivation but it is not clear how representative that is. It was commonly noted that remote gaming players were more costly (in terms of the promotional spend required) to acquire than remote betting players.

The same terminology was not used by any of the terrestrial companies (though when we spoke with both the terrestrial and remote parts of businesses operating in both sectors, the remote company was still guided by this same strategy). For one of the terrestrial betting companies, the 'strategy' discussed was around tailoring promotions to the sporting calendar ('seasonal') or trying to revive parts of the business where demand appeared to be tailing off ('tactical'). The other terrestrial betting company talked about their strategy as a form of 'customer relationship management'.

While the companies we spoke to described the promotions in various different ways, they appear to fall into a relatively small number of categories:

- **Freeplay** promotions include free bets (sports betting), or free spins/chips (gaming). These can be general bonuses to be used to bet or gamble at the player's discretion, or tied to a specific event or game. They can also sometimes be tied to the player themselves making a bet or a gamble (e.g. betting on one football match gives a free bet on another event). Matched deposit offers are another common form of freeplay promotion: players are given a bonus multiple of any deposits they make into their online accounts. These deposits will either be tied to particular forms of gambling or can be used for any gambling, but will always have conditions which mean the bonus funds must be 'recycled' a large number of times before any of the money can be withdrawn as cash.

- **Cashback** promotions include returned stakes for losing bets (usually under certain conditions, e.g. if a particular player scores), returning a proportion of losses (mostly in casino gaming) and loyalty schemes offering points for play.

- **Other forms of promotion** include prize draws, and temporary "long odds" offers, the latter being particularly common in terrestrial betting.

Some of the online firms we spoke to described how different forms of promotions were used to achieve these different objectives. Most commonly, the firms described how freeplay promotions (most often a matched customer deposit) are used to help acquire customers whereas any cashback offers (including loyalty schemes and maximum losses) are part of a retention strategy. As a result, general marketing by these online gambling companies (which is also more commonly focused on acquisition) tends to feature any sign-up freeplay offers quite prominently, but will tend not to emphasise cashback offers.

Most of the online firms we interviewed argued that their use of 'genuine' cashback, in the form of freely-withdrawable cash funds rather than restricted 'bonus' funds, was somewhat limited. Where cashback was given as cash, it was often limited to big-spending customers, where it was thought there was less chance of the reward being used for anything other than continued gambling:

> *"… those [high-value] customers inevitably are good customers who enjoy our products, and therefore they'll reinvest that money in the products. We want to give them as much flexibility to invest in the products they want to play at the time they want to play."*
>
> – Remote Betting Company (#7)

This approach was not universal. One online gaming firm argued they used genuine cashback more often than cashback in the form of a freeplay; a number of other companies did offer genuine cashback to all players in some circumstances or for some specific promotions; and one terrestrial betting firm said they usually paid any 'returned deposit' offers, where losing stakes are returned if particular circumstances occur, as cash rather than as free bets. In general, though, freeplay offers of various forms are the most commonly used promotions for all parts of the strategy by online gambling companies. For example, matched deposit bonuses were quite commonly used for retention as well as acquisition, as were other bonus payments into player accounts.

Some firms also described using promotions to launch new games or new products, usually by offering freeplays or free spins for those specific games.

Another way in which promotions can be used is to cross-sell different products: for example, players who sign up to bet on sports may be offered promotions designed to encourage them to play casino games, or slots. For one online company, cross-selling was seen as an important objective because players who use multiple products are seen to have a higher lifetime value:

> *"We know that the more products a customer plays with us, the higher their lifetime value will be with us … you may have come in with the intent of playing casino; however, at some point within your lifecycle I will start to introduce you to*

other products based on my understanding of yourself … to entice you to cross over to another product there needs to be an incentive [which] is basically around a cashback promotion, a free play promotion, a stake match promotion, etc."

– Remote Betting and Gaming Company (#4)

However, there was some disagreement about whether cross-selling was a sensible strategy. One online betting and gaming company, which focused mostly on betting, was wary of trying to deliberately promote gaming to those who had not previously used it and suggested that some gamblers might be alienated by attempts to cross-sell.

Comparing the responses from the firms we interviewed, it appears that promotions are more important for online gaming than online betting. Amongst the operators willing to offer estimates, the range of gross gaming yield devoted to promotions in gaming (casino, bingo and poker) were typically 20-50% compared to 10-20% for betting. Within gaming, though, there was variation across the types of games, with bingo being seen as particularly promotion-intensive. Part of the reason for this difference was seen to be that promotions were a way for online gaming firms to differentiate their offering to players, since the basic 'games' themselves are roughly similar across operators:

"On the non-sports side we are even more reliant on promotions, because we don't have the sports events to base the business around … and typically there isn't the price differentiation on gaming … the points of differentiation become around brand and promotions, and to some extent product, though product is increasingly the same across our competitors."

– Remote Betting and Gaming Company (#6)

For betting, by contrast, firms can also set the odds or offer different ranges of bets on different events. Indeed, for online betting, companies often reported using temporary long-odds offers as another form of promotion, offering more attractive odds for a particular event for a limited period.

Only one terrestrial firm reported an estimate of the proportion of gross gaming yield devoted to promotions, at around 3%. Technological and regulatory constraints were seen to limit the level and types of promotions which could be used for terrestrial gambling.

The main form of promotion for terrestrial betting is the free bet. There was variation in the use of loyalty cards for terrestrial betting, with one company saying they did not use them, believing the costs of setting up and running the scheme would be too high. Another company did use loyalty cards, partly to be able to obtain individual-level data on their customer's betting behaviour which might be used to better target promotions.

This form of targeting was ubiquitous among the online firms we spoke to, where the data on individual player behaviour is captured routinely and used to

target promotions. There has been a clear move towards making this targeting ever more fine-grained in recent years, though there is some difference across firms in how far advanced they are with this process. In general, smaller companies tended to be less advanced on the data analysis and promotional targeting than larger firms. The advantage of targeting promotions is that the 'deadweight' cost (paying people to bet or gamble in ways they would have done even without the promotion) can be reduced, for example using modelling techniques to predict who is most likely to respond to a promotion. Other key data analytics mentioned included estimating when people are more likely to 'lapse' their account with the firm, which sorts of promotions people will best respond to given their observed gambling behaviours, and so on.

Besides an increased emphasis on targeting, there was no particular consensus on other changes in promotional strategy in recent years among online gambling companies. Some companies reported more aggressive recruitment strategies, others argued they had switched to focusing on retention, and others that there had been no particular change in strategy at all other than refining the types of promotions offered based on learning and experience.

With regard to the overall importance of promotions to the business, a general theme is that smaller, online only companies tended to emphasise the importance of promotions more than larger companies who also had an offline presence in the UK high street. This suggests that 'brand' may play some role in player behaviour:

> *"The fact of the matter is, the less 'brand' you have, the more you need bonuses … if you have a very strong brand, you can somehow afford not to go that strong on bonuses; if you have a weaker brand you have to go very strong on bonuses so you can get people into the system."*
>
> – Remote Betting and Gaming Company (#1)

4.3.2 Impact of promotions on customer behaviour

There was a broad consensus among the remote gambling companies interviewed that promotions affect customer choices of which company to gamble with, and that offering competitive promotions was a vital part of the industry. In general, it was felt that consumers were coming to view promotions more as an expected part of the offering from online betting and gaming companies. One large online company (which also has a high street presence) cited internal survey evidence that freeplay offers are the first- or second-most cited reason for why players choose a particular site to gamble with, and that offers also drove reactivation:

> *"When we survey customers who've churned, when they came back, one of the main reasons always given is free bets; when we survey customers who haven't yet come back and say 'what would it take to make you come back?', they always*

say free bets … it's always the first thing they look for, it's a big expectation of people in the market, so it's critical to what we do."

– Remote betting and gaming company (#6)

Most of the companies we interviewed were able to conduct some empirical assessment of the impact of promotions, again with varying degrees of sophistication (similar to the variation in how well firms were able to 'target' promotions based on data analytics). A number of larger online gambling firms in particular reported using control groups and randomising offers to estimate their effect. These companies also try to calculate a return on investment (ROI) figure for each promotion. This was not ubiquitous; one large online betting and gaming firm argued that evaluating promotions was more about judgement than measurement, and a large gaming firm argued it was too difficult to calculate the ROI for a given promotion with any accuracy, and so preferred using a holistic judgement approach. Smaller online firms varied in the degree to which they tried to estimate an ROI for each promotion.

For terrestrial betting, where less data were available on individual player behaviour, the firms we interviewed suggest that attempts to measure the impact of promotions relied more heavily on aggregate data.

There was also some sense that consumers were becoming more 'sophisticated' in how they compared the offerings from different companies: for example, an increasing use of comparison sites both to compare odds for remote betting companies, and the deposit bonuses being offered by different remote gaming companies. As a result, one online gaming company argued that there was an increased need to offer 'surprise' promotions to trigger behavioural change. Increased sophistication was also highlighted by one terrestrial betting company as a reason why they had switched cashback offers (in the form of returned losing stakes if certain conditions occur) that were less frequent but more likely; consumers were increasingly able to evaluate offers on the basis of their expected benefit rather than just being attracted to the presence of an offer. Many companies suggested they were offering less generous matched deposit offers (in that the money had to be recycled more often to be cashed out) because generous offers would attract short-term players who would sign up purely for the bonus but would not represent genuine lifetime value for the firm.

The usual distinction made was between 'savvy' customers who were particularly sensitive to the price (combining the underlying odds with the value of promotional offers) and 'recreational' players who, whilst attracted by promotions, were not particularly sensitive to prices but also considered quality of service, ease of use and so on in deciding which site to use and stay with:

"You have a very specific group of what we call 'punters': the ones who really, really 'play the system', they understand the system. They actually will play and understand prices [for specific bets available across different companies]."

– Remote betting and gaming company (#1)

One online betting and gaming company made it clear that they felt that high bonuses alone were not enough to drive acquisition or retention without having a high-quality, reliable service as well.

Whilst it was often felt that the proportion of 'savvy' customers was increasing, they were still thought to be a minority of customers; however, they often were the heaviest gamblers ('high rollers') and so could make up a significant part of overall revenue. A number of online gambling companies offered estimates that their players held multiple online accounts with different providers, with four a commonly-cited figure. Usually one account was thought to be dominant.

In online sports betting, the firms we interviewed felt that changes in odds did affect demand, in part because customers often have multiple online accounts, and the odds can easily be compared across providers. There was also evidence that this was true for promotional offers made by terrestrial bookmakers offering temporary 'long odds', which the firms we interviewed believed to be associated with increases in betting volume. However it was hard for the companies to know whether this represented genuine additional betting as a result of the 'price cut', or substitution across bets (betting on the promoted event rather than another event) or across time (betting during the promotional period rather than before or after).

4.3.3 Impact of gambling duty regime on the use of promotions

For those companies that were not entirely based offshore, the interview asked whether the current UK gambling duty regime (in terms of tax rates and how taxes treated promotions) affected the use of promotions by the company.

Where relevant, most companies we spoke with were able to identify the different tax treatment of promotions for different sectors (e.g. betting and gaming), and in general favoured a consistent treatment across sectors. However, there was mixed evidence on whether this differential approach had any impact on how the firm currently used promotions.

One large terrestrial betting firm suggested that because free bets were included in revenues (and so subject to General Betting Duty), their use was reduced, contrasting the use of free bets on machines (where they are not subject to tax). The firm was also actively considering how the duty system would treat free bets for remote betting following the move to a place of consumption tax:

> *"INTERVIEWER: So [the tax treatment of promotions] is something you consciously think about in determining the use of promotions across different activities?*
>
> *INTERVIEWEE: Yes, definitely, and it's a key discussion at the moment in terms of point of consumption tax. The tax treatment of free bets and the*

technical requirements in terms of wagering requirements is something that will significantly influence how we use free bets."

– Terrestrial betting company (#7)

Another remote betting and gaming company (which also has a terrestrial presence) argued that following the move to a place of consumption tax, the way in which promotions were treated could affect how the tax reform affected promotions:

"… on the gaming side there are a whole variety of different mechanisms [for promotions]. If for whatever reason some of them fall outside being considered value deductions by the UK tax regime then we'll have to shift quite significantly the way that we do things towards promotions that are considered deductible."

– Remote betting and gaming company (#6)

However, two other companies argued that different tax treatments for promotions had little or no impact on the choice of which promotions to use in which sectors, although acknowledged that the overall marketing budget for a particular sector (which was set centrally) could be affected by tax reform.

4.3.4 Impact of cost shocks and changes in duty on promotions

Companies were asked to consider how general shocks to their overheads (such as increases in rent, wage costs or server costs) would impact their use of promotions, and then how tax reforms (whether changes to the current rate of gambling duty if relevant, or the move to a place of consumption tax for remote gambling) would affect promotions.

In general, there was no consistent difference in how companies said they would respond to a change in taxation compared to any other change in costs.

All of the companies interviewed suggested that, in the event of an increase in costs (whether overheads or an increase in the duty liable for a company) the promotions and marketing budget would be vulnerable to being cut. Some companies also singled out increased compliance costs in the event of a move to a place of consumption tax which could put pressure on this spending. When asked directly, most companies suggested that a short-run cost shock could be absorbed without affecting the use of promotions (given that marketing budgets tend to be fixed for a given period such as an accounting year) but that longer term shocks might then feed through into the promotions budget available.

Most companies interviewed considered promotions and wider marketing in a single budget and so were not able to assess whether one might be more likely to be reduced than another, though one online gambling company indicated that marketing was more vulnerable to cuts than promotions:

"Marketing is a very easy thing to cut back on. People are quite easy to cut back on. Promotions are quite easy to cut back on."

– Remote gaming company (#8)

For online gambling companies in particular, this promotions and marketing budget was seen to be the largest single 'discretionary' spend and therefore most likely to be reduced in the event of a cost increase:

> *"In a hypothetical situation it's very hard to say what way the industry would move or what way we would move as a company if we had to reduce our bonus costs or promotional activity … the way I see it, I think it would be the easiest thing to take away first without totally negatively affecting the company."*

– Remote betting and gaming company (#3b)

Other cost bases which were sometimes mentioned (and in some cases cited as having been cut in the face of previous cost shocks) were staff costs (in particular headcount) and contractual costs with suppliers of software and other services which allowed the firm to run remote gambling operations.

For terrestrial betting, where promotional spend is a smaller component of the cost base, other costs which could be cut were identified by the interviewees as the number of stores, with less profitable shops being vulnerable to closure.

Some companies also suggested that in the face of cost increases or a tax increase they would seek to 'rebalance' promotional spend, either targeting spending more heavily on 'high roller' players (who appear to make up the majority of revenues and are perhaps more responsive to deals), or through spurring what is already an increasing trend to try and promote more intelligently to those players most likely to respond and so minimise any deadweight cost.

Two remote betting and gaming companies (each with a terrestrial presence) also noted that they would seek to cut back on promotions with a lower expected ROI. One firm also said they would cut back on promotions with a more uncertain ROI.

Most firms who considered what might happen should costs or taxes *fall* did not suggest that it would lead to any additional spend on promotions, at least not unless it was clear that doing so would be profitable:

> *"EBITDA[51] is the core focus of this business, and unless we're driving the bottom line positively and hitting that target, then we probably wouldn't re-invest [in promotions or marketing] just for the sake of having extra money to invest."*

– Remote betting and gaming company (#3b)

The view that promotions would be cut in the face of a cost increase but not raised in the event of a cost fall is consistent with the idea that, at the margin, changes in promotions might have relatively little impact on profitability.

[51] Earnings before interest, taxes, depreciation and amortisation.

However, some smaller operators (as noted above, those with no 'high street brand') were concerned about whether cutting their promotions in the event of cost increases could damage profits, particularly if the move to a place of consumption tax was associated with a significant unregulated black market:

> *"… the natural reaction if you're faced with a big increase in costs in one element of your business is to make savings elsewhere … that might be in the marketing cost and the spend that we have on UK media … or we might look to try and change the promotion that we offer to players. If you do either of those you run the risk of seriously damaging your business in terms of new players that you recruit and players you retain … there will be a whole host of black market operators … who will come in and offer a deal to the consumer which is based on lots of free chips, very attractive offers, that we as a licensed player and taxpayer won't be able to match."*
>
> – Remote gaming company (#2)

In terms of a wider pricing response to a tax or cost increase, one of the larger companies (with both remote and terrestrial operations) did suggest that the underlying price or margin could be increased both in betting and some forms of gaming such as bingo where the 'house cut' could be adjusted. Smaller firms tended to argue they had no scope to increase underlying prices to remain competitive, and for casino gaming noted that the underlying odds were fixed.

