COMPETITION, THE PRICE OF GAMBLING AND THE SOCIAL COST OF GAMBLING

a briefing paper presented to the European Gaming and Betting Association

by

David Forrest
Professor of Economics
University of Salford, UK

February, 2010

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1. Background

The European Court of Justice has made a series of judgements concerning the applicability to gambling services of the provisions for freedom of trade embodied in the Treaty of Rome. In general, it has held that the presumption that there should be a single market within the European Economic Area holds for gambling products as for any others. However, the Court has equally acknowledged the concept of subsidiarity and accepted that, in principle, member states may exempt gambling from the general rule that they must permit access to their markets by firms from other parts of the European Economic Area. Member states may take this course if restrictions would further their aims in the sphere of social policy.

Had the Court not qualified this right of member states to restrict free trade in gambling services, there is little doubt that several countries would have continued indefinitely to protect their domestic markets from competition by, for example, refusing licences to operators from elsewhere or making it difficult for their citizens to link to extra-territorial internet gaming sites. This is because a feature of the gambling sector in Europe is that many jurisdictions have adopted a distinctive market structure: it is common (as, for example, in France, Netherlands and Sweden) for exclusive rights over the gambling market, or particular modes of gambling, to have been granted to state-owned or state-sanctioned monopolies. This structure inevitably creates conflicts of interest within government. Like any monopolist, a gambling enterprise with an exclusive franchise can charge higher prices than under competition and thereby secure a stream of monopoly profits (sometimes termed economic rent) which would be competed away if entry by new firms were permitted. These monopoly profits can be captured by governments through ownership, taxation or licensing fees. Thus there is an incentive for governments to argue on 'social' grounds, however spurious, that there are good reasons to maintain the status quo, notwithstanding that this carries a different sort of cost in the form of consumers facing unnecessarily high prices, thereby inducing them to take part in gambling less than they would choose to do so given a free market. Governments, in reality motivated by a desire to protect their own fiscal interests, will then argue that the benefits to consumers from an open market would, in fact, be more than offset by increases in the social costs of gambling.

In its judgements, the European Court has recognised the danger that governments will act in their own rather than their citizens' interests by qualifying their ability to exempt gambling from the rules of the single market. The Court will not accept arguments for restrictions based on protection of revenue streams. Moreover, restrictions to secure social objectives must be 'proportionate' and consistent with other governmental policies.

France is one of the countries which has had to review its gaming laws and regulations as a result of the stance taken by the Court. But, recently, it has been argued that it would be legitimate, on social grounds, for France to regulate the market to a sufficiently restrictive extent that prices would remain at the high levels

associated with monopoly rather than fall to the lower levels associated with competition. Any such restrictions would, of course, protect the market of existing domestic providers of gambling services since consumers would have little incentive to seek out extra-territorial operators were the latter not free to compete on price.

The particular social argument that is now being advanced in support of policy to ensure maintenance of high prices is that lower prices would stimulate demand and thereby increase costs in France associated with problem and pathological gambling. The purpose of this briefing paper is to offer an economic perspective on the plausibility of the argument.

For this particular case for restrictions on gaming markets to be convincing, three things would have to be true.

First, permitting competition would have to result in lower prices to consumers of gambling services. This part of the argument would be accepted by virtually all economists because it is hard to identify cases in any industry where liberalisation of entry to a market has not permitted prices to consumers to fall. This is underlined in the present context by, for example, the significantly higher prices paid by consumers in the monopolised French betting market compared with the competitive betting market in the United Kingdom.

Second, a fall in prices charged to players would then have to result in higher expenditure on gambling services by existing or potential problem and pathological gamblers. This is far from certain to occur since economic theory demonstrates that, when the price of a product falls, consumer expenditure on it can either increase or decrease, depending on *elasticity of demand*. There is insufficient empirical evidence to permit a definitive prediction concerning whether expenditure would in fact increase in this case (or, to the contrary, actually diminish) because there have been no published scientific studies specifically on elasticity of demand by dysfunctional players. On the other hand, economic reasoning, and evidence on the elasticity of total demand (which includes demand from both problem and non-problem players), below should make us very sceptical about whether competition would raise expenditure by very much (or indeed at all) amongst problem and potentially problem players.

Third, if expenditure did increase amongst dysfunctional players, raising social costs generated from the gambling sector, the magnitude of any such extra costs would then have to be high enough to outweigh the value of any gain derived by recreational players from access to cheaper prices. Included in the potential gain to recreational players would be that they will, to some extent, have had to substitute other, less preferred entertainments and diversions for engagement in gaming under the prior regime of artificially high prices. The gain to recreational players from a fall in price is conceptualised by economists as an increase in *consumer surplus*. The value of consumer surplus has been shown by several studies typically to be very large in the context of gaming markets and to dominate money evaluations of social cost.

Further elaboration of arguments concerning the second and third steps in the case for regulation will be much clearer if some basic concepts from economics are employed. Our first task is to outline how these concepts apply to gambling.

2. The demand for gambling

The *demand curve* is perhaps the most useful tool in the economist's tool kit. It is a representation of how many units of a product will be purchased per period at all the possible prices that might be offered. Demand curves may be used in purely conceptual argument or they may be actual numerical constructs, estimated from studying reactions to different prices in the past or in other locations. Demand curves are always drawn downward sloping, i.e. showing that consumers will buy more units (as measured on the horizontal axis of a diagram) as price (measured on the vertical axis) is reduced, provided of course that other factors governing behaviour are not changing at the same time. The downward slope is termed the 'law of demand' and, whenever demand curves have been estimated numerically, they have, for all products and at all times, been found to conform to the 'law'.