A number of companies, in particular those who also had a high-street presence, suggested that a tax shock such as the move to a place of consumption tax which affected almost all operators at the same time could have quite different effects on promotions than a shock which only affected a single firm. The impact on profits if a single company reduced promotions would be much larger than if all companies did so. Many companies also noted that there was uncertainty about what the market structure would look like after the place of consumption tax was introduced, and that any final decisions about promotions would ultimately depend on the competitive pressures faced by the firms after the reform:

> *"[The impact on promotions and wider marketing] depends on the position you're in post-point-of-consumption in terms of market share … there are a lot of operators marketing to the UK market that will … disappear, so you'd need to take a stock-check, see who's actually in and who you'll be competing against, at that point in time what market share you have, and then you'd determine your strategy around how you market or promote."*
>
> – Remote betting and gaming company (#4)
>
> *"…the way we spend promotional budgets, whether that's free bets for existing customers or for new customers, is a result of the competition and what they're doing, because we have to be competitive. And so if the introduction of the point of consumption tax means that everyone is in the same boat and everyone is reducing the amount of bonus that they give for new customers and equally being less rich*

in terms of how they retain and reactivate players then the actual impact on us from a day-to-day perspective might be equalled out … from a competitiveness point of view we're on a par with everyone else."

– Remote betting and gaming company (#3b)

5 Overall conclusions

HMRC commissioned Frontier Economics to undertake research to produce price demand elasticity estimates for specific sectors of the UK gambling market split by whether they operate as terrestrial or remote sites. We were asked to estimate own- and cross-price elasticities for eight sectors of the gambling market:

- Terrestrial betting;
- National Lottery (main-draw, scratchcards, online instants);
- Terrestrial gaming;
- Gaming machines;
- Terrestrial bingo;
- Pools;
- Remote betting; and
- Remote gaming.

HMRC also commissioned Frontier Economics to analyse how promotions (special offers, discounts and other similar inducements) are used in the gambling industry, and what the impact of cost shocks (including to gambling excise duties) might be for pricing and promotional decisions.

We drew on a wide range of primary data (collected directly from gambling companies) and secondary data to estimate price demand elasticities. In total, 13 firms provided data in addition to data collected from other sources including the Gambling Commission, HMRC and online sources. Further, we carried out nine interviews with eight companies to discuss promotions.

Key findings: price elasticities

Our preferred own- and cross-price elasticity estimates for each sector are presented in **Figure 7**. The estimated elasticities are based an overall judgement for each sector which draws on econometric modelling (including judgements about how estimates ought to be adjusted for potential biases from measurement error and the endogeneity of the price variable), previous literature and economic principles.

Drawing on the data we collected, we estimated sector-by-sector time series models of demand to calculate price elasticities. We used the econometric estimates in combination with existing academic research and economic reasoning to arrive at our preferred set of estimates.

We find that demand is most price sensitive for remote gaming, lottery main-draw products and scratchcards. Demand for terrestrial betting and bingo is unit elastic (i.e. a 1% increase in price leads to a 1% fall in the quantity demanded). Our work suggests that demand is less sensitive to price changes for pools, terrestrial gaming, gaming machines and remote betting.

We find some evidence of substitution between lottery (draws) and betting, and lottery (mains) and scratchcards. Having reviewed our econometric results and the existing literature, and having considered a number of economic arguments, we were not able to find consistent evidence of substitution or complementarity between the remaining sectors. Further quantitative or qualitative analysis of cross-price effects would be valuable: the existing literature is extremely sparse.

Figure 7. Preferred elasticity estimates

		Change in quantity								
		Lottery (draws)	Lottery (scratchcards)	Terrestrial betting	Pools	Terrestrial bingo	Terrestrial gaming	Gaming machines	Remote betting	Remote gaming
Change in price	Lottery (draws)	**-1.08**	+0.10	+0.10						
	Lottery (scratchcards)	+0.10	**-1.30**							
	Terrestrial betting	+0.10		**-1.00**						
	Pools				**-0.485**					
	Terrestrial bingo					**-1.00**				
	Terrestrial gaming						**-0.50**			
	Gaming machines							**-0.60**		
	Remote betting								**-0.50**	
	Remote gaming									**-1.50**

Source: Frontier Economics

Key findings: the role of promotions

HMRC were interested in understanding better how and why businesses use promotions in the gambling market, and what the impact of cost shocks would be on how promotions are used. There was particular interest in these issues for remote gambling companies.

We conducted nine interviews. The interviews were subject to a thematic analysis and we developed a synthesis of the findings from each of the interviews.

Types of promotions and their effectiveness

We found that promotions are an integral part of broader marketing for the firms we interviewed. Promotions are used for customer acquisition, customer retention and customer re-activation, and this strategy was common to all the online gambling firms we spoke to. The promotional strategy for terrestrial gambling was not thought of in the same terms.

Overall conclusions

Freeplays and cashback were two of the most commonly described types of promotions used by gambling companies. Cashback offered as cash rather than as a restricted bonus fund was less common.

Many firms were able to assess the effectiveness of promotions, though how this was done varied by company. Some firms employed very sophisticated methods – using control groups and randomising offers. These firms try to calculate a return on investment figure for each promotion. Other firms argued that evaluating promotions was more about judgement than measurement, so took a more holistic approach.

Promotions and customer behaviour

Among the remote gambling companies we interviewed, all felt that promotions affect customer choices of which company to gamble with, and that offering competitive promotions was a vital part of the industry.

The companies interviewed felt that consumers view promotions more as an expected part of the offering from online betting and gaming companies. There was also a sense that consumers were becoming more 'sophisticated' in how they compared the offerings from different companies: an increasing use of comparison sites comparing odds for remote betting companies, and deposit bonuses being offered by different remote gaming companies.

Cost changes and use of promotions

Most companies we spoke to felt that, in the event of an increase in costs the promotions and marketing budget would be vulnerable to being cut.

There were differences between short-run cost shocks, and shocks that persist. Short-run cost shock could be absorbed without affecting the use of promotions (since marketing budgets are fixed for a given period such as a year). However, longer term shocks would have an effect on the promotions budget.

Scope for further analysis

Our research has suggested two main areas where further evidence would most usefully support the evidence base:

1. This study is only the second (following Paton and Vaughan Williams, 2005) to try and estimate own- and cross-price elasticities across multiple different sectors of the gambling market, reflecting the difficulties in obtaining the necessary data. This makes it hard to draw firm conclusions about cross-price effects in this market. More quantitative evidence would help, and further qualitative evidence to understand whether gamblers and operators perceive different sectors to be complements, substitutes or completely unrelated would also be very valuable.
2. Given the growth of online gambling, it is surprising that no previous evidence (to our knowledge) has tried to estimate price elasticities. Again,

this could reflect a lack of available data. Our findings are therefore an important first step but would again usefully be complemented by evidence from other studies, perhaps from other countries where data may be available.

Overall conclusions

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Appendix A: Full literature review

Own-price elasticities of demand

Draw-based lottery games

We identified 15 studies examining own-price elasticities of demand for lottery draws (see **Table 4**).

The studies cover five different countries and most use data from the 1990s and 2000s. Seven studies are based on UK data (though are mostly now based on quite outdated information). We were unable to find any studies which looked at own-price elasticities of demand for other lottery products such as scratchcards on the basis of econometric analysis.[52]

Most studies use data on tickets sold (either at a draw-level or aggregated across weeks or months) as a measure of demand and compute lottery price as the expected value of a lottery ticket (following Forrest et al., 2000) in the relevant period. Price is endogenous to sales (since the expected value of a lottery ticket depends in part on how many other tickets are purchased). Studies typically instrument price with variables related to the incidence or value of rollovers or other top-ups to prize pools.

The UK studies we reviewed typically find own-price elasticities equal to or close to -1 (and are not typically able to reject the hypothesis that the elasticity is -1). The main exception is Farrell et al. (1999) who estimate a long-run elasticity for lottery draws of -1.55, and Farrell and Walker (1999) who find elasticities significantly larger than -1. The latter paper is the only study to use individual-level micro data recording spending on lottery products, rather than relying on national sales data. Their focus was on how average lottery spending and participation varies between regular and rollover draws. Five sample surveys[53] are pooled giving a total sample of 9,077 observations. Four of the sample surveys coincided with regular draws and one with a double rollover draw. It is possible that the more price elastic results in this study reflect substitution across time (i.e. people bringing forward future lottery demand to the period of the rollover) rather than a long-run equilibrium response to a price change, however.

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[52] Paton and Vaughan Williams (2005) estimate the own-price elasticity for scratchcards in the UK to be -1.3 on the basis that the UK operator was seeking to increase the payout rate, suggesting that demand is relatively price elastic. This estimate was based on economic reasoning.

[53] The survey data was collected by National Opinion Polls on behalf of the former industry regulator Office of the National Lottery (OFLOT)

Table 4. Summary of evidence on own-price elasticity of demand for lottery games

Article	Country	Years	Method**	Elasticity
Farrell et al. (2000)	UK	1994-96	IV (FIML), weekly data	-0.80 to -1.06
Farrell et al. (1999)	UK	1994-97	IV (2SLS)	-1.05 (SR) -1.55 (LR)
Farrell and Walker (1999)	UK	1994-96	OLS, Tobit and Heckman models (individual data)	-1.46 to -2.63
Forrest et al. (2004)	UK	1997-00	IV, weekly data	-0.90 (Sat) -3.21 (Wed)
Forrest et al. (2002)	UK	1997-99	IV (2SLS), draw-level data	-0.88 (LR, Sat) -1.04 (LR, Wed)
Forrest et al. (2000)	UK	1994-97	IV (2SLS), weekly data	-1.03
Paton and Vaughan Williams (2005)	UK	1994-2004	IV (GMM), monthly data	-0.83
DeBoer (1986)	US	1974-83	Panel regression on US state lotteries	-1.19
Gulley and Scott (1993)	US	1984-91	IV (2SLS),draw by draw data	-1.15 to -1.92
Mason et al. (1997)*	US	1988-93	weekly data	-1.08
Combs et al. (2013)	US	2004-09	OLS, 2 separate draw games (New Jersey)	-0.47 to -0.52
Beenstock and Haitovsky (2001)	Israel	1985-96	OLS, weekly data	-0.65
Papachristou and Karamais (1998)	Greece	1990-96	OLS, draw by draw data	Elastic
Lin and Lai (2006)	Taiwan	2002-04	IV, draw-level data	-0.38
Yu (2008)	Canada	1997-01	OLS (unclear)	-0.67

Source: Frontier Economics. *based on references to paper in other sources but full paper not located. ** Definitions: Instrumental variables (IV), Two stage least squares (2SLS), Ordinary least squares (OLS), Generalised method of moments (GMM), Full information maximum likelihood (FIML)

Forrest et al. (2004) find that demand for Wednesday lottery draws is very sensitive to price changes; their study is different as studies typically aggregate across different draw-based games. If there is substitution between draws on different days, we would expect to see higher (more elastic) elasticities at the level of a particular day's draw compared to the overall market for lottery draws. Note that Forrest et al. (2002) had previously found no evidence that the elasticity for the Wednesday draws is significantly above minus one.

Apart from the UK studies, we have also identified a number of papers covering the US and some for other jurisdictions such as Canada, Israel and Taiwan. Most US studies find elasticities equal to or close to -1, though Combs et al. (2013) find inelastic demand for two draw-based games in New Jersey.[54]

The studies covering the other jurisdictions typically find price elasticities smaller than one in absolute terms. However, given that the rules of lottery games can vary internationally, findings from other jurisdictions may not be directly applicable to the UK.

Terrestrial gaming

In models of casino gaming, the quantity is usually measured as the total 'drop' (amount of money exchanged for chips) whilst the price is defined as the proportion of that total stake which is not returned to customers (the casino 'win' divided by the 'drop'). Note that here we restrict attention to studies looking at total casino gaming or table-based casino gaming; studies which look entirely at machine-based gaming (whether in casinos or not) are discussed below.

The literature estimating own-price elasticities of demand for casino gaming is relatively limited (see **Table 5**).

We identified only three papers which produced a variety of estimates ranging from a slightly inelastic estimate of -0.85 (Business and Economic Research Limited, 1997) to a highly elastic estimate of -1.9 (Swan, 1992).

The only UK estimate (Paton and Vaughan Williams, 2005) estimated an own price casino elasticity of around -1.2. Their estimate is based on monthly data supplied by the casino industry over a roughly 7½ year period. They use changes in the structure of UK gaming taxes and the number of licensed casinos to instrument price. They also restrict attention to non-London casino data, noting that the UK market is divided into a 'high-end' London market which is seen to compete with global casinos in the US and Far East, and other casinos.

[54] They also find some evidence of complementarity (negative cross-price elasticities) across draw-based games. Note that the less elastic estimate here is not driven by the use of OLS rather than instrumental variables since they exploit exogenous variation in price driven by a new promotional offering in the New Jersey game to identify the estimates.

Appendix A: Full literature review

Table 5. Summary of evidence on own-price elasticity of demand for casinos

Article	Country	Time Period	Method/notes	Elasticity
BERL (1997)*	New Zealand			-0.85
Swan (1992)*	Australia - New South Wales			-1.90
Paton and Vaughan Williams (2005)	UK	90 monthly observations	IV (provincial casinos only)	-1.18

Source: Frontier Economics. *based on references to paper in other sources but full paper not located.

Gaming machines

A number of studies have examined own-price elasticities of demand for machine-based gaming. We identified five separate studies (see **Table 6**), of which three were US-based. These US studies are based on slot machine gaming in regional casinos (Thalheimer, 2012; Landers, 2008; Thalheimer and Ali, 2003), but often refer to the estimates as 'casino' elasticities, since machine gaming dominates casino wagering in their samples. For example, in 1998 Thalheimer and Ali (2003) estimate that around 81% of total casino spending in their sample was made up of slot machine spending.

In the US studies the quantity variable is some measure of total 'handle' (the demand for slot machine wagers per person) and the price is the 'win percentage' (the amount retained after winnings are paid out). Elasticity estimates in these studies tend to cluster around -1, though the approaches differ across the papers, ranging from OLS estimates based on a single casino to fixed effects panel models based on a large number of casinos. Thalheimer and Ali (2003) find some evidence that demand became less price sensitive over time, with the elasticity estimate falling from around -1.5 in 1991 to -0.9 in 1998. They argued this reflected market maturity, though Landers (2008) finds no significant evidence of changes in the elasticity estimates over time.

Table 6. Summary of evidence on own-price elasticity of demand for machine-based gaming

Article	Country	Time Period	Method/notes	Elasticity
Thalheimer (2012)	US – Iowa	1995-2012	OLS (slots)	-0.85
Thalheimer and Ali (2003)	US – Iowa, Illinois, Missouri	1991-98	GLS (slots)	-1.50 (1991) -0.90 (1998) -0.99 (avg.)
Landers (2008)	US - Iowa, Illinois, Missouri and Indiana	1991-2005	Fixed-effects panel data (slots only), 50 casinos	-0.75 to -0.87 (SR) -1.00 (LR)
Swan (1992)*	Australia - New South Wales		Poker machines	-1.70
Paton and Vaughan Williams (2005)	UK	1996-2004	Machines in casinos and bingo halls	-0.62 (SR) -0.94 (LR) (revenue elasticity with respect to tax)
Paton and Vaughan Williams (2005)	UK	2002-04	Fixed Odds Betting Terminals	-0.40

Source: Frontier Economics. *based on references to paper in other sources but full paper not located.

We identified only one estimate from the UK (Paton and Vaughan Williams, 2005). They provide estimates for gaming machines in casinos and bingo halls based on data from one operator, and a separate estimate for Fixed Odds Betting Terminals (FOBTs). They find that the demand for FOBTs is relatively price inelastic, though have only a short time series of data. For other machines, they are only able to observe net revenue (gross gaming yield) rather than separate measures of stakes and payouts. This means there is no way to calculate the 'price' of gaming on these machines. As a result, they estimate how revenue varies in response to the average tax rate on gaming machines. This can be interpreted as a price elasticity assuming full pass through of tax changes into final price. For incomplete pass through, dividing the coefficient by the assumed pass-through rate gives the revenue elasticity with respect to price. From this, an estimate of the demand elasticity can be made. A positive revenue elasticity with respect to price implies that as prices rise, demand does not fall by so much that total revenues are reduced (suggestive of a price elasticity below -1). A negative revenue elasticity suggests that the fall in demand is sufficiently large to reduce total revenue (price elasticity in excess of -1).[55]

[55] Revenue effects from tax changes and subsequent price changes may also be driven by cross-price interactions with other sectors, of course.

Appendix A: Full literature review

Paton and Vaughan Williams estimate the long-run revenue elasticity with respect to tax to be around -0.94, suggesting that the price elasticity of demand is something in excess of -1.

Terrestrial betting

We group estimates both for fixed odds and horseracing (pools) betting together in terms of the survey of the literature (see **Table 7**). This is done because most of the evidence from outside the UK refers to the US horseracing (pools) market which appears most similar to the pools (Tote) betting on horse/dog racing in the UK. Tote betting falls within the betting segment of the gambling market.

We identified nine studies of the US horseracing (pools) market, though all are now somewhat out of date and often rely on quite historical data. These studies use total amount wagered and amount retained to construct quantity and price measures. The elasticity estimates range from around -1.3 (Morgan and Vasche, 1979) to -3.9 (Simmons and Sharp, 1987), consistently suggesting that demand is price elastic though with quite a range in the degree of price sensitivity.

It is worth noting that these studies typically look at the demand for a particular *type* of horseracing rather than a market level analysis of total betting demand. For example, Thalheimer and Ali (1995) look at how wagering responds to price at three separate racetracks in Ohio, finding elasticity estimates at the track level of around -3.0.[56] Ali and Thalheimer (2002) look at 15 different groups of races and the own- and cross-price demand elasticities between them. Their median estimate of -2.1 is therefore an estimate of the elasticity for a particular type of wagering. They typically find positive cross-price terms across types suggesting that part of the price response to one type of wagering becoming more expensive is substitution to other types.

Thus the overall *market* price elasticity for racing is probably somewhat smaller because of this substitution across types. Morgan and Vasche (1982) find a slightly less elastic estimate of -1.3 based on analysis of the wider market for thoroughbred horseracing in California. They find that the elasticity is driven by the impact of higher prices on attendance at race meetings rather than on the amount staked for those who attend.

[56] They do not estimate cross-effects from takeout rates at other tracks.

Table 7. Summary of evidence on own-price elasticity of demand for betting

Article	Country	Years	Method/Type of betting	Elasticity
Ali and Thalheimer (1997)	US	1960-1988	OLS, Horseracing pools (2 types)	-1.63 (harness racing), -1.65 (thoroughbred)
Ali and Thalheimer (2002)	US	1985	OLS, race level data, horseracing pools (15 types)	-2.10 (median)
Gruen (1976)	US	1940-1969	OLS, Horseracing pools (thoroughbred racing)	-1.57
Morgan and Vasche (1979)	US	1958-1978	Model of participation and stakes per attendee, horseracing pools (panel data from 4 major meetings in California)	-1.48
Morgan and Vasche (1982)	US	1958-1980	Model of participation and stakes per attendee, horseracing pools (panel data from 4 major meetings in California)	-1.30
Simmons and Sharp (1987)	US	1982	OLS on 89 thoroughbred horse racing events, daily data	-2.81, -3.90
Suits (1979)	US	1949-1971	OLS (variation in takeout rates by year and state), horseracing pools	-1.59
Thalheimer and Ali (1992)	US	1970-1987	SUR, horseracing pools (single track)	-1.88
Thalheimer and Ali (1995)	US	1960-1987	SUR, horseracing pools, track-level (Ohio)	-2.85, -3.05, -3.09
Paton and Vaughan Williams (2005)	UK	1994-2004	IV, Land-based bookmaker	-1.18
Paton and Vaughan Williams (2005)	UK	91 monthly observations	IV, Pools betting (sports)	-0.49 (LR, not significant)
Paton et al. (2004)	UK	1987-2001	2SLS, bookmaker betting	-1.59 to -1.62
Paton et al. (2001)*	UK		Land-based bookmaker	-1.19 to -2.50
Suits (1979)	US	1974	Simple ratio analysis, bookmaker betting in Nevada	-1.64, -2.17

Source: Frontier Economics. *based on references to paper in other sources but full paper not located.

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We identified four studies which estimate the price elasticity of demand for betting in the UK Three looked at fixed-odds betting in bookmaker shops. The most recent (Paton and Vaughan Williams, 2005) uses government data on total stakes by month and price data from three large bookmakers to estimate a demand model. The bookmaker betting elasticity is estimated to be -1.18, consistent with the idea above from the US studies that at a market level betting elasticities would be lower (less elastic) than at an individual product or race level.

Pools

We identified one study (Paton and Vaughan Williams, 2005) which estimates the price elasticity of demand for pools betting in the UK. The study uses government stakes estimates and price data from a large pools operator to estimate a demand model. Price is instrumented using effective tax rates relative to turnover in the market. The long-run pools betting elasticity is -0.49, and is not significantly different from zero.

Terrestrial bingo

There is little empirical evidence on the price elasticity of bingo demand. Only one paper was identified (Paton and Vaughan Williams, 2005) who use monthly quantity data (total stakes) and price data (proportion retained) from a single operator between 1996 and 2004 to estimate a demand model. They find a long-run price elasticity of -0.42.

Remote gambling

We found no published evidence on price elasticities for remote betting or gaming. Paton and Vaughan Williams (2005) use economic theory to estimate that the own-price elasticity of demand for 'e-gaming' is around -1.25, based on the fact that consumers face relatively low transactions costs and information costs and may therefore be relatively sensitive to price. They note that the elasticity for a particular operator is likely to be much larger than the elasticity for the market as a whole given that the products offered by different remote gaming operators will be highly substitutable.

Cross price elasticities of demand

Most studies which look at price elasticities of demand in the gambling market focus on a single sector. Where studies have price and quantity data on a number of sectors, cross-price elasticities may be estimated. In some cases, studies do not have price data from other sectors, but use measures of the demand for or availability of other forms of gambling to infer something about the degree of substitution across sectors.

Our focus is on cross-price elasticities across broad gambling sectors. Some papers look at cross-price elasticities for different products *within* a sector. For example, Forrest et al. (2004) look at different lottery products in the UK, and the cross-price elasticities of demand between the main Lotto draws, scratchcards and Thunderball. They find a small degree of substitution between Lotto and scratchcards (an elasticity of -0.11). Lin and Lai (2006) look at two different Taiwanese lottery draws and find little substitution between them.

We look now at the evidence for cross-price elasticities across sectors, focusing on those sectors where the evidence base is largest.

Lottery and terrestrial betting

Paton and Vaughan Williams (2005) find evidence that the lottery is a substitute for betting – that is, increases in the price of betting increase lottery demand. They estimate a cross-price elasticity of +0.12, drawing on monthly level price and quantity data from industry sources.

Paton et al. (2004) find evidence of a similar substitution between betting and lottery – that is, increases in the price of lottery gambling increase betting demand. Cross-price elasticities are estimated to be around +0.36 to +0.40. Forrest et al. (2010) also find evidence that an increase in the lottery price is associated with increases in the demand for betting, suggesting substitution, though they do not estimate elasticities directly. They use daily betting turnover data to study the sensitivity of betting demand with respect to any bonus money added to the lottery jackpot both on the day of the draw and on the two preceding days. US evidence from Simmons and Sharp (1987), Gulley and Scott (1989) and Thalheimer and Ali (1995) finds similar results: increased lottery availability tends to be associated with a reduced demand for horserace betting. Elliott and Navin (2002) find that an additional dollar of state revenue from taxes on pari-mutuel horserace betting in the US is associated with a reduction in lottery revenue of more than $2.50, suggestive of strong substitution between betting and lottery.

Not all of the literature consistently finds substitution between betting and lottery. Paton and Vaughan Williams (2005) find that increases in the lottery price reduce betting demand, suggesting complementarity between the sectors. They suggest this result is 'counter-intuitive' and do not therefore include it as a preferred elasticity estimate in their final set of results. Purfield and Waldron (1999) find evidence that lower lottery prices in the Irish National Lottery increase the demand for fixed-odds betting in Ireland on the Lottery outcome (a form of side betting where consumers can gamble at fixed odds on the lottery draw itself), though this does not particularly suggest complementarity between lottery and betting demand in general. Indeed, it is highly intuitive that demand for this particular form of betting should be complementary to the lottery itself.

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Other studies suggest little relationship between the two sectors: Walker and Jackson (2008) find no evidence of substitution or complementarity between lottery price and betting while Kearney (2005) finds that increased lottery spending does not significantly reduce spending on other forms of gambling.

Lottery and terrestrial gaming

Some studies suggest that lottery and gaming are substitutes. Paton and Vaughan Williams (2005), using data from across sectors, find that an increase in the price of casino gaming is associated with a small but statistically significant increase in lottery demand (elasticity +0.04). They also find that increases in machine taxes strongly increase lottery demand (elasticity +1.02); if taxes are not passed through fully into prices this could suggest an even larger degree of substitution with respect to price. When looking at the opposite relationship (how gaming demand responds to lottery price), they find strong substitution with FOBTs (elasticity +1.28).

Other studies also find evidence for substitution between lottery and gaming, looking at how the availability of one form of gambling affects demand for the other. Shonkiler (1993) finds a small effect: the introduction of a lottery in California reduced casino revenues in Nevada by 3%. Walker and Jackson (2008) also find that decreases in state-level lottery sales are associated with increases in casino revenue, suggesting substitution. Elliott and Navin (2002) examined the extent to which introducing licensed casinos in US states affected the demand for state lotteries. They find significant substitution effects: each additional dollar of revenue from riverboat casino gaming reduces gross state lottery revenue by $1.38. Fink and Rork (2003) argue that some of this may be driven by selection bias if casino gaming is more likely to be introduced where lottery demand is already falling. They correct for this using Heckman selection methods, finding smaller effects (a $1 increase in state casino tax revenue reduces net lottery proceeds by $0.56), but still suggestive of a degree of substitution between the sectors.

Again, there are other studies which suggest little relationship between lottery and gaming. Steinnes (1998) looks at the relationship between Native American casinos and other forms of gambling in Minnesota, finding a very small (argued to be inconsequential) negative effect on casino demand of state lottery revenue.

Terrestrial betting/pools betting and terrestrial gaming

A number of US papers have looked at the impact of the availability of casinos on the demand for horserace betting. These tend to find significant negative impacts, suggesting substitution across the sectors. Ali and Thalheimer (1997), for example, find that casino gambling (measured by the number of casinos) in Atlantic City reduced demand for horseracing betting in New Jersey by more

than 30%. Similar results are found in Thalheimer (1998) and Thalheimer and Ali (1995).

The only study we could find which estimated cross-price elasticities between betting and gaming was Paton and Vaughan Williams (2005). They find some evidence of statistically significant complementarity between different forms of gaming (casino demand and the price of FOBT gaming), though the size of the effect (a cross price elasticity of -0.01) is relatively small. They find evidence of substitution between forms of betting (bookmaker and pools), with a 1% rise in betting price estimated to increase pools demand by 0.63%.

They did not find any significant cross-price effects *between* betting and gaming of different forms. Their best estimate was that increases in betting prices are associated with an increase in casino demand (elasticity +0.06), though this is not statistically significant at any normal levels. Similarly, they find a positive cross price effect from betting price to FOBT demand (+0.30) and other gaming machines (+0.03), but again neither estimate is statistically significant.

Terrestrial betting and terrestrial bingo

One UK study has found evidence of complementarity between bingo and betting. Paton et al. (2004) find a positive relationship between bingo demand and betting demand, though they did not have any price data on bingo which would have allowed them to estimate a cross-price elasticity directly. They also find that the statistical significance of this relationship is sensitive to the time period chosen. Paton and Vaughan Williams (2005) do have price data from betting and bingo, and do not find any significant cross-price effects.

Terrestrial gaming and remote gaming

There is mixed evidence on the degree to which terrestrial and remote gaming are complements or substitutes, and no evidence at all on the size of any cross-price relationships.

From a purely theoretical standpoint it is not clear what the direction of this relationship might be. It may be thought online and land-based gaming are substitutes, but an argument could also be made that people who play online casinos might then be more inclined to visit terrestrial casinos as well if online gambling generates an increased preference for gaming. It may also be argued that the two cater to different segments of the gaming market such that there is little reason to expect any substitution or complementarity between them at all.

There is relatively little empirical evidence. Philander (2011) examines the degree of substitutability between online casino gaming and terrestrial casino gaming using US data on sales for both sectors between 1999 and 2006. He finds evidence of substitution: a $1 increase in online gaming is associated with a $0.28 reduction in commercial casino revenue. However, Philander and Feidler (2012)

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find that online gaming (specifically poker) is complementary with terrestrial casino gambling. Their evidence is based on state- and province-level demand for the two sectors in the US and Canada. The size of the effect is relatively small: a $1,000,000 increase in terrestrial gaming revenue increases demand for online poker by around $2,500. However the effect is relatively robust to the model specification chosen. It may be that there is a different relationship between terrestrial gaming and online poker compared to other forms of online gaming, but the sparse literature means it is hard to draw any firm conclusions.

Other evidence on cross-price elasticities

As noted above, few papers gather evidence on quantity and price across multiple gambling sectors allowing for robust estimation of cross-price terms. Paton and Vaughan Williams (2005) is the only example we found which was able to estimate cross price effects across a number of sectors. Aside from the evidence from that paper already cited in this section, they also estimate significant effects in the following sectors:

- The National Lottery and bingo are found to be substitutes (a 1% rise in bingo prices is associated with a 0.4% rise in lottery demand). The authors argue this is likely to be an upwardly biased estimate of the elasticity.
- Casinos and bingo are found to be substitutes (a 1% rise in bingo prices is associated with a 0.44% rise in casino demand). The authors again argue this is likely to be upwardly biased.
- Gaming machines and scratchcards are found to be substitutes (a 1% rise in scratchcard prices is associated with a 0.1% reduction in machine revenue); this is a revenue elasticity rather than a demand elasticity.
- FOBTs and bingo are found to be substitutes (a 1% rise in bingo prices is associated with a 2.89% rise in FOBT demand). The authors argue this is likely to be upwardly biased.

Promotions in the betting and gaming market

HMRC were interested in the use of promotions in the betting and gaming market, and the impact of cost shocks (including changes to gambling duties) on prices and the use of promotions.

We found little direct evidence in the literature about how changes in gambling taxes would affect the use of promotions. We therefore looked at a wider set of issues, both in terms of economic theory and empirical evidence, related to promotions in the gambling market and related markets. Evidence on these issues helped us to form a number of questions and hypotheses which were used

to help develop a topic guide for a number of semi-structured qualitative interviews with gambling companies to explore promotions and taxation in more depth. Evidence from these interviews is summarised in Section 4.

Economic rationale for promotions

At a very basic level, any company using promotional offers would do so in the belief that it raises profits. Economic theory outlines a number of avenues through which promotions could raise profits, summarised in **Table 8** below.

Importantly, promotions could increase profits even without raising the overall demand for gambling (e.g. through price discrimination or increased market power).

Importance of promotions over time and sector

There was little published, peer-reviewed evidence on trends in gambling promotions over time or across sectors, and none at all for the UK. In the Atlantic City casino industry, Marfels (2010) shows that spending on 'complimentaries' (including free play coupons and cashback) rose from 11.1% of revenues in 1980 to 36.2% in 2009.

Some evidence suggests that advertising spend by gambling firms has been increasing in the UK and other jurisdictions (Monaghan et al., 2008). Microsoft Advertising (2011) show total advertising spend by gambling operators in the UK rising from less than £100 million in 2006 to almost £140 million in 2010. To the extent that spending on advertising and promotions are positively correlated this suggests that promotions are more common now than in the past, though detailed data on this are lacking.