Our starting point for analysing the market for gambling is therefore to draw a downward sloping demand curve. But a demand curve relates the quantity purchased by consumers to the price and it is not as obvious as for other products how the quantity and price of a gambling product are to be defined.

The ambiguity in respect of quantity arises because of the flexible nature of the transaction. Let us call a single entry to a game a *bet*. If price falls and more bets are placed, the number of extra bets observed does not serve to reveal much about the price sensitivity of consumers. For example, only a few extra bets may be placed but they may typically be for much higher stakes than before. This problem makes the standard way of measuring quantity, which is to settle on a physical measure such as miles travelled or litres of wine purchased per period, impractical to adopt in the case of gambling. The solution in the economics of gambling has therefore been to measure quantity demanded, on the horizontal axis, not by a physical but by a money measure, namely amount staked in (say) euros per period. Sometimes, this is labelled 'number of unit bets'.

What to measure on the vertical (price) axis is also not obvious in the case of gambling. A player who places a series of unit bets may expect to receive some of his or her money back in the form of prizes and therefore to call the 'price' one unit of currency would be naïve. Economists have reasoned that 'price' generally means the amount left by the buyer with the seller in return for the good or service provided. For example, the price of a cinema ticket is the amount of money left at the box office by the client. By analogy, the price of a unit bet is captured by the take-out rate, which is the proportion of a unit bet which is, on average, retained by the operator. In studies of gambling, economists therefore measure the demand curve relative to take-out rate (termed win percent in some contexts). It is the take-out (or win percent) that the operator receives in return for the entertainment supplied to the player.

Expenditure on gambling in a period is defined by player losses (or gross gaming revenue). As with any product, expenditure is given by quantity *multiplied by* price: in this case number of unit bets *multiplied by* take-out rate. This gives an evaluation of expenditure which is conceptually the same as that applied to any other good or service. For example, taking expenditure on gambling as the amount left with

operators yields a figure that could legitimately be compared with that for expenditure on films, which is the amount left at box offices.

Fig. 1 presents a stylised representation of a demand curve. Price may be thought of

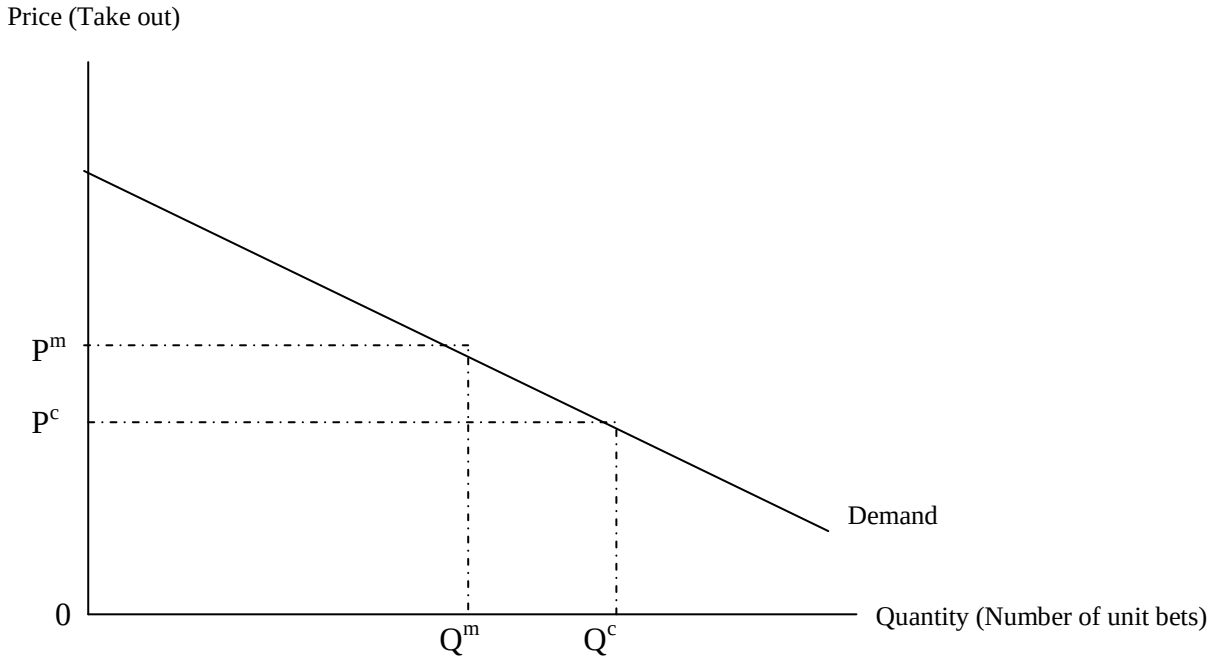

Fig 1. Demand curve for gambling

as take-out and quantity as number of unit bets (amount staked). Suppose new entry into a market drives the price down from monopolistic level P^m to competitive level P^c. The quantity of gambling is then predicted to increase from Q^m to Q^c. The fall in price will have resulted in there being more gambling.