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Table 8. Economic rationales for promotions in the gambling market

Rationale	Description
Product differentiation	In some gambling markets, products are essentially identical (a bet on a given horse, a spin of a roulette wheel). Simple economic pricing models (e.g. Bertrand competition) predict that in competitive markets, the price should be equal across companies and set at marginal cost. Promotional offerings are therefore a way for firms to differentiate their product from that of their competitors, potentially allowing them to raise price above marginal cost by exerting a degree of market power for their particular product. The market then exhibits characteristics of monopolistic competition (Marfels, 2012). For example, the Competition Commission (2012) found evidence that casinos spent a larger share of revenues on promotions when local competition increased, and prepared 'defence strategies' for expected increases in competition which included more promotional activity.
Search costs and price obfuscation[57]	Searching for low prices is costly (Stigler, 1961). These search costs are one possible explanation for why firms might want to promote: promotions make it harder for consumers to learn which firms charge high and low prices (Varian, 1980), or make pricing less transparent (obfuscation) and harder to understand (Ellison and Ellison, 2009). A number of studies have considered possible harms to consumer welfare from complex pricing strategies (see for example Ahmetoglu et al., 2010). Such strategies are easier to implement when firms can set multiple price points, including promotions. There is also the specific issue in gambling as to whether consumers even recognise price as 'expected win': there is evidence that consumers respond to changes in the size of the jackpot over and above the impact on the expected return from a ticket in lottery games, for example (Forrest et al., 2002).
Price discrimination	Promotions may be a way for firms to price discriminate between consumers who have a higher or lower willingness to pay (Sobel, 1984). Price discrimination may be a particular rationale for promotions such as loyalty cards which require consumers to reveal information about themselves to the firm and for the firm to track their behaviour. This can allow firms to segment their customers and potentially offer tailored promotions and offers to different groups, a form of third-

[57] Actions that make it time-consuming for consumers to inspect a product and learn its price. Price obfuscation occurs when the customer's ability to fully understand the price, and therefore to compare prices is reduced.

	degree price discrimination.
Consumer responsiveness to promotions	Economic models have explored pricing strategies when firms can set many prices rather than just one, either because they sell many different products (a bookmaker will set prices for many thousands of events, for example) or because there are multiple price points relevant to a single product (entry fees and gaming fees at a bingo club, underlying odds and promotions at an online casino). In general, firms will try to set lower prices where consumers are most price sensitive (competitive Ramsey pricing, Bliss 1988). If consumers are particularly sensitive to promotions, this could explain their use in the gambling market. There may be behavioural reasons why this is the case. For example, promotions could be a "focal point" if they are more heavily advertised or easily understood than the underlying odds. Or if there are "switching costs" involved in moving to a new gambling company, promotions may be needed to incentivise switching behaviour.
Habits and addiction	If past gambling behaviour affects future gambling behaviour though habits or addiction then promotions which encourage people to start gambling could be profit-enhancing. Addiction models (for a summary see Leicester and Levell, 2013) argue that current behaviour (the amount gambled today, for example) depends in part on past behaviour (the total amount gambled before). The larger this 'stock' of past gambling, the more value consumers derive from current gambling, leading to self-reinforcing behaviour. Farrell and Creigh-Tyte (2003) highlight evidence that UK lottery sales following a rollover tend to be slightly higher than earlier levels for around five to six additional draws, suggesting some small evidence of habitual behaviour in lottery games. Lillard and Sfekas (2010) find evidence that smokers who are more susceptible to addiction tend to favour quantity discounts (buy one pack, get one free) whereas those less susceptible favour price discounts (e.g. buying a carton at a lower per-cigarette cost than a single pack). They hypothesise that firms offer quantity based deals to more 'addicted' consumers to build up their addiction stocks more rapidly.

Source: Frontier Economics

Impact of promotions on gambling behaviour

Consumer self-reported studies

Many studies have relied on consumer self-reports of how important promotions are relative to other factors in determining their gambling behaviour. This might

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lead to concern about whether self-reported behaviours differ from actual behaviours in response to promotions of various kinds.

Much of the evidence focuses on the casino sector and in particular the impact of loyalty schemes. Griffiths and Wood (2008) suggest that many casinos compete on the basis of service rather than price. As a result, loyalty schemes (as part of the overall service) are the most important promotional strategy compared to sectors such as retail where temporary price promotions are more straightforward to implement. Barsky and Tzolov (2010) note that in general the evidence from marketing literature in multiple sectors (not just gambling) is mixed on whether loyalty schemes actually affect consumer loyalty, however.

Palmer and Mahoney (2005) look at a single casino in the US, surveying 3,000 members of its loyalty programme. They find no evidence that loyalty schemes affect gambling behaviour. Southwell et al. (2008) surveyed 414 older (aged 60+) users of gaming machines in Brisbane, Australia. Most of those surveyed made use of promotions offered by gaming clubs (e.g. offering free public transport to the venue, or credits on gaming machines), but less than 20% of those who used the promotions suggested they spent more time or money on gambling than they otherwise would as a result. Hing and Haw (2010) carry out two surveys in Australia, one of gamblers and one of problem gamblers receiving treatment. For each group, discounted food and drink (a common promotional strategy in casinos) was a relatively unimportant determinant of where people gambled compared to the quality of service and the perceived safety of the venue. Problem gamblers also cared more about the type of machines offered. Delfabbro and Panozzo (2004) carry out focus groups with problem gamblers and find that few cite promotional schemes as a cause of their behaviour. McDonnell-Phillips (2006) surveyed almost 500 regular gamblers about methods to help them commit to reducing their gambling behaviour. Only 3% cited abolishing 'freebies' for those who gamble a lot as an effective strategy. Slightly stronger evidence for the importance of promotions was found by Caraniche (2005) who surveyed machine gamers and managers of gaming venues. Around one-third of players and almost 20% of managers thought that abolishing free food and drink would help curb problem gambling.

Evidence from the UK is limited. In their assessment of proposed mergers in the casino market, the Competition Commission (2012) used consumer surveys and found little evidence that promotions or the availability of loyalty cards were an important determinant of customer behaviour. Non-price features, such as casino environment, were seen as the most important influences on where consumers chose to gamble. This is backed up by UK survey evidence described in Microsoft Advertising (2011). When asked about what determines the choice of casino, special offers such as free bets were only the sixth most common response and loyalty schemes only eighth. The quality of dining facilities, non-gaming entertainment, staff, gaming variety and recommendations from others

were more important drivers of casino choice. However, promotions appeared to be a much stronger driver of choice for online casino gambling: offering free bets was the single most common reason given for choice of online casino.

Observed gambling behaviour

Rather than relying on self-reports by gamblers, some studies have tried to measure directly the impact of certain promotions on behaviour using observed gambling data. Again, this evidence is focused heavily on the casino sector. The value of these studies is that they rely on data to observe the impact of the promotion on actual behaviour, rather than self-reports by gamblers. However, the drawback is that they focus on particular examples of promotions in specific contexts, such that it may not be possible to generalise the findings to other sectors (e.g. remote gambling).

Findings from a number of studies are summarised in **Table 9**. There appears to be little consistency in the results, suggesting that the specific context is an important determinant of observed outcomes. Outcomes also tend to be short-run, and it is therefore unclear whether promotions affect long-term behaviour.

Aside from the casino sector, observational evidence for the impact of promotions in lottery draws is given in Lee et al. (2010) who look at a Taiwanese lottery. They find that adding bonuses to the jackpot significantly increases ticket demand whereas announcing a fixed 'minimum' jackpot regardless of total ticket sales or announcing a 'conditional' bonus jackpot (depending on the value of a particular drawn ball, for example) had no impact on sales. In the UK, Forrest et al. (2002) look at the effect of 'superdraws' on ticket sales, where additional funds are added to the jackpot on top of the normal value. Interestingly, they find no evidence that superdraws raise demand other than through the effect on the jackpot or expected ticket price – that is, any additional marketing or visibility of the draw as a 'superdraw' does not raise demand by any more than would be expected from a normal draw with the same jackpot or expected price.

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Table 9. Observational studies on promotions and gambling behaviour in casinos

Author(s)	Setting and promotion type	Methods	Findings
Lucas and Brewer (2001)	Las Vegas hotel casino. Effect of 'buy-in incentives' (measures like $25 of credits for $20) on slot machine gambling.	Regression analysis of hotel data on amount gambled on slots.	Buy-in incentives had a statistically significant positive effect on gambling, but not clear positive effect on profits.
Lucas and Bowen (2002)	Las Vegas hotel casino. Effect of 'promotion days' on slot machine gambling.	Regression analysis of daily data on amount gambled on slots from 6 months of internal casino records in 1998. Control variables identified different forms of promotions (prize draws for slots players, value of free play coupons, invitational slots tournaments).	Offering prize draws was not associated with increased slots gambling, though the size of the cash prize was positively associated with spending. Free play coupons and tournaments were associated with increased gambling.
Lucas (2004)	Las Vegas hotel casino. Effect of 'match play' coupons in blackjack (offers additional win on a successful bet).	Regression analysis. Effect of total match play coupons redeemed on amount 'dropped' at blackjack tables using casino data over 222 days.	No significant effect of match play use on blackjack betting.
Lucas et al. (2005)	Las Vegas hotel casino. Impact of $50 and $100 'free play' offers on slot machines spending ('coin-in').	Regression methods comparing spend with the offer to previous trips by same gamblers without an offer.	$50 offer had significant *negative* effect on spending. $100 offer had no significant effect. Offers reduce casino revenues.
Suh (2012)	Las Vegas hotel casino. Field experiment conducted by the casino comparing a randomly-assigned control group receiving a standard $50 free-play offer for slots and a treatment group offered $100.	Regression analysis of data from player databases. Players in the experiment had similar gambling histories. Other offers (e.g. complimentaries) were the same across groups.	The $100 voucher did not lead to significant increases in amount gambled and was less profitable than the $50 voucher. Receiving complimentaries associated with increased gambling.

Source: Frontier Economics

Impact of promotions on profits

Salmon et al. (2004) and Crofts (2011) find no clear evidence that promotions in casinos are associated with increased profits. Crofts (2011) argues this is because many gamblers belong to multiple loyalty programs. Loyalty schemes in casinos are often introduced as a defensive response to schemes introduced by others; individual casinos make more profits with them than they would without, given the schemes introduced by other firms, but collectively profits are reduced because the overall net impact on gambler loyalty is limited when people are 'loyal' to multiple venues. Suh (2012) uses experimental methods to demonstrate that larger promotions may not raise profits. Customers at a slot machine offered a standard promotion generated a net cash flow of $18 each, compared to $2 for another group offered a promotion of twice the size.

There is some empirical evidence that promotional spend and casino profitability are positively correlated when looked at as a whole rather than as individual case-study examples. Repetti (2013) uses profits data from casinos in Atlantic City over a ten-year period from 2002 to assess the wider impact of total promotional spending on profitability. Using regression methods controlling for casino size, legalised gaming in neighbouring states and season-specific variation, she finds that a $1 increase in promotional spending raises net revenue by $3.53 and gross profit by $1.29. The striking difference to other studies which suggest little impact on profit could be because the promotion (e.g. free credit on slot machines) leads gamblers to spend more on other forms of gaming (or food, drink and accommodation) as well. It could also be that the promotion encourages repeat visits so that whilst it does not raise profits on the day the promotional voucher is used, it does raise profits in the longer-term. Alternatively, though, the finding may simply be explained by reverse causation: if casinos run more promotions when they are more profitable, this could also drive the correlation observed.

An obvious question to ask is why firms would continue to run promotions if they did not expect them to be profitable. Some rather anecdotal analysis from the casino industry (e.g. Zender, 2013) suggests that the costs of promotions are rarely fully understood by casinos and little evidence is ever collected on the extra revenues and profits generated.

Impact of tax changes on use of promotions

The economics of tax changes

The basic economic analysis of tax incidence makes it clear that who ultimately bears the burden of a tax (effective incidence) is not necessarily the person who remits the payment to the tax authorities (formal incidence). Gambling excise duties are formally levied on the gambling companies, but at least part of the final burden would fall on gambling consumers as the firms seek to pass-through the

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additional costs in various ways. This may take the form of a simple worsening of odds: offering 4/1 that a given horse wins a race rather than 9/2, for example, or reducing the prize for a particular combination of balls drawn in a lottery or pattern of matches in a bingo game. If payouts cannot be altered, either because of competition, regulation or the fixed terms of a game, however, firms may seek to recoup the additional tax costs in other ways. This could include increases in participation charges (which can also be viewed as part of the 'price' of gambling) such as entry fees to casinos, bingo clubs or for participating in gaming tournaments and pools bets. Or, where firms engage in promotions, the terms of the promotion could also be worsened.

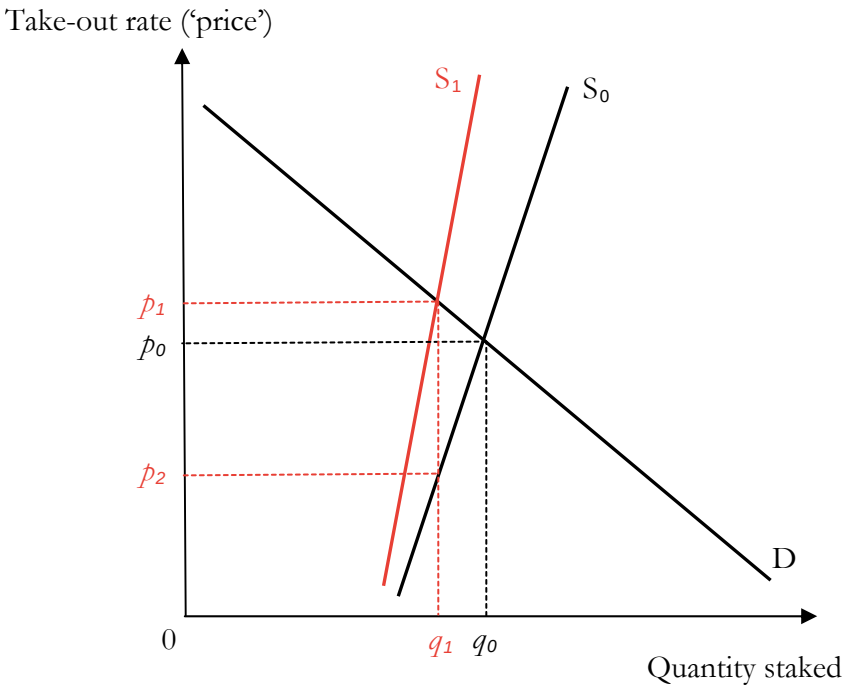
In a competitive market, the analysis of tax incidence is fairly standard: the incidence will fall more heavily on consumers than firms if demand is more responsive to price than supply, and vice-versa. If regulation means that supply is relatively price insensitive, we would expect more of the burden of a tax change to be felt by the industry (or rather, those who supply capital and labour to the industry) rather than by consumers.

Figure 8 illustrates the basic intuition for a gambling sector (betting shops, for example). The vertical axis shows the 'price' of gambling (the take-out rate, or the proportion of stakes retained by betting shops, call this p). The horizontal axis shows the 'quantity' of gambling (stakes, call this q).

We suppose that because of gambling regulations or other restrictions on supply, the supply curve is inelastic – supply does not increase much even as the price rises such that the curve is steep relative to the demand curve (Anderson, 2005). Now consider an excise tax imposed on revenue. At a given price, the amount that firms are willing to supply will be reduced by the amount of the tax. The supply curve will shift inwards and rotate (since at a higher price the tax will reduce the value of supply by a larger amount). At the new equilibrium, consumers pay a higher price but the effective after-tax price retained by firms is lower. The difference $(p_1 - p_0)$ is the part of the overall tax burden borne by consumers, and the difference $(p_0 - p_2)$ is the part of the burden borne by firms. It is clear from this example that more of the burden is borne by the firms and less of the burden is borne by consumers, because supply is less responsive to price than demand.

As noted above, firms may 'pass through' tax changes to consumers in a number of ways if they set a number of prices, or use special offers, or can vary quality. The 'price' in **Figure 8** could therefore be viewed as some average, quality-adjusted, market-level price, or we could conceive of looking at the elasticities of supply and demand separately with respect to individual prices, promotions and quality to understand which prices are most likely to increase (or promotions decrease) in response to a change in the tax rate.

Figure 8. Illustrative impact of revenue tax in competitive market with inelastic supply



Source: Frontier Economics

The analysis above applies only in competitive markets. Some sectors of the gambling market may be better characterised as oligopolies with only a few large firms (such as terrestrial betting, bingo and gaming). Economic theory is less clear on tax incidence in such markets (Fullerton and Metcalf, 2002): depending on the market structure taxes may be *overshifted* to consumers (that is, a 1% tax rise could increase final consumer prices by more than 1%).

Evidence of pass-through rates

There is little evidence from the gambling market as to whether increases in tax rates are passed through into consumer prices. The Australian Government Productivity Commission (1999) looked at variation in gambling taxes across US states and how the price of machine gaming varied across states, finding little correlation between them. They found similar evidence across Australian states and when looking at the time-series correlation between tax rates and prices. Of course these findings need not prove that gambling taxes are not passed on to consumers (as might be predicted by the model above when supply is relatively inelastic), since they either do not look at changes in tax rates and changes in prices, or may not account for other factors changing at the same time which may influence both tax and price.

Appendix A: Full literature review

As noted above, in imperfectly competitive markets, there is no clear theory-based prediction about how taxes will be passed through, and so an empirical analysis is needed. Whilst there is no direct evidence on pass-through rates in imperfectly competitive gambling markets, there is some evidence from related markets which are also characterised by a relatively concentrated supply side. For example, in the alcohol market, Young and Bielińska-Kwapisz (2002) and Kenkel (2005) both find evidence that increases in excise duties are overshifted into final consumer prices. Of course, in the alcohol market there may be different supply-side regulation than in the gambling market, so it is not clear how much we can trace this result across markets, though it is illustrative of the general principle that pass-through rates in imperfectly competitive markets need not be in the range of 0 to 100%.

Evidence of promotional response to tax changes

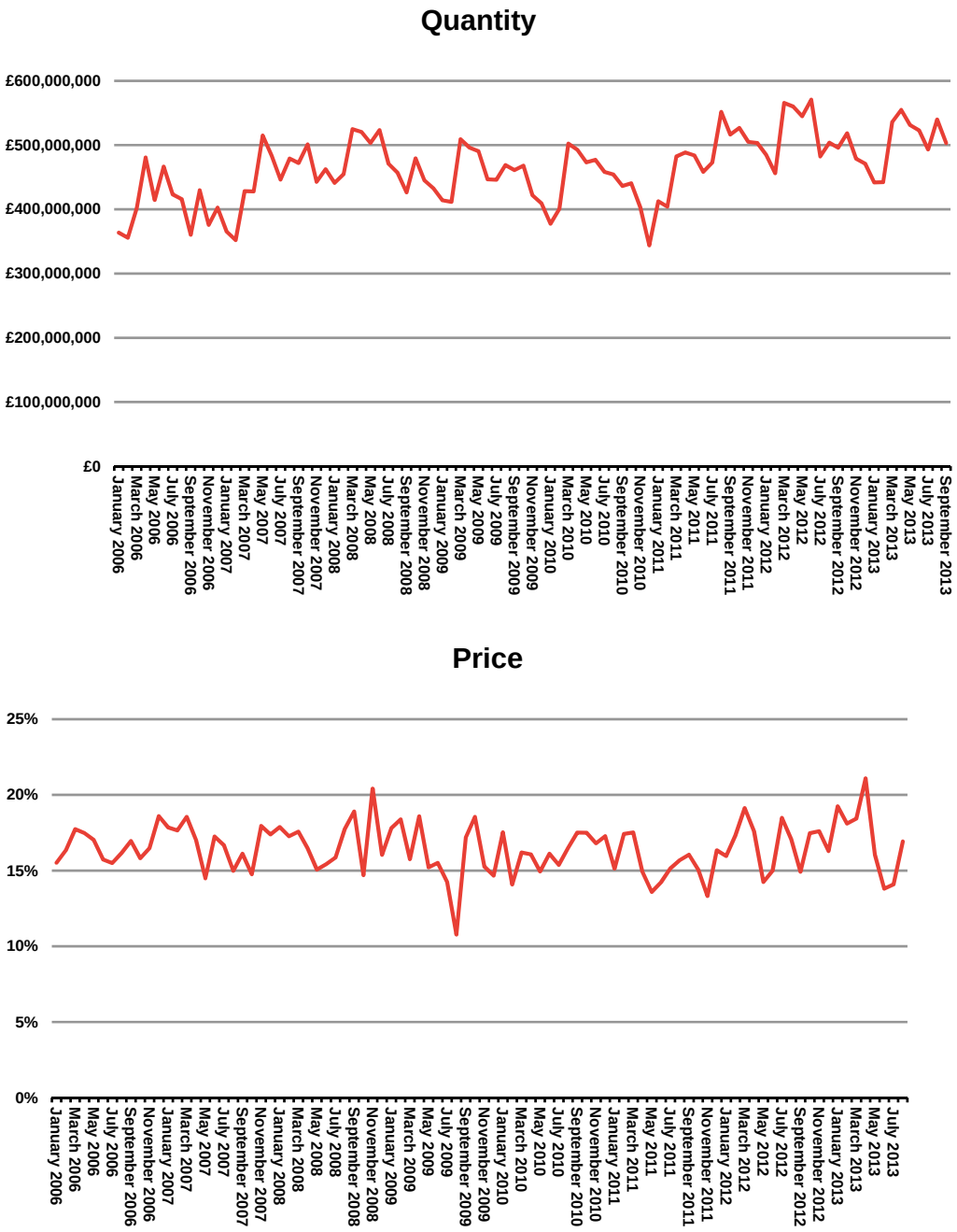
There is no direct evidence on how changes in gambling-related taxes have affected promotions.

The Competition Commission (2012) found evidence that customer promotions in the casino industry had previously been reduced when turnover fell, around the time of the economic crisis in 2008. This might suggest that promotional spending is reduced as a way to maintain profit margins, though of course the large, unexpected shock of the financial crisis may have had very different market impacts both on the supply and demand side than would a change in excise taxes. There is also conflicting evidence from the US casino industry (Klebanow, 2010) that operators *increased* the level of promotions offered, both to recruit new players and retain existing customers, in the face of the economic downturn.

In other markets, Chaloupka et al. (2002) searched documents released by companies during lawsuits brought by smokers in the US against tobacco firms for evidence of company marketing strategies in the face of tax increases. They found evidence that firms developed "defence strategies" to respond to tax rises, including increased use of deals marketed as short-term offsets to tax rises. Promotional spend increased from $1 billion per year just ahead of a 1991 increase in tobacco excise taxes to $2.4 billion per year on average in the three subsequent years. There was also evidence of increased promotional spending following the settlement deal between tobacco firms and US states in 1998, which could be seen as a significant cost shock ($206 billion to states over 25 years). Slater et al. (2001) correlate use of promotional offers for a tobacco brand (a 'free gift' with purchase of a pack) with state-level variation in tobacco control measures in place in 1991, drawing on survey data from tobacco retailers. They find greater use of promotions in states with more stringent control measures.

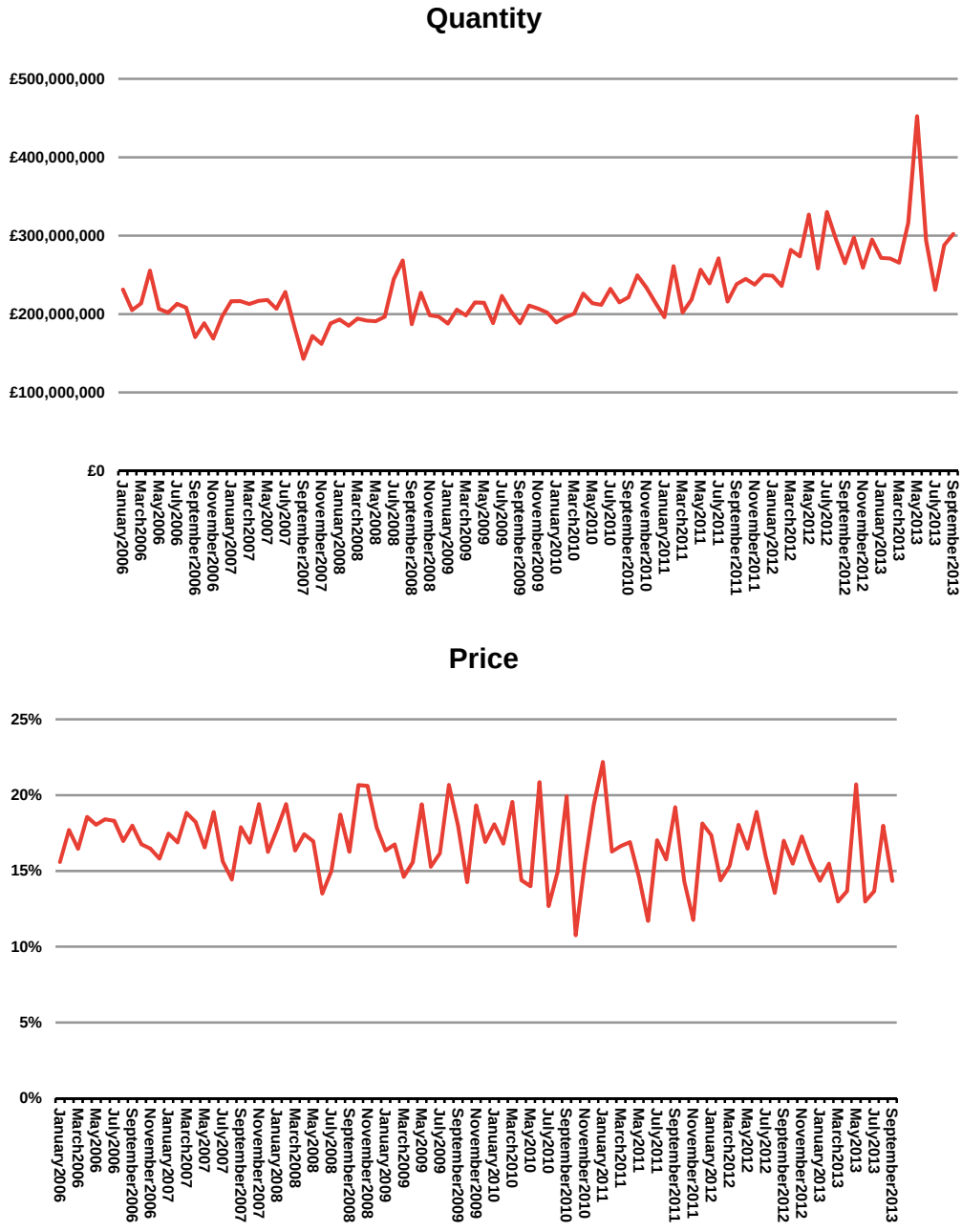
Appendix B: Descriptive statistics

Figure 9. Terrestrial betting quantity and price



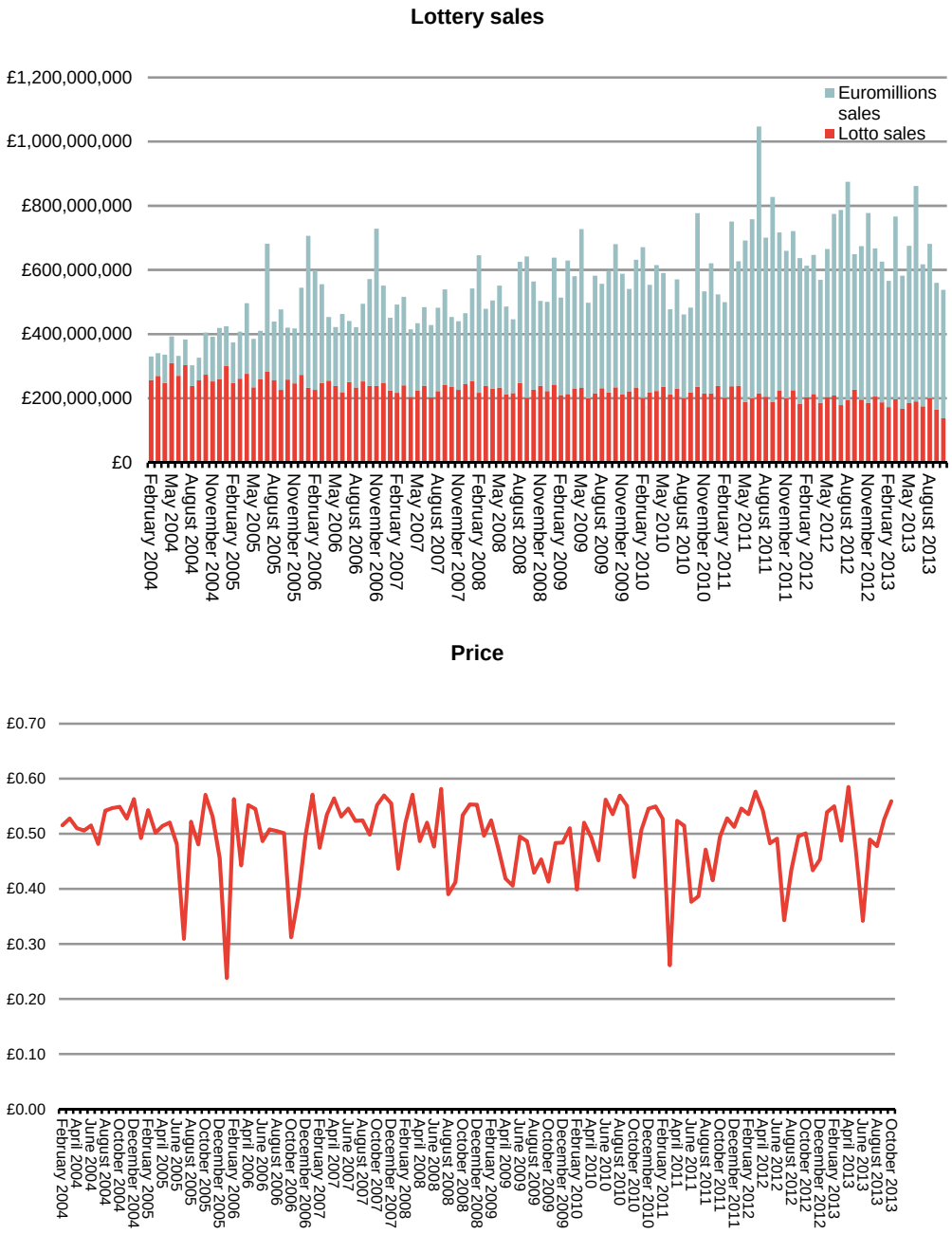
Frontier Economics: figures based on aggregated data from at least three companies.

Figure 10. Terrestrial gaming quantity and price



Source: Frontier Economics. Note: Figures based on aggregated of at least three companies.

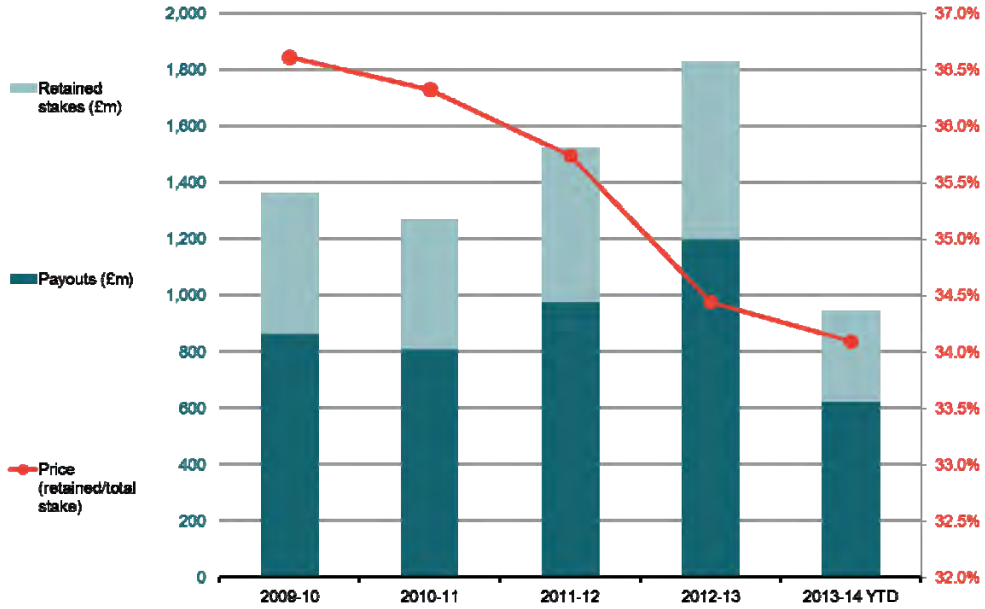
Figure 11. Lottery sales and price



Source: Frontier Economics, based on data collected from http://lotto.merseyworld.com and www.national-lottery.com

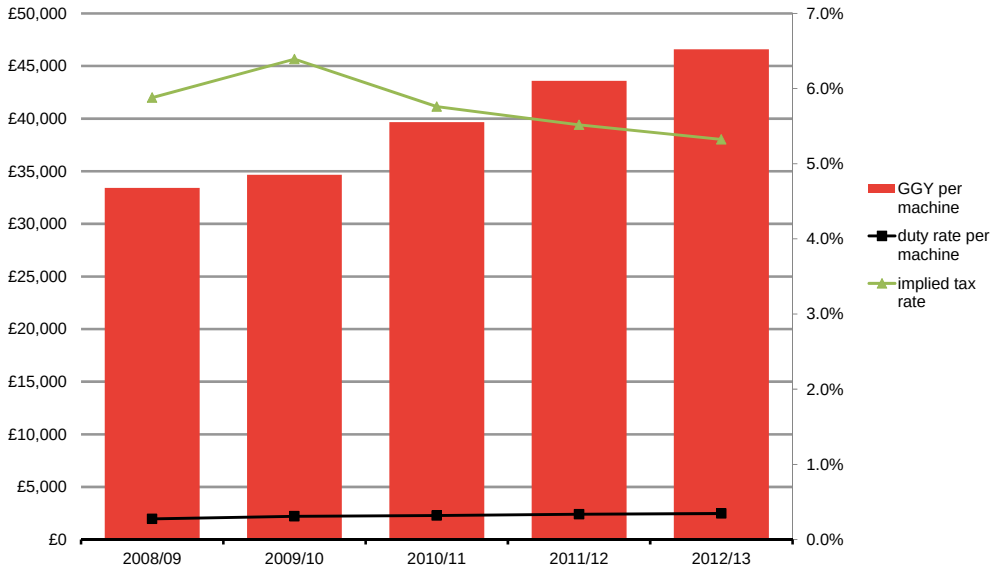
Appendix B: Descriptive statistics

Figure 12. Scratchcard sales and payouts



Source: Gambling Commission. Note 2013-14 data based on first 6 months of the financial year.