The case for regulation designed to prevent a fall in price is based on the presumption of a relationship between the amount of gambling and the scale of social costs from gambling. But the latter appears likely to be only weakly related to the quantity consumed. In this respect, gambling is different from other controversial products. For example, if the price of cigarettes were to fall from a decrease in taxation, downward sloping demand would predict that more cigarettes would be smoked. Health costs in the society would increase because these costs are directly related to physical consumption of the product. The case of gambling is not like this. The bulk of social costs identified in the literature- for example fraud, self-harm, domestic violence- arise from financial pressure on the problem gambler and are therefore related not to a physical *quantity* but to *expenditure* (Forrest, 2008). We therefore need to be looking not at *Q* but at *P* multiplied by *Q*.

Because expenditure is price multiplied by quantity, it also can be represented on a demand curve diagram. Fig. 2 presents the same information as Fig. 1 but now we add

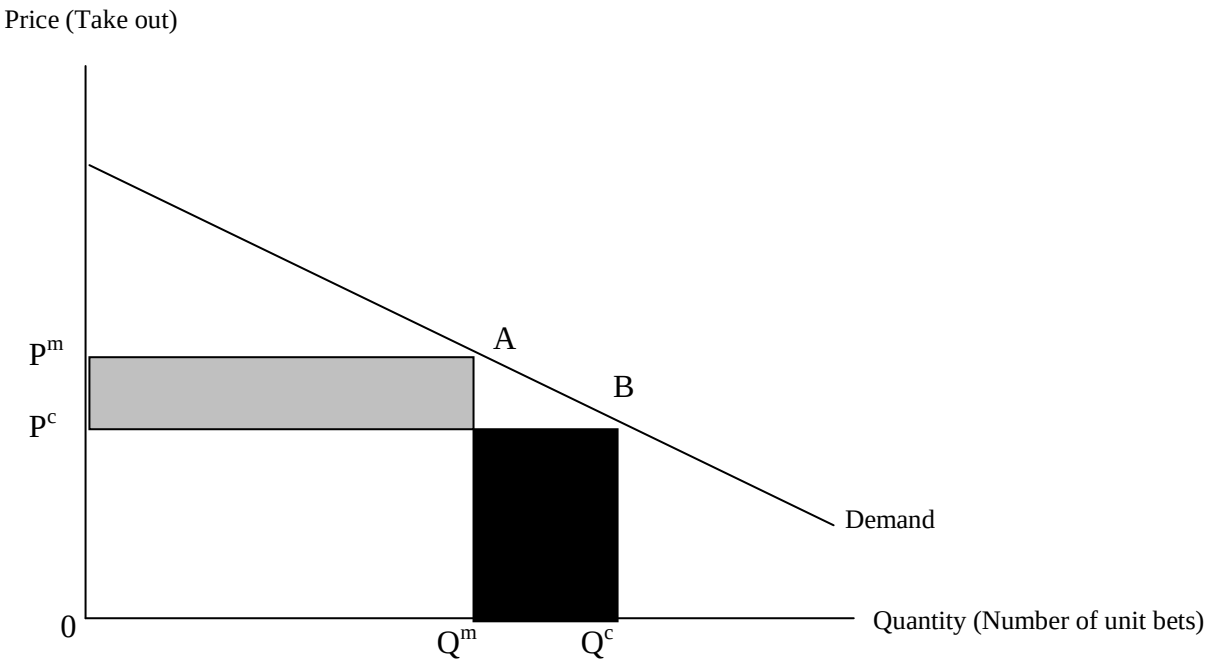

Fig 2. Expenditure on gambling

representations of gambling expenditure at the monopolistic and competitive price levels. Expenditure is shown as the area of a box with boundaries corresponding to *P* and *Q*. For example, expenditure under the monopoly price is P^m x Q^m which is the area of the box bounded by points O P^mA Q^m. Under a competitive regime, price changes to P^c and expenditure is now represented by a new box, OP^cBQ^c. Comparing the second box with the first, there is both an 'extra' area (heavy shading) which is associated with extra bets placed and a 'missing' area (light shading) which reflects the saving for consumers on bets which would have been placed anyway, even at the higher price. Obviously, the diagram could be drawn with the first of these either bigger or smaller than the second. Hence the fall in price *could* increase expenditure on gambling or it *could* decrease expenditure on gambling. It cannot, then, simply be assumed that a fall in price will increase spending and thereby social costs associated with gambling.

3. Elasticity of demand

What determines whether expenditure increases or decreases when price falls? The economist's answer is *elasticity of demand*, which measures how sensitive consumption is to changes in price. Suppose price decreases by 1%. In response, quantity increases by 2%. Elasticity compares the percentage change in quantity with the percentage change in price that brought it about. In this case, change in *Q* is +2% and change in *P* is -1%. Dividing plus two by minus one gives the elasticity which is therefore -2. Elasticity of demand is expected always to take a minus sign because quantity and price move in opposite directions as price is adjusted.

If elasticity is more negative than -1, for example -2, demand is said to be *elastic*. If elasticity is exactly -1, demand is said to be *unit-elastic*. If elasticity is less negative than -1, for example -0.5, demand is said to be *inelastic*.

What happens to expenditure on a product when price falls depends on whether demand is elastic, unit-elastic or inelastic. For example, suppose elasticity is indeed equal to -2 (*elastic*). Expenditure is *P*x*Q*. If *P* falls by 1% but *Q* increases by 2%, the effects of the fall in price must then be more than made up by the effects of the extra sales. In terms of Fig. 2, the heavy shaded box will be bigger than the light shaded box. Per-period expenditure on the product will increase.