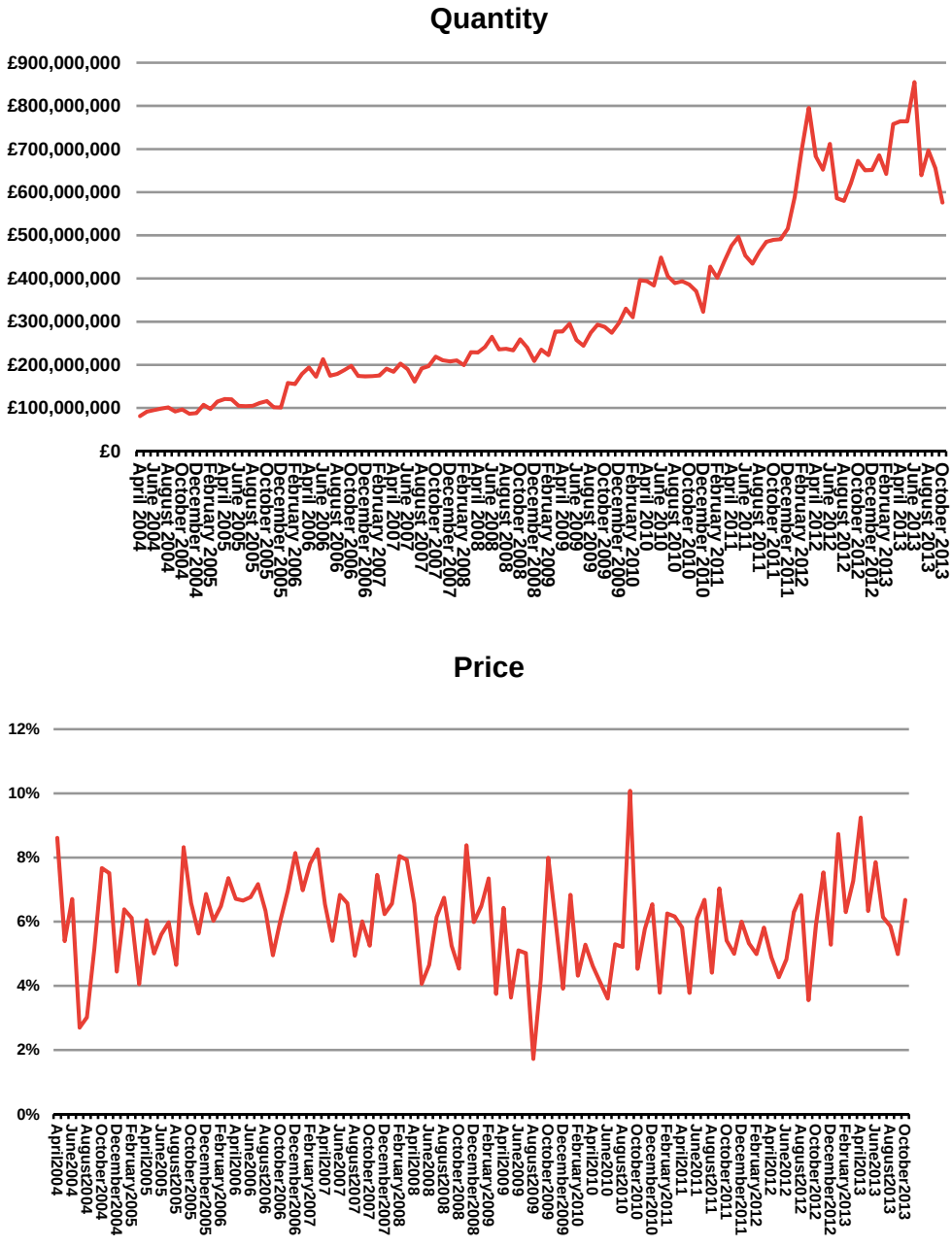
Figure 13. B2 machines gross gaming yield and duty rates



Source: Frontier analysis of Gambling Commission data. Note: B2 machines are machines with a maximum stake of £100 and maximum prize of £500. For more information see: http://www.gamblingcommission.gov.uk/gambling_sectors/gaming_machines/about_gaming_machines_fruit_m/gaming_machine_categories.aspx

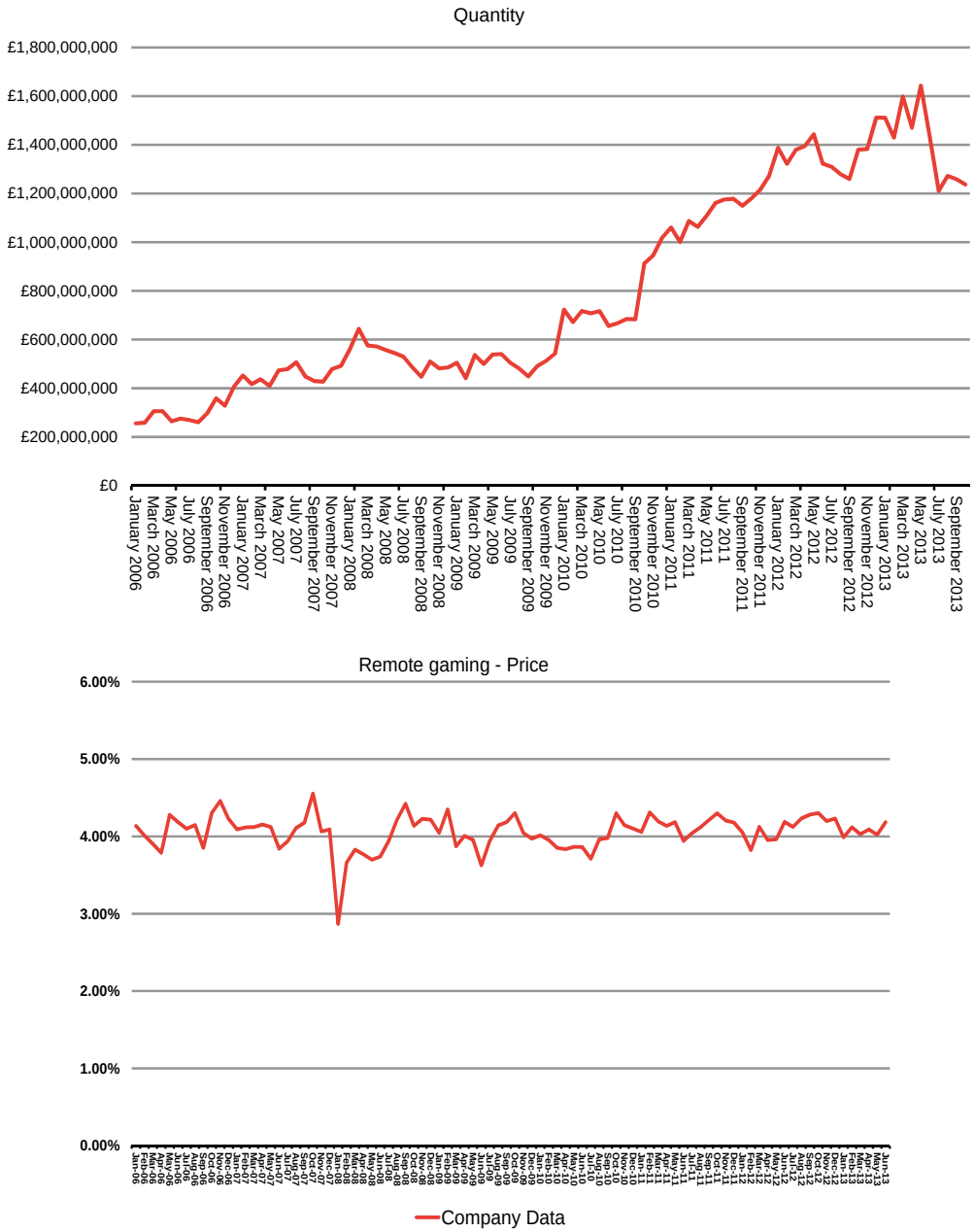
Appendix B: Descriptive statistics

Figure 14. Remote betting quantity and price



Source: Frontier Economics. Notes: Figure based on data provided by companies. Only periods where at least three companies' data overlaps shown.

Figure 15. Remote gaming quantity and price



Source: Frontier Economics. Notes: Figure based on data provided by companies. Only periods where at least three companies' data overlaps shown.

Appendix B: Descriptive statistics

Appendix C: Full econometric results

Figure 16. Full results of preferred model for terrestrial betting

Lagged quantity	0.411 (2.86)**
Own price	-0.463 (3.29)**
Price bingo	-0.341 (0.87)
Price terrestrial gaming	0.030 (0.46)
Price pools	0.089 (1.85)
Price lottery	0.007 (0.25)
Price remote betting	0.061 (0.75)
Price remote gaming	-0.058 (0.34)
Unemployment rate	0.005 (0.18)
Log (GDP)	0.829 (1.30)
Year	0.015 (1.17)
Football major tournament	0.113 (3.81)**
Olympic games	-0.007 (0.15)
Number of Saturdays in month	0.016 (1.62)
Constant	-29.077 (0.87)
N	87

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Figure 17. Full results of preferred model for terrestrial gaming

Lagged quantity	0.255 (3.76)**
Own price	-0.115 (0.66)
Price terrestrial betting	-0.082 (0.46)
Price bingo	1.897 (5.38)**
Price pools	0.018 (0.17)
Price lottery	0.074 (1.15)
Price remote betting	0.224 (2.94)**
Price remote gaming	0.674 (2.81)**
Unemployment rate	-0.063 (2.88)**
Log (GDP)	-0.466 (1.02)
Year	0.018 (1.43)
Football major tournament	-0.031 (0.36)
Olympic games	0.076 (2.27)*
Number of Saturdays in month	-0.008 (0.55)
Constant	-14.045 (0.50)
N	107

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Appendix C: Full econometric results

Figure 18. Full results of preferred model for terrestrial bingo

Lagged quantity	0.492 (3.50)**
Own price	-0.544 (1.26)
Price terrestrial betting	-0.027 (0.25)
Price terrestrial gaming	0.044 (0.89)
Price pools	0.011 (0.51)
Price lottery	-0.010 (0.55)
Price remote betting	-0.050 (0.84)
Price remote gaming	-0.058 (0.34)
Unemployment rate	0.026 (1.64)
Log (GDP)	0.790 (1.20)
Year	-0.020 (2.02)
Olympics	0.003 (0.13)
Football major tournament	-0.035 (1.26)
Number of Saturdays in month	0.008 (1.52)
Constant	37.821 (1.44)
N	58

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Figure 19. Full results of preferred model for pools

Lagged quantity	0.488 (8.37)**
Own price	1.205 (3.35)**
Price terrestrial betting	0.231 (0.83)
Price bingo	-0.290 (0.80)
Price terrestrial gaming	0.242 (1.99)
Price lottery	-0.035 (0.81)
Price remote betting	-0.026 (0.27)
Price remote gaming	0.234 (0.72)
Unemployment rate	-0.004 (0.12)
Log (GDP)	-0.153 (0.27)
Market entry	0.501 (3.78)**
Own price interacted with market entry	-1.021 (1.92)
Year	-0.036 (2.96)**
Number of Saturdays in month	-0.034 (1.38)
Football major tournament	0.036 (0.63)
Olympic games	-0.028 (0.35)
Constant	83.895 (3.19)**
N	108

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Appendix C: Full econometric results

Figure 20. Full results of preferred model for Lottery (draws)

Own price	-0.869 (9.96)**
Lagged quantity	0.197 (2.53)*
Price bingo	-0.698 (1.64)
Price terrestrial betting	-0.300 (1.20)
Price terrestrial gaming	-0.008 (0.05)
Price remote betting	0.183 (1.73)
Price remote gaming	-0.254 (1.09)
Price pools	0.019 (0.14)
Year	0.028 (2.82)**
Unemployment rate	0.064 (2.53)*
Log (GDP)	1.267 (2.70)**
Olympic games	0.030 (0.39)
Football major tournament	0.033 (0.55)
Number of Saturdays in month	0.078 (4.00)**
Health lottery launch	0.018 (0.48)
Constant	-59.381 (2.95)**
R^2	0.75
N	111

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Figure 21. Full results of preferred model for remote betting

Lagged quantity	0.603 (7.93)**
Own price	-0.048 (0.58)
Price bingo	-0.457 (1.14)
Price terrestrial gaming	0.053 (0.51)
Price pools	-0.028 (0.31)
Price lottery	0.056 (1.31)
Price terrestrial betting	-0.345 (1.55)
Price remote gaming	-0.090 (0.33)
Unemployment rate	-0.035 (1.19)
Log (GDP)	-1.343 (1.74)
Year	0.072 (4.33)**
Football major tournament	0.219 (5.23)**
Olympic games	0.003 (0.06)
Number of Saturdays in month	0.019 (1.56)
Constant	-118.946 (3.32)**
R^2	0.99
N	87

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Appendix C: Full econometric results

Figure 22. Full results of preferred model for remote gaming

Lagged quantity	0.514 (4.81)**
Own price	-0.876 (2.85)**
Price bingo	0.532 (1.48)
Price terrestrial gaming	-0.056 (0.46)
Price pools	0.075 (1.01)
Price lottery	-0.010 (0.27)
Price terrestrial betting	0.171 (0.89)
Price remote betting	-0.101 (1.39)
Unemployment rate	-0.032 (1.07)
Log (GDP)	0.474 (0.50)
Year	0.051 (1.75)
Olympic games	0.007 (0.23)
Football major tournament	-0.048 (1.08)
Number of Saturdays in month	-0.015 (1.21)
Constant	-99.943 (1.47)
R^2	0.99
N	76

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity. Prices in logs.

Figure 23. Regression of scratchcard sales on lotto sales

Log lotto sales	-0.333
	(2.78)**
Time trend	-0.010
	(23.73)**
Constant	23.441
	(10.85)**
R^2	0.87
N	97

* $p<0.05$; ** $p<0.01$

Source: Frontier Economics. Notes: Robust t-statistics in parenthesis. Dependent variable is log quantity of scratchcard sales.

Appendix C: Full econometric results

Appendix D: Topic guide for interviews

INTRODUCTION

The introduction contained a short explanation from the interviewer about the background to and objectives of the interview, confidentiality, and how the interview would be conducted. It gave the interviewee(s) an opportunity to ask any questions before the main interview began.

BACKGROUND

Aim: To check any background information collected and to set the context of the interviewee and their role in the company, particularly how their role related to decisions about promotions

- Just for background context please tell me a bit about your role in the company.
- I understand that the company operates in the following sector(s) of the betting and gaming market. Is that correct?

USE OF PROMOTIONS IN GENERAL

Aim: to understand which promotions firms use, how and why, and how they measure success

- What is your overall strategy for using promotions?
- What sorts of promotions do you use to meet that strategy? Are any of these promotions more important to your business than others? Does this vary across sector?
- [If not listed] Do you ever use freeplays or cashbacks? Why (not)?
- Has the promotional strategy or your use of promotions changed in the last few years? In what way?
- How do you think your customers' behaviour is affected by promotions? Does this vary across different types of customers?

USE OF FREEPLAYS AND CASHBACK

Aim: to understand when, why, how and for which customers freeplays/cashback are used

Now we would like to talk more about your company's use of freeplays/cashbacks.

For this interview, by a "freeplay" I mean a free opportunity to gamble accorded to a player by an operator; this gamble may be used on various gambling activities. By cashbacks I mean a scheme including a loyalty scheme where a player receives some form of cashback for their activity (independent of whether they win or lose).

- Which forms of freeplay/cashback do you use?
- Which are the most frequently used? Does this vary across sectors?
- Why do you use freeplays/cashback?
- How do freeplays/cashback fit in with your general advertising or wider marketing strategy?
- Do you use freeplays/cashback as a way of altering the price of a gamble or making prices appear more attractive to your customers? To what extent is price important to your customers; does it influence their choice of whether or how much to gamble?
- How do you monitor the effectiveness of freeplays/cashbacks?
- Do you offer customer 'wallets'? Do you give freeplays/cashbacks through the wallet or through some other mechanism? Do you monitor the use of freeplay/cashback that you give customers through the wallet?
- Do you have any insight into how freeplays/cashback affect your customers' behaviour?
- What proportion of your customer base is offered freeplays/cashback? What proportion of this takes the offers up? What proportion of these is used to gamble with?

Appendix D: Topic guide for interviews

IMPACT OF COST CHANGES ON PROMOTIONS

Aim: to understand the impact of cost shocks on the use of promotions and freeplays/cashbacks in particular

We would now like to talk about how cost changes affect your use of promotions.

- Very generally, would you expect that changes in your overheads would have any impact on your use of promotions?
- How would your use of promotions vary in response to a lowering of overheads, if at all?
- How would your use of promotions vary in response to an increase in overheads? What other changes might be made first in the business to maintain profit margins?
- Would there be any differences in how promotions might be altered depending on whether you were expecting temporary or permanent changes?
- Generally does the UK gambling tax regime affect your use of promotions? How and why (not)? Does this differ by type of promotion or across sectors?
- If the UK gambling tax rate for [SECTOR] were to fall, would this affect your use of freeplays/cashback? How?
- What about if the gambling tax rate were to rise?
- If the tax treatment of freeplays/cashback were to become more generous (allowing you to offset their cost against the tax base) how would this affect your use of freeplays/cashback?
- If the tax treatment of freeplays/cashback were to become less generous (no longer allowing you to offset their cost against the tax base) how would this affect your use of freeplays/cashback?
- If tax deductions available from the use of promotions were less generous, but you were no worse off overall (i.e. other taxes or rates were lower), how would this affect your promotions strategy (if at all)?
- How do you think the new place of consumption tax will affect your business? Will it tax affect your use of promotions / your promotions strategy?

Appendix E: Short interview summaries

Table 10 summarises information about the interviews which were conducted. This is followed by a summary of seven of the nine interviews conducted.[58]

[58] One firm (interview #5) did not give permission for the interview summary to be included in the published report, and another firm (interview #7) was unable to do so before the deadline for publication. Evidence from both is included in the main synthesis discussed in Section 4.3.

Table 10. Summary information about firms with which interviews conducted

Interview ref	Sectors covered by interview	Approx. years in operation	Approx. size within UK market
1	Remote betting Remote gaming	10+ years	Medium size firm
2	Remote gaming	10+ years	Medium size firm
3a	Terrestrial betting Gaming machines	10+ years	Large firm
3b	Remote betting Remote gaming	0-10 years	Medium size firm
4	Remote betting Remote gaming	0-10 years	Small firm
5	Remote betting Remote gaming	10+ years	Large firm
6	Remote betting Remote gaming	10+ years	Large firm
7	Terrestrial betting Remote betting Remote gaming	10+ years	Large firm
8	Remote gaming	0-10 years	Large firm

Source: Frontier Economics. Note: 3a and 3b represent two interviews conducted with the same firm.

Interview #1

Use of promotions, freeplays and cashbacks

Types of promotions used

The company uses a large number of different promotions, including various forms of freeplay such as signup bonuses (both matched deposits and free deposits without any customer match), free bets and bonuses paid on player birthdays. Cashbacks are also used – for example, returning losing bets under certain conditions – though these were rarely offered directly as cash, and more often as a form of bonus that had to be used to gamble.

Promotions were seen as essential to the online gambling market – consumers exhibit very little brand loyalty and the potential market size was also thought to be relatively limited. Promotions were particularly important for online gambling firms who had no high-street or wider presence (where brand recognition may play at least some role in customer decision making). It was felt that online firms used promotions much more than offline firms, in part because online gambling is more competitive, in part because of scrutiny of key performance indicators like player acquisition, and in part because 'tangible' offers like hospitality were not available.

The total value of bonus incentives relative to gross revenue is larger in poker than in betting (around 21% in poker compared to 10-11% in betting). Promotional costs are also very high for bingo: around 50% of gross gaming revenue is returned in the form of promotional offerings.

Promotional strategy

Bonuses and promotions are framed around the idea of a "customer lifetime journey", which is focused on the individual player. Bonuses were described in terms of their overall objective in getting the customer to start gambling with the company, stay with them, and be prompted to resume if they appeared to have stopped playing.

Signup bonuses (matched or free deposits) are seen as the key mechanism for acquisition (in particular encouraging switching between online gambling providers), which is a particularly important part of the overall strategy. Acquisition was through to be more costly for online casino gambling than online betting.

Free bets are seen more as a tool for retention and to promote loyalty; these promotions are tailored to individual players based on their observed preferences for particular sports, where they are based and the lifetime value of the player to the firm. This segmentation was seen important to a successful strategy, in

particular limiting the offers made to those who would be unlikely to respond. The operator was keen to improve the way in which offers were segmented.

Customers who have been inactive for a while or who have very low balances can also be targeted with specific promotions; these might be based on the individual customer's previous betting and gaming behaviour (e.g. giving them free bets on an upcoming tennis tournament if they had bet on tennis matches in the past). Global 'reactivation' campaigns are also used, usually tied to major sports events.

There had been a recent shift in the strategy towards retention rather than recruitment, because of changes in national regulatory arrangements which limited the ability of consumers to sign up to sites with multiple accounts.

Impact of promotions on behaviour

A small proportion of online betting customers (described as 'punters') were through to be sensitive to the overall "price" of gambling, using promotions as a way of hedging bets across competing sites. Though these are a small proportion of players, they make up a large proportion of the firm's revenue. A similar issue was noted for online gaming, where a very small proportion of particularly 'promotion-sensitive' customers make up a relatively large share of the business.

The other group of customers are described as 'recreational players' who do not compare across sites to understand which gives the better deals and bets. They choose a site on the basis of whether it works well, is easy to access, they understand and feel comfortable with its mechanisms and style, or respond to a more general advert. They don't look at overall 'price', but will be quite responsive to bonus offers to try new sites and so will require further incentives to stick with a particular firm.

Promotions are evaluated based on an estimated ROI calculation, though in general it was thought hard to judge promotional impact, partly because it was difficult to estimate counterfactual behaviour and partly because it was hard to judge the long-term effects on loyalty and retention. The company was considering how this could be improved through control groups and modelling.

Impact of cost changes on promotions

Regulation and overheads

The company described having started a drive to reduce overheads within the last year, as part of a move towards nationally regulated markets. This includes reducing the number of promotional campaigns per month for poker, but also pulling out of some countries entirely where they had very few registered customers to help reduce running and webhosting costs, some headcount reductions and reducing overall marketing spend.

The move to a place of consumption tax in the UK

The tax reform was expected to increase costs. It was felt that very few companies could afford to fully absorb the tax, and would need to consider where overheads could be reduced, which could include reductions in promotions, general marking costs and staff numbers. Consideration was being given to reducing the number of rooms to play bingo (where promotional costs are high) if under the new regime promotions would not be deductible from tax. It was felt that it would be critical to allow promotional spend to be deducted from the tax base to avoid distorting incentives away from using promotions, potentially distorting competition between land-based and online firms, and potentially increasing costs disproportionately for those firms who offered more generous promotional incentives.

Interview #2

Use of promotions, freeplays and cashbacks

Types of promotions used

The operator identified a number of promotions, including matched deposits, free chips (to be used for any form of gaming), free spins (game-specific), loyalty points (which can be converted to free chips), 'topical' offers based around current events in the UK, and tournaments offering free chips as the prize.

Free chips were more commonly offered than free spins. The most common promotion was the matched deposit, both on sign up and for existing players. Over 80% of players take up matched deposit offers, and these offers are a centrepiece of wider advertising and marketing (which, like the deposit offer, is a way to drive recruitment). A smaller type of bonus is a "safety net" limiting losses, returning additional losses to players either as free plays (for most players) or as cash (for a limited number of VIP players).

Promotional strategy

Promotions were felt to be tactical and ongoing, part of a package designed to stimulate consumers as part of a "conversion journey" that varies according to their "lifecycle" of engagement with the company. Promotions are aimed at creating demand and stimulating play. Welcome deposit bonuses are used to recruit new players. Loyalty and retention is centred on loyalty schemes, topical offers, daily bonus offers for active players and so on. Promotions (particularly targeted free spins and different loyalty point accumulation rates) can also be used to influence players to try new games or activities with the company.

The company focuses on "dropout points", where players at different points of the lifecycle are most likely to stop gaming with them, and targets some

promotions specifically on those points. For example, for an early lifecycle player, the point at which they are required to make a *second* deposit into their account is seen as a likely dropout point, requiring specific promotions. Players who experience a long losing streak may also receive a bonus. Those who do lapse are given specific incentives to return.

The strategy has changed recently, with promotions becoming more frequent and more generous (in response to increased competition) – for example, new welcome bonuses do not always require the customers to deposit themselves.

Impact on behaviour

Promotions are seen as key in the online gaming market, particularly for acquisition and retention. Players who perceived that the 'returns' to their gaming were falling would likely leave the company for a competitor. Relative to online betting, online gamers more often had zero account balances which also reduced the costs of switching companies; a positive loyalty scheme balance was seen as one way to address this.

Customers are now thought to expect bonus offers, and few are willing to play without them. Big-spending customers were thought to be particularly aware of the competition in the market. Offering cashback to this group is seen as important.

Players are described as lacking in loyalty on average the firm estimated that players have six active accounts with different companies, though one tended to be a favoured account (making up around 60% of total online gaming spend).

It was felt to be hard to evaluate the degree of effectiveness of promotional offers: although measures could be monitored such as the number of recruited players or re-activated accounts, it was hard to assess the contribution of an individual offer because of the high frequency with which promotions were used.

Impact of cost changes on promotions

Changes in overheads

The operator would consider how costs could be trimmed in the face of an increase in overheads, including wider marketing spending, royalty payments to software providers, salary costs/headcount and promotional spend. The extent of savings that could be made would be ultimately be governed by the market. Historically, the firm argued that increases in overheads had been met through staff cuts rather than trimming promotional spend; however future cost increases would have to be considered with respect to current market conditions.

Change to taxation on place of consumption basis

The operator was concerned about the potential for a large, unregulated black market to emerge after the place of consumption tax was implemented. The tax was also feared to reduce competition by forcing some existing operators to exit the market. The operator argued that very few UK players (less than 10%) were aware of or reacted to information about where and how online gaming firms were licensed and regulated. They also argued that the "brand name" of the gaming firm was not of paramount importance – instead consumers were most sensitive to the deals they could take advantage of.

In response to the tax change, it was suggested that the use of bonuses and television advertising would be reduced, otherwise the company would be close to going out of business. Again, competitive pressures would be the driver of whether promotions or wider marketing were cut first. There was concern that black market operators would be able to offer more generous promotions that the licensed operators would find it difficult to match.

Interview #3a

Use of promotions, freeplays and cashbacks

Types of promotions used

For terrestrial betting, a range of promotions are used. These include free bets, and returned stakes ('concessions') if certain conditions are met (e.g. if a horse falls). These are usually returned as cash rather than free bets. 'Price enhancements' are also used, where for a very limited time the odds on a particular gamble are increased. Promotions are not usually locally segmented.

On machine games, the main promotion was a freeplay offer triggered at a stake threshold which gave players a printed voucher offering a matched deposit for the next session. The voucher had to be redeemed within a week. The stake threshold is varied according to local competition (it is easier to obtain vouchers in more competitive areas).

Unlike some competitors, the firm does not use a loyalty card scheme. Although it was recognised that this limited the ability to target offers (since the firm would otherwise find it hard to track individual gambler behaviour) or to evaluate the impact of promotional offers thoroughly, the decision not to use loyalty cards stems a perceived lack of customer enthusiasm for them, and the costs of setting up and maintaining the systems.

Promotional strategy

The promotional strategy in betting is focused around two broad approaches: seasonal promotions (tailored around sporting events) and tactical promotions

(designed to increase turnover in particular parts of the business). Concession offers are more heavily used as tactical promotions. Concession offers are now used less frequently than in the past, but the conditions under which stakes are returned have been made more likely to occur. Free bets are also used less often than in the past, in part because it was unclear whether they genuinely drove additional long-term betting.

The strategy towards gaming machines is now seen to focus on retaining and rewarding loyal players, having previously been about recruiting new players by offering free 'tournament' plays open to all players. Vouchers can also sometimes be used to encourage particular games by being limited in how they can be redeemed.

Impact of promotions on behaviour

The firm assesses the impact of promotions on the market being promoted (e.g. the increase in stakes over the promotional period) but acknowledged it was hard to ascertain the genuine additionality of the change given opportunities to shift betting behaviour across different markets and over time. This is particularly the case for price enhancements, where a large increase in betting volume is seen during the offer period, but which may simply reflect substitution rather than new betting. However it was felt these price offers were popular with customers and had come to be an expected part of the promotional mix.

In terms of the use of concessions (lost stakes back on some bets if certain conditions are met), the firm argued that consumers responded to the conditions, not the mere presence of the 'offer' of the stake back. Uptake when the circumstances were unlikely was low. This explained why they had moved from frequent use of concession offers with quite unlikely scenarios to less frequent use of offers with more likely scenarios.

The firm argued that (on the basis of feedback from shop staff and some market research) some customers were not at all responsive to any type of promotional offer, preferring only to bet on particular sports irrespective of promotional inducements to bet on other events. A relatively small proportion of consumers were thought to be more 'savvy' around the impact of promotional offers on the price of gambling; more broadly it was felt that promotions on gambling were no different to those on other consumer products such as those in supermarkets, where consumers were responding to the idea of getting a bargain or a deal.

For most consumers, geographic proximity rather than price or promotional offers were through to be the main driver of which store customers visited.

The freeplay offer on machines was seen to be an effective way of rewarding regular gamers who are willing to stake their own money. However only around 40% of the vouchers offered were redeemed.

Impact of cost changes on promotions

Changes in overheads

Initially, it was felt that any change in general overheads would not affect the use of promotions. The sector-specific marketing budget from which promotional costs are met is separate from the wider operational budget and set at the beginning of each year. Long-term increases in overheads could, however, change the marketing budget, which was seen to be most likely to change in the face of a cost shock. Other than headcount it was difficult to identify other savings which might be made; marketing was highlighted as the main discretionary cost.

In the face of a cut in overheads it was thought that the savings would be re-invested in operations (such as content rights in betting shops to show sporting events, or investment in refurbishing the retail estate) rather than leading to an increase in marketing budgets.

Changes in taxation

There was no clear evidence that differences in the tax treatment of promotions in different sectors influenced the promotional strategy or use of promotions by the firm. The tax implications had "no significance" in the choice by marketing teams of which promotions to run for betting or machine gaming, which are largely determined by the overall marketing budget. However the level of budget may be affected by changes in the tax rate or the tax treatment of promotions, which might then affect the number of promotions run.

Moving to a place of consumption tax for remote gambling could lead to spillover effects from the firm's remote gambling (Gibraltar-based) arm, though it was hard to predict precisely what they would be. They could include changes in the division of budgets between UK and Gibraltar, or changes in staffing arrangements, with staff potentially being relocated from Gibraltar back to the UK.