Similarly, if demand is *unit-elastic*, the percentage increase in *Q* will be the same as the percentage fall in *P*. Expenditure then remains constant despite a fall in price. And if demand is *inelastic*, the effects of the percentage increase in *Q* cannot fully compensate for the effects of the larger percentage drop in *P*. Expenditure actually decreases.

It follows from this analysis that whether or not a reduction in price, for example triggered by deregulation, increases players' expenditure (i.e how much they lose per period), thereby increasing social costs, depends crucially on the value of the elasticity of demand for gambling services.

It is a common misconception that demand for a product is inherently elastic or inelastic. In fact, in the general case, demand will be both elastic and inelastic, depending on the price at which elasticity is defined. Recall that elasticity is given by the formula

$$\frac{\text{percentage change in } Q}{\text{percentage change in } P}$$

Using *d* to signify "change in", this can be rewritten as

$$\frac{(dQ/Q)x100}{(dP/P)x100}$$

and then as

$$(dQ/dP)x(P/Q)$$

So elasticity can be interpreted as a number obtained by multiplying together two components. The first component is, in fact, nothing more than the inverse of the slope of the demand curve. This will be constant all the way along a straight line demand curve. But, as you travel down that demand curve from left to right, the second component is not constant: *P* is falling and *Q* is rising. Thus the *(P/Q)* component becomes smaller and smaller. It is this that makes elasticity itself smaller and smaller. Hence, we can conclude that elasticity varies along the demand curve. It will be different at every point and will change from being elastic at the top of the demand curve to inelastic further down. This is illustrated in Fig. 3: demand becomes less and less elastic from left to right and at some unique point is unit-elastic.

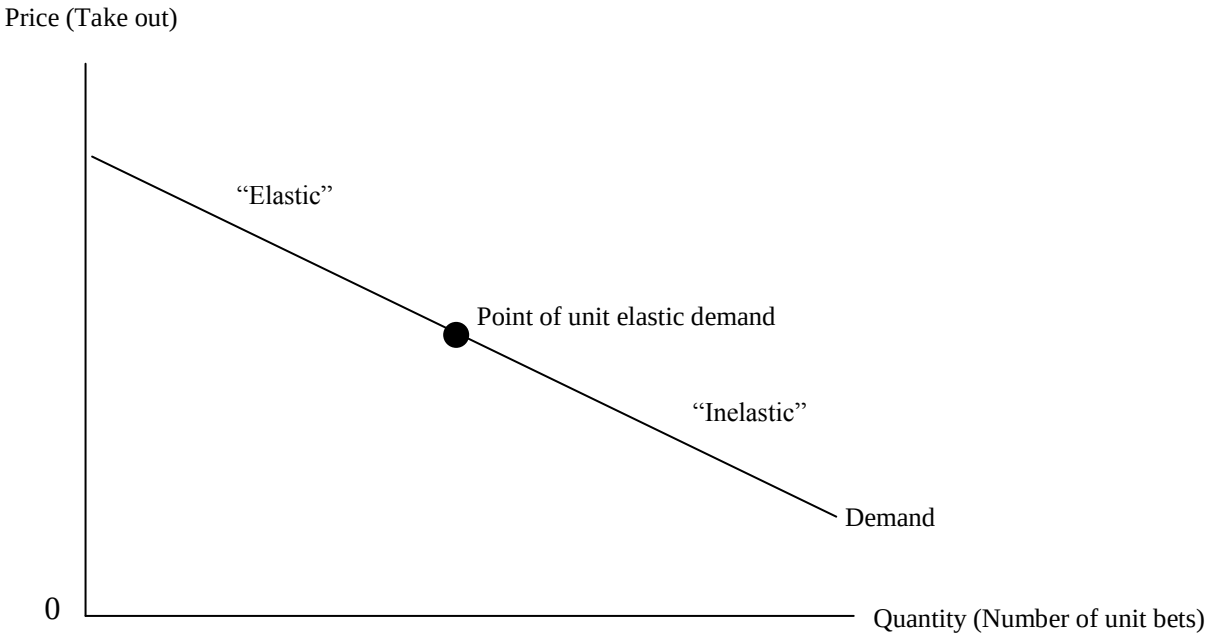

Fig 3. Variation of elasticity along a demand curve

It follows that market structure is a decisive determinant of elasticity. A monopolist can fix price and so effectively can choose the point on the demand curve where it operates. It is usually assumed that it will choose the point consistent with maximising profit. We know that this will never be on the inelastic segment of the demand curve. How do we know? Imagine that a monopolist, in determining its strategy, starts by considering a very high price and then asks what would happen to expenditure (revenue from its perspective) if it adopted lower and lower prices. Since demand near the top of the curve is 'elastic', the reductions in price would initially provoke proportionately larger increases in quantity, raising revenue. But, as the monopolist contemplates lower and lower prices, it would be encountering less and less elastic demand and therefore smaller and smaller boosts to revenue. Revenue reaches its maximum at the price corresponding to unit-elasticity. The monopolist would never go beyond this point because demand then becomes 'inelastic': from there on further falls in price would attract less than proportionate responses in quantity such that revenue would actually decline. This cannot be in the interests of a profit-maximising monopolist which will therefore never price at a level where demand is inelastic.

So where will a profit-maximising monopolist price? One special case would arise where all costs in the enterprise were 'fixed', i.e. there were only overheads and there was no extra cost (*marginal cost*) associated with selling an extra unit of the product. In this case, the monopolist will simply have to maximise revenue from customers in order to maximise profit and this is achieved by pricing at the point on the demand curve where demand is unit-elastic.

In most industries, of course, marginal cost is not zero but greater than zero. In this more general case, the monopolist will not wish to price at as low a point as that of unit-elasticity. There, revenue reaches its maximum but the last sale attracted will have contributed only a tiny extra amount to revenue whereas it would have cost something (for example, because raw materials are needed) to supply the customer.

Therefore it is not profit-maximising to attract that last customer by lowering the price so low as to correspond to the point where demand is unit-elastic. Thus, we arrive at the well known proposition in economic theory that a monopolist with positive marginal costs will price where demand is elastic. And the greater the marginal cost is, the further up the demand curve, away from the point of unit-elasticity, the monopolist will go.

So what do we expect the elasticity of demand to be for a gambling service? Most empirical studies of elasticity of demand in the sector have related to markets served by monopolist franchises such as the pari mutuel at a particular race track or the lottery in a particular American state. In such settings, as in European jurisdictions served by state monopolies, a reasonable expectation might be that demand will be elastic. However, it might not be "very elastic" because marginal cost is often low in gambling settings. Marginal cost refers here to the extra cost of servicing extra sales and this will typically be low to the extent that some of any additional unit sales will take the form not of new transactions bur rather of bigger stakes on the same transactions. In such a case, marginal cost might (for example) be only the extra commission claimed by the credit card company. Thus, on the basis of *a priori* economic reasoning, one would not be surprised at an elasticity estimate such as -1.5 but one would be surprised if it were a number like -3. For example, Gulley and Scott (1993) worked out that for a US lottery with 50% take-out and marginal cost on a $1 stake of 9 cents (over half of this retailer commission), elasticity would have to be -1.19 *if* the lottery operator were successfully maximising profit. When they measured elasticity for lottery products in two states, their estimates duly turned out to be close to -1.19. Demand was indeed "slightly elastic".

Our particular gaming context is one where demand is currently met by a monopoly franchise. Our prediction is therefore that demand will be a little more elastic than -1 *at the current take-out*. But, if the market were opened up to competition, price would certainly fall and it would not have to fall far to enter the inelastic segment of the demand curve. Consider the notional experiment of lowering the price gradually to the competitive level. At first demand is elastic and gambling expenditure indeed increases as consumers are confronted by a lower take-out. However, as take-out falls further, demand becomes inelastic and now gambling expenditure falls back again. Whether the end result is a greater or lesser level of gaming expenditure cannot be determined by purely theoretical reasoning; but a fall eventually becomes more likely the deeper the fall in take-out from the introduction of competition. In any case, it would be surprising if any increase in gaming expenditure that might follow the introduction of unfettered competition were to turn out to be large. Further, and perhaps counter-intuitively, limited competition with only a limited impact on take-out would actually be more likely to increase the volume of gaming expenditure. This is because a modest fall in price might not be enough to take the market far into the inelastic segment of the demand curve where expenditure is falling with price.

The argument for maintaining current high prices in certain gaming markets in order to restrain aggregate spending is therefore weak on the basis of formal economic reasoning. But of course it would be better to have empirical evidence to settle the argument because theory has to make assumptions (such as ours of a straight line demand curve) which, though not implausible, could still be too imperfect to be the

basis of predictions that can be made with confidence. Unfortunately, empirical evidence is limited; but there is some.

4. Empirical studies of elasticity of demand

Elasticity is so central to microeconomics and its ability to make predictions about the world that it might be considered surprising that there are relatively few studies in the peer-reviewed literature on gambling. The explanation is that econometricians can estimate elasticity only if the slope of the demand curve is revealed by consumers responding to variations in price in a naturalistic setting. So many gaming markets are subject to close regulation that take-out rates are typically constant over long periods of time and thus opportunities are rare to observe consumers' responses to different price regimes.

But opportunities have arisen occasionally. In a major Report on the gambling industry prepared for the European Commission, Swiss Institute (2006) presented a comprehensive survey of the relevant academic literature. It identified 26 studies, published during a thirty year period, which offered an elasticity estimate or estimates. Modes covered in this literature were pari-mutuel racetrack betting, bookmaker betting, lotteries and casino slot machine play (unfortunately, there is no published evidence relating to remote gambling). Authors had typically taken advantage of some change in market structure to study, for example, the response of handle to downward shifts in price associated with new entry being permitted into American riverboat and racino markets (Thalheimer and Ali, 2003). In the case of Paton et al.(2004), the authors were able to model reaction to changes in the value for money of bookmaker betting brought about by variations in the betting tax regime in the United Kingdom. Such changes as these have occurred rarely with most modes. Lotteries are a special case in that the structure of lotto games, where jackpot prizes not won are carried over to the next draw, provide regular opportunities to note how sales vary as value for money changes from draw to draw. All the studies on lotteries cited in the Swiss Institute Review (for example, Forrest et al., 2002) estimate elasticity by exploiting this particular feature of the lottery market.

All 26 studies included in the survey by Swiss Institute (2006) (and a few more published since) find that price elasticity takes a negative value, confirming downward sloping demand curves. The median value of elasticity in the set of estimates derived from these studies was -1.57; pari-mutuel studies tended to report the most, and lotteries the least, elastic demand. The results from this body of research are, then, broadly consistent with the general proposition made above that demand is likely to be "elastic but not very elastic" in gambling markets (given that most are characterised by monopoly pricing).

The most important paper for our purposes is Thalheimer and Ali (2003) because it is the only one of the 26 to offer separate estimated values of elasticity before and after significant change in price prompted by new entry into the market. The context was slot machine wagering at American casinos. Over the study period, win percent fell in the face of intensifying competition as more venues were permitted to open. Elasticity was estimated as -1.5 at the beginning of the study period (win percent 10.4%) but -0.9 at the end (win percent 6.1%). This result is certainly unsurprising on the basis of *a priori* economic reasoning but it is important because it provides specific empirical

evidence that confirms that elasticity falls as new entry is permitted into a gaming market (it also illustrates how substantially price can fall when monopoly power is eroded). With these particular numbers, the reduction in take-out triggered by competition would indeed increase aggregate player losses but only by a few percent. This is consistent with predictions made above. Of course, it is risky to base policy on such a limited volume of evidence but, if none other exists, and if its results conform with what economic theory predicts, it may be presumed to offer the best guidance available. This is that it is implausible to expect competition to increase player expenditure by a very large amount. Therefore there can be said to be no scientific evidence to support price regulation that would deprive consumers of access to better value gaming.

A major caveat to this conclusion is that it focuses on what happens to *total* expenditure across all players as price falls. But, of course, we would ideally like to know what happens to expenditure by a subset of players, namely those who are, or may be caused to become problem or pathological gamblers. It is this subset of players which is the source of the social cost of gambling.

5. Elasticity of demand of problem gamblers

The reason for our second-best reliance on argument and evidence relating to the global figure for player expenditure is that there have been no econometric studies at all specifically on problem gamblers' expenditure. Why there is this gap in the literature is not hard to understand. Studies on elasticity typically identify natural experiments where there has arisen the opportunity to observe past changes in aggregate turnover as take-out moved up or down. Only aggregate turnover can be observed because problem gamblers do not declare themselves and thus users of data cannot break down totals into money from problem gamblers and money from recreational gamblers. Even if a researcher identified that a price change was about to occur, it would require a longitudinal study to follow the trend in problem gambling expenditure over time. Recruitment of a panel of 'problem gamblers' would be a difficult task as they are hard to find, comprising much less than 1% of the adult population in many jurisdictions where prevalence studies have been undertaken.

On the other hand, the increase in availability of data generated from internet gambling sites offers some hope that understanding of problem gamblers' behaviour will improve in the future. This is because it may be possible to identify likely problem gamblers from their past pattern of transactions. If a price change occurred (perhaps it could even be engineered as a price promotion to provide an experiment), it could then be observed whether problem gamblers displayed different elasticity from non-problem gamblers. This would represent a viable research strategy but a caveat is that it would likely generate an inflated estimate of elasticity. First, some of the increase in demand during a promotion may represent inter temporal substitution (players make more transactions now but fewer in following periods because they choose to bring expenditure forward to take advantage of the promotion). Second, and probably more seriously, even if the price change were not time-limited, some of the increase in demand would involve not new expenditure but simply expenditure switched from other unobserved websites or other unobserved modes of gambling in response to a change in relative prices.

With current knowledge, it is not possible to make definitive predictions about whether aggregate losses incurred by problem gamblers would increase or decrease if take-out shifted from the monopolistic to the competitive level. It depends on the shape of the demand curve of problem gamblers and specifically on whether it is elastic, unit-elastic or inelastic at relevant values of take-out. This problem gamblers' demand curve will be nested within the demand curve for all gamblers but cannot be observed even where there are adequate data to estimate the latter. We think from evidence that demand overall is "slightly" elastic but what we really need to know is whether the sensitivity to take-out amongst problem gamblers is greater or less than amongst gamblers generally.

The absence of empirical evidence creates a roadblock to which two responses are possible. The first is to say that the case for blocking price falls cannot be made on the basis of scientific evidence and therefore the case fails on the ground that there is a presumption in favour of free markets if there is no convincing argument to the contrary. The second is to recognise that there is no reliable quantitative evidence but to turn instead to the judgement of presumably well informed experts.

Perhaps the most comprehensive and also influential study of gambling ever produced was Australian Productivity Commission (1999). Its Report presented estimates of demand curves in Australia (both for gambling services generally and for particular modes). It had commissioned research that suggested that (at least for one mode) 30% of current expenditure was from problem gamblers. It therefore knew *one* point on the relevant problem gamblers' demand curve; if *P* were set at current take-out, it could work out what the value of Q would have to be on the problem gamblers' demand curve to yield this 30% result. But, like us, it did not know what the rest of the problem gamblers' demand curve would look like. Based on the views of experienced gambling analysts, it chose in fact to draw the problem gamblers' demand curve as steeper than the overall demand curve. This implies that, at current take-out, demand was expected to be less elastic among problem gamblers than among all gamblers. Since demand at current take-out was taken as close to -1 across the whole market, demand was therefore being speculated to be *inelastic* for the sub-group termed 'problem gamblers'. If demand is indeed inelastic, as the experts assembled by the Australian Productivity Commission thought, then a fall in take-out, while increasing the turnover from problem gamblers, would reduce their total losses and therefore ease financial pressure on them. More competitive pricing would therefore mitigate rather than aggravate the costs of social problems related to gambling. It is interesting that the same assumption of inelastic demand was made by Peirson (2007) in his pioneering attempt to construct an economic model of problem gamblers' behaviour.

Of course, the assumption of inelasticity in problem gamblers' demand is only speculation. It is equally plausible to hypothesise that demand will always be unit-elastic for problem gamblers. This would be so if their demand curve took the shape of a rectangular hyperbola (Fig. 4). This type of demand curve is a special case where

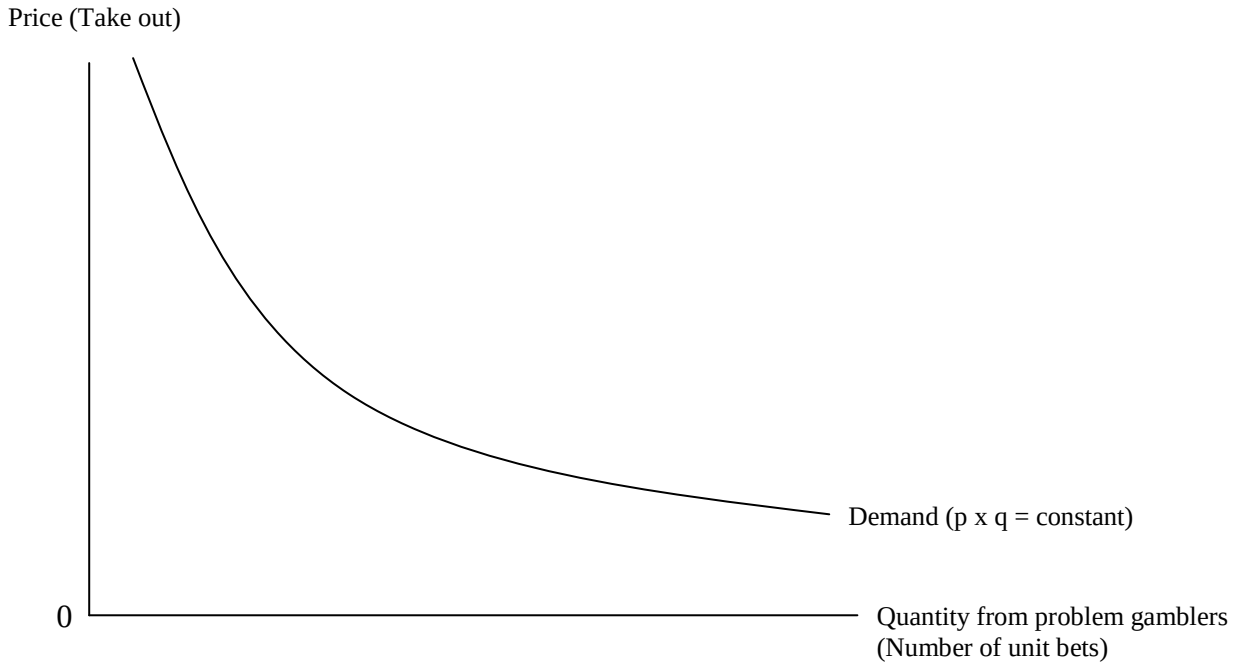

Fig 4. A constant expenditure demand curve

elasticity is the same at every point. Its value is -1, implying equal expenditure at all possible prices. This would be the case, for example, if problem gamblers always spent all their disposable income on gambling. This does not sound too implausible as a way of characterising many dysfunctional players. If this demand curve represented behaviour accurately, it would make little sense to deprive recreational consumers of access to lower prices because these lower prices would not be increasing financial pressures within the group of problem gamblers (though it might result in more time being taken up by gambling). Note again here the crucial difference from other dangerous products. An alcoholic might similarly use all his or her disposable income on drinking. Cheaper drinks would also leave expenditure unchanged in this case but there would be substantial damage done given that social cost (for example, liver disease) is related to physical volume of consumption. In gambling it is expenditure rather than quantity that is the primary driver of social cost.

The regrettable truth is, of course, that we do not know from empirical evidence what the elasticity of demand is among problem gamblers. The preceding text does however show that it would not be unreasonable to expect inelastic or unit-elastic demand instead of the high elasticity implicitly assumed in the argument for minimum prices. The supposed social gains to be had from a high price regime are therefore highly uncertain because, if demand were inelastic or unit-elastic, there might not be any. By contrast, the losses to recreational consumers from charging them an artificially maintained high price are definite and large.

6. Consumer surplus

The concept of *consumer surplus* provides a framework for estimating the benefits buyers derive from access to a good or service offered at a given price. In Fig. 5, a

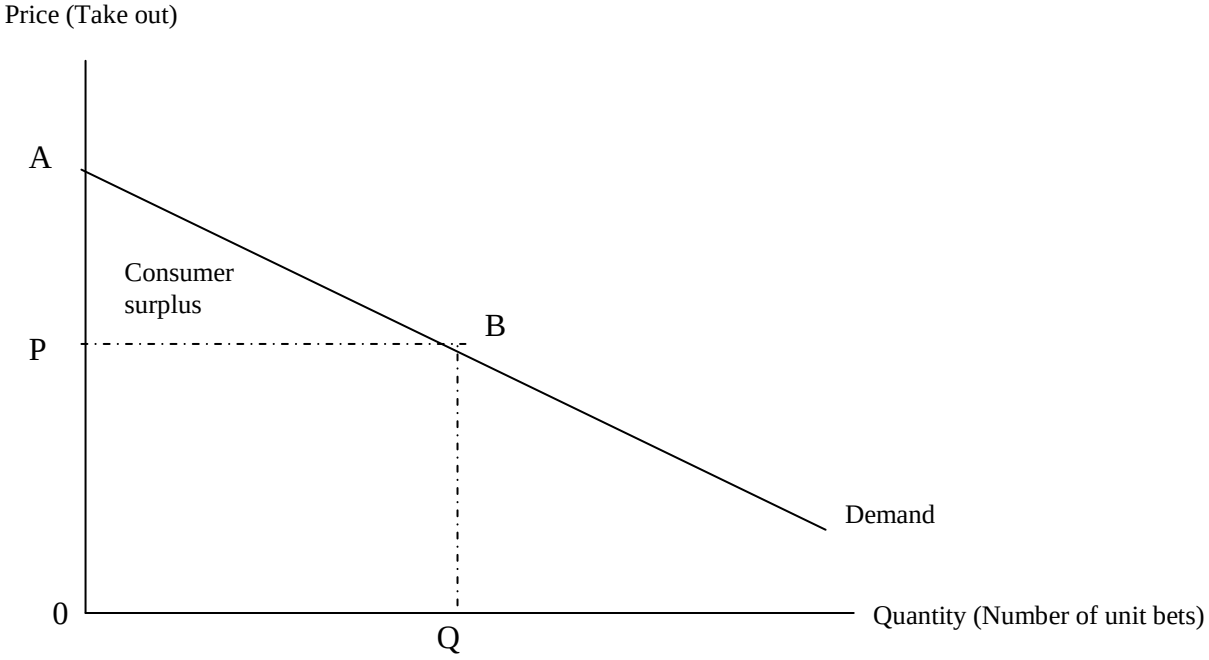

Fig 5. Consumer surplus for gambling

product is sold at a price of *P* and *Q* units per period are purchased. Price has to fall to *P* before the purchaser of the last unit sold, unit number *Q*, is just persuaded to buy. The current price therefore represents exactly the *willingness to pay* of the buyer of the very last unit sold. Assuming this consumer to be rational when deciding how to spend his or her money, this willingness to pay can be interpreted as the money value of the benefit the buyer expects to get from obtaining the good. Therefore this last buyer obtains no *net* benefit from the transaction. *P* is the consumption value of the good but *P* has to be handed over to the seller in exchange. For this buyer 'consumer surplus' is zero.

For all other buyers, the situation is different. For all of them, the amount they would be willing to pay is in fact higher than the price they have to pay. They therefore gain from their transactions and this gain is known as consumer surplus. For any individual buyer, it is defined as the difference between his or her willingness to pay and the current price. Aggregated across all buyers, it is the area between the demand curve and the price line, triangle *P*AB in Fig. 5 (O*P*B*Q* is player expenditure or gross gaming revenue). Note that consumer surplus is measured in money terms but it does not correspond to any physical flow of money. Rather it represents the money equivalent of how much better off buyers collectively are as a result of activity in this market. This would be the benefit lost if, for example, the good were prohibited.

Australian Productivity Commission (1999) attempted to measure the annual consumer surplus generated by the country's gambling industries. It argued that this should be taken into account in policy formation and compared with any estimate made of the social costs from gambling.

Assessing consumer surplus is a standard technique used in decision taking across the whole range of government. But there is a complication in the case of gambling. The technique is legitimate only to the extent that consumers behave rationally such that, for example, the amount they are willing to pay (lose) reflects the consumption benefit (entertainment value) they gain from the activity (gambling). But some of the purchases of gambling products are clearly made by dysfunctional players who do not have full control of their actions and their willingness to pay therefore does not represent a true benefit. Confronting this problem, the Australian Report counted consumer surplus only for non-problem players. The proportion of gaming expenditure estimated to be associated with problem play was removed from the demand curve before it was used to calculate consumer surplus. The consumer surplus estimates in the Report, the first to be made in the context of gambling, were therefore estimates of the gain to *recreational* players from having access to opportunities to gamble. The estimates proved to be very high relative to even pessimistic estimates of the social costs of gambling.

One of the few attempts made in Europe to assess the social benefit generated in the gambling sector similarly resulted in very high estimates of consumer surplus. Crane (2008) used the approach in Australian Productivity Commission (1999) to forecast the annual benefit to be generated by seventeen new casinos authorised for Great Britain by the Gambling Act (2005) as £3.2b (€3.5b). Even when she made extreme (pessimistic) assumptions about the amount of social disruption these casinos would cause, the annual social cost they were expected to generate was still only £1.8b (€2b). These figures are based on necessarily roughly estimated demand curves but the large excess of social gain over social loss from the proposed casinos is illustrative of large losses where policy takes a prohibitionist stance.

If gambling is legal but policy is nevertheless restrictive to the extent that price is maintained at artificially high levels, losses of potential consumer surplus are still high. Farrell and Walker (1999) used their estimated demand curve for UK Lotto to predict how much *extra* consumer surplus would be generated if the take-out rate were lowered by 0.28 (the proportion of the entry fee hypothecated to Good Causes). The annual figure they produced was a little over £2b (€2.2b), another vivid illustration of the losses of a high take-out regime.

Comparably precise estimation of the gains to, for example, French gamblers if they were able to access a competitive market would require a significant research exercise. However, some rough idea of orders of magnitude can be obtained from simple calculations. If elasticity happens to be exactly -1, consumer surplus can be shown