Interview #3b

Use of promotions, freeplays and cashbacks

Types of promotions used

The main promotions used in both remote betting and online bingo are various forms of freeplays. In betting these include 'bet match' (e.g. bet £X on football to receive a £Y free greyhound bet) and matched deposit offers. Around 70% of matched deposit offers for remote betting are taken up. In bingo these include matched deposits.

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Almost all the cashback offers, including loyalty rewards, are in the form of freeplays (bonus funds) rather than cash. Loyalty schemes are only offered to VIP players for remote betting, but are more widely offered for bingo. Other cashback offers in bingo include returning a proportion of losses.

The company has a sector-level "free bet budget" from which promotional offers are made. This equates to around 25% of Gross Gaming Revenue (GGR) per month for remote bingo and 22% for remote betting.

Promotional strategy

The promotional strategy for both remote betting and bingo focuses on customer acquisition, retention and re-activation. The budget is split roughly 40% (acquisition), 40% (retention) and 20% (re-activation) both for remote betting and online bingo. The focus is to acquire customers who are recreational ("small bet" or "selective bet") customers who are product/brand sensitive rather than price sensitive.

For remote betting, due to increased competition in the market (including odds comparison sites), promotions are more aggressively and frequently used now than they used to be in the past, and are seen to be more tailored around retention whereas previously the focus had been on acquisition.

In general, promotions are moving towards being more heavily tailored to individual players based on statistical modelling of their observed behaviour and likely lifetime value to the company. This has revealed some unexpected things (for example, a larger-than-expected proportion of online bingo customers appear to be 'savvy' to deals such that they are in fact loss-making to the company). At the moment segmentation of offers in remote betting is based mostly on preferred sports and platform (e.g. mobile, computer). Part of the strategy is encouraging people to use mobiles to gamble.

Impact on behaviour

Evaluation of promotions is quite rigorous, including the use of control groups, and helps to produce an estimated return on investment for each promotion run.

There is a sense that loyalty is difficult to promote in bingo and that the company is "only as good as its latest promotion".

In remote betting, there is a perceived difference between recreational players and those who actively seek out 'lower prices' (and so are hard to retain). Whilst it was thought only a low proportion of all customers are particularly price sensitive, they could still have large effects on the overall profit margin.

Whilst it was difficult for the firm to pin down exactly what led to customer acquisition, they recognised that as an online offering from an established high-street bookmaker, brand recognition and loyalty may be a factor alongside

promotions. However promotions were still seen to be an important driver of acquisition because of the overall market competitiveness.

As well as promotions and the overall 'price' of gambling, retention and loyalty were also driven by customer service and quality of communications.

Impact of cost changes on promotions

Changes in overheads

It was felt that the promotions budget is very sensitive to changes in costs and would be 'the first to go' in the event of a significant overheads increase. However decisions about how cost shocks could be recovered would be subject to an assessment of wider competitive market pressures.

Budgets for wider marketing activities designed to recruit players were seen as more robust to cost increases than budgets for promotions which were more designed around retention and reward – the value and volume of free bet offers was therefore expected to drop in the face of a cost increase. There would also be a rebalancing of the promotional spend within a reduced budget, such as an increased focus on VIP players and making promotions more targeted on those 'recreational' players who are most responsive to them.

It was felt that if any reduction in overheads could be re-invested in marketing or promotions, but it would only be done if it were felt to be the best use of the additional revenue in generating extra growth and profitability.

Changes in taxation

The move to a place of consumption tax was felt likely to reduce marketing spend and the amount of promotions offered because of the impact on profitability. Again, final decisions would depend on an assessment of the market structure after the tax reform. If all the remote betting and gaming firms are faced with the tax change at the same time, and responded in similar ways in terms of promotional offering, this would clearly ameliorate the negative impact on a single firm reducing its promotions unilaterally. However it was hard to predict at the moment what the overall market would look like after the reform.

Another possibility mentioned was that the company's online gambling margin (both for betting and bingo) could be increased slightly as a way of passing through the costs of the tax reform. It was felt that a less aggressive approach to pricing within the industry was a possible outcome of the reform.

It was further stated that the tax could have an effect on TV advertising. Spending on this increased significantly last year for the top 10 market players, but a slowing down is expected following the introduction of the tax.

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Interview #4

Use of promotions, freeplays and cashbacks

Types of promotions used

The company uses a range of promotions, including freeplays and freebets (including matched deposits, free chips, free spins, free bonus, free ticket (bingo), free entry to poker tournaments) and cashbacks (usually in the form of bonus funds) such as a proportion of losses returned or returned stakes tied to sporting outcomes. Returned loss offers are now made on an opt-in basis, and around 30% of players take up the incentive.

The company does not have a companywide loyalty scheme though certain products have loyalty points which are used to incentivise activity in certain product segments, e.g. some products like poker have loyalty points which can be redeemed for cash, tournament tokens or a tangible gift.

Some sports betting offers were only open to new users registering on the site, such as temporary increases in odds on specific sporting events.

The promotions budget in sports betting makes up around 10% of gross gaming revenue, and 30% for online gaming.

Promotional strategy

Promotions are very focused and tailored to reflect where customers are in their 'lifecycle' with the company, and what the business objective is (increase activity in particular products, incentivise use of different products, etc.) for a particular customer base. The company analyses customer data very rigorously and uses predictive modelling based on observed customer activity to inform what types of promotions to use for individual customers. The use of data to inform promotional offerings was expected to become ever more important over time.

Some promotions are about customer acquisition, others about customer retention and still others about customer re-activation. The types of promotions used for each objective are different:

- Free bets and free plays are more commonly used for acquisition.
- Cashback promotions are more typically used to retain customers at risk of 'churning', reduce attrition and increase loyalty and frequency of play.
- Re-activation is based on observed data on the customer who has lapsed; the precise offer will depend on models of how the customer has used the site, the games or sports they gamble on and their previous spending.

Promotions are also used to 'cross sell' the company's products. This is based on a view that customers who use more products have a higher lifetime value to the

company. Considerable effort is made to cross sell gaming products to those who sign up for sports betting: the acquisition cost of sports betting customers is considerably lower than the acquisition cost of casino customers.

The company has recently switched its focus towards acquisition and increased market share. This has been supported by a rise in wider marketing. In addition to this the company has been incentivising customers to change platform and use mobile more which typically has higher frequency of play and fewer price sensitive players. There has been a significant increase in freeplay and cashback promotions designed to target channel switching

Impact on behaviour

Promotions are used very frequently, particularly at the start of the customer lifecycle, a period when customers are seen to be particularly responsive to offers. Sports betting customers are seen as very transient and competition from other providers is very strong.

Customers are seen to respond to both price and promotions themselves. There is an expectation in the marketplace for promotions to be offered. Given that in many cases the 'products' on offer across companies are very similar (e.g. many sites use the same poker platforms), promotions and wider communications are seen as the key ways in which competitors differentiate their offerings to customers.

Different customer groups respond differently to promotions. Some customers are extremely savvy – they are very active checking odds using online comparison tools and using this to spot arbitrage opportunities across sites which guarantee positive payouts. The company can try to tailor functionality so as not to offer promotions to these players. The proportion of very sensitive players fluctuates but is not thought to be that large.

Impact of cost changes on promotions

Changes in overheads

Initially, it was felt that changes in overheads have no impact on the promotional budget but a distinction was made between short-run and long-run effects. Promotional budgets are set at the start of a financial year, so short-term fluctuations in overheads would be unlikely to affect things too much. However longer-term changes could then influence the overall size of the budget available.

Fundamentally, the aim of the company is not to affect the end user. So if faced with a cost increase the company could look for savings elsewhere, for example they could try to renegotiate contracts with its suppliers.

A point was raised about cost shocks which affect one firm in isolation from those which are common to the market in terms of the possible impact on the

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firm's response. Common cost increases might be more likely to reduce promotional budgets than cost shocks specific to a single firm.

Changes in taxation

It was noted that there was still considerable uncertainty over precisely what the place of consumption tax rate and structure would be. Again, the point that a place of consumption tax would be an industry-wide effect rather than a firm-specific effect was noted.

Another point that was raised was around black market operators (operating outside Gibraltar) and whether and how the UK regulatory authorities would effectively combat and prevent black market operators from attracting UK users.

It was felt that the tax would definitely affect the use of promotions but it was hard to be specific. The strategy would be adapted to reflect market conditions in the post-tax world – some competitors may not be there after the introduction of the tax so the strategy would be adapted to reflect that.

Interview #6

Use of promotions, freeplays and cashbacks

Types of promotions used

The operator uses a range of promotions across remote betting and remote gaming:

- "Buy one get one free": bet on a particular event to get a free bet on another event;
- Matched bets and matched deposits;
- Free bets and free plays;
- Contingent cashback returning lost stakes under certain conditions;
- Temporary odds enhancements;
- Loyalty scheme;
- Offers based around promotional calendars (e.g. cashback on a given day).

Promotions in remote betting vary as to whether they are offered as restricted bonus funds or as cash, though there is an increasing move towards restricted bonuses. Promotions in gaming are almost always offered as freeplays with conditions attached.

Although no precise figures were given, a larger proportion of gross win in remote gaming was devoted to promotions than in remote betting. It was argued that this was due to the nature of gaming compared to betting, with no 'cycle' of high-profile events which drive business and a limited opportunity to compete

directly on price. The operator suggested that within online casino the industry average was around 10 to 30% of gross win returned in bonuses.

Promotional strategy

The broad promotional strategy is quite similar across remote betting and remote gaming. The strategy revolves around customer acquisition, retention, reward and reactivation, using promotions in a context-specific way to deliver this strategy and support a brand value based around building excitement and entertainment.

Different types of promotions support particular aspects of the strategy. In remote betting, for example, contingent cashbacks tied to major events are seen to promote excitement, whereas free bets are targeted on specific acquisition and retention objectives (e.g. minimising churn). In general, the operator offers retention bonus proactively to encourage loyalty, and almost all customers will receive some sort of freeplay or free bet offers. The value of targeted offers can be related to the estimated lifetime value of a customer to the operator.

The way in which promotions are offered is constantly evolving, based on measurement and testing of how successful they are, moving towards an overall goal of minimising the 'wastage' of promotions.

In general, there has also been a move towards offering promotions to more customers and more often. This is driven both by the operator having a more sophisticated understanding of their customers through data analytics, and by customers becoming more sophisticated in what they expect from operators and learning to expect promotions as part of the online gambling package.

Impact on behaviour

The operator tests all promotional offerings and adapts the promotion based on evidence, including the use of control groups and statistical modelling. A return on investment is calculated for all promotional offers.

There is clear evidence from the company's own evaluations that promotions are effective at increasing acquisition, retention and customer spend.

Customer surveys reveal that freeplay offers are always cited as the first- or second-most important reason for why customers sign up to a particular site. Similarly strong evidence for the importance of freeplay offers in driving behaviour is seen in terms of reactivation.

The operator argued that for betting, the vast majority of customers gamble for fun; they respond to promotions as it gives them additional opportunities to gamble but not so much because it changes the expected return. In terms of remote gaming, it was felt that customers view freeplays again as more opportunity to play but not in terms of the odds or expected return to their gaming. The chance to hit a large jackpot was seen as a driver of gaming behaviour for some customers. Online poker was seen to be different in that

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there is clearly some element of skill and that some players can expect to win from their play. Those customers also tended to be relatively price sensitive to the offers across sites.

Impact of cost changes on promotions

Changes in overheads

An unexpected increase in overheads would be expected to reduce promotional spending, which is one of the most variable parts of the overall cost base. An increase in variable costs would reduce the amount which could feasibly be spent on promotional offers to retain customers.

Other cost bases which could be considered in the light of an overhead shock would be staff costs (headcount and wage bill) and other variable costs such as wider marketing. The cost bases to be cut would be those which would have the least impact on revenues (e.g. the more marginal investments in promotions, marketing or staff) and those with the most uncertain impact (where there is less confidence in the magnitude of ROI, for example).

Change to taxation on a place of consumption basis

It was felt that, so long as the new tax regime applied to all operators offering online gambling in the UK, then the main impact would be to reduce across the industry the amount that operators were willing to pay to acquire or retain customers. The main response would therefore be a lower promotional spend on the existing customer base (only running the higher ROI promotions) and a reduction in acquisition. Wider marketing spend was also thought likely to be reduced.

However there was concern that a significant black market would emerge with some operators outside the new tax and regulatory regime; the case of Italy was cited where a move to onshore regulation in remote gaming and sports betting was followed by a significant percentage of the market being unlicensed.

The main barrier to effective regulation was seen to be an inability to regulate online advertising. The more sophisticated and price sensitive customers (who tend to be larger spenders with a greater number of accounts) were perceived to be particularly responsive to online advertising, using online search strategies to find the best deals for online betting and gaming.

Ways in which regulations could be enforced might include "white listing" (only allowing card payments to be processed for approved and properly licensed sites, for example), making it harder for unlicensed operators to do business. It was felt, though, that this could be evaded and that experience abroad had suggested it was difficult to implement effectively. Enforcement could also be made to work from a software supplier or financial institution's perspective, particularly on the gaming side given the heavy reliance on 3rd party suppliers. Forcing

suppliers/financial institutions to warrant that they will only process UK customer transactions from UK licenced businesses could result in all major supplier/financial institutions options being closed off for unlicensed operators.

Interview #8

Use of promotions, freeplays and cashbacks

Types of promotions used

The operator runs bonus offers, including deposit bonuses, which have constraints attached (for example, a minimum number of spins to be activated, a minimum amount wagered). They also run cash rewards which are offered to a player account without constraint – genuine 'cashback' offers.

A third category of promotion used is non-cash prize draws and other competitions, though this is relatively uncommon.

There is also a loyalty scheme. Points accumulated are converted into cash, or can be used to buy entry into prize draws.

The operator does not run 'freeplay' promotions in the form of funds which can only be spent on a particular type of game. Rewards (whether as a bonus or cash) can be used across any of the games run by the site.

Bonuses and comps are viewed as 'rewards' which can be unlocked through various different mechanisms. For example, bonus funds can be paid upfront and 'cashed out' after a certain amount of gaming which would generate an expected value to the company. Cashback can be paid after a certain gaming session, for example some proportion of losses returned as cash (up to 100%, in some cases).

Promotional strategy

The strategy centres on the acquisition and retention of players. For acquisition, bonuses are critical (sign-up deposit bonuses), including wider marketing and advertising of these offers. Retention uses both bonuses and cashback.

There has been no particular change in the promotional strategy in recent years in terms of the amount of promotions offered to players, although the strategy is influenced by experience and learning about which sorts of promotions are felt to be more effective.

Impact on behaviour

There is some analysis of promotions to assess which are more effective, for example looking at outcomes such as retention rates. The focus is very much a holistic one based on outcomes rather than trying to estimate a return on

investment for every promotion, since this figure is felt in general to be too difficult to calculate with any degree of precision.

Any customer response to promotions is mostly felt to be based on the offer itself rather than any perceived impact on the 'price' of gaming.

Impact of cost changes on promotions

Changes in overheads

The operator suggested that an increase in overheads, whether through a tax increase or any other source, would potentially lead to reductions in the use of promotions as a way to offset the cost. The major variable cost bases are promotions, marketing and staff costs. At least in the short-term a number of other costs are fixed (e.g. servers). Promotions and wider marketing are seen as complementary spending rather than one being more 'vulnerable' in the face of a cost shock than the other.

A reduction in overheads would not be expected to lead to an increase in the use of promotions; the current level was thought to be appropriate and there would be no particular benefit from additional promotional spending.

The response to a cost shock would depend on perceptions of whether it was permanent or not; short-term cost increases could potentially be absorbed.

Change to taxation on a place of consumption basis

The operator felt the place of consumption tax would lead to a reduction in third-party marketing spending. In the medium term, there could be an off-shoring of some of the company's UK-based staff, particularly around software development, in part to reduce UK corporation tax liabilities. Promotional spend could also be impacted, though as one of the larger online gaming firms, the operator felt they may also find some other ways to reduce costs.

There was concern that smaller competitors may try to move outside the regulated market altogether in the light of evidence from other countries such as Spain that a large percentage of remote casino gaming was now unlicensed. Other low margin businesses may go out of business entirely.

There was felt to be a degree of loyalty to firms currently in the market but over time this could be quickly eroded if unlicensed companies were able to offer better odds or deals.

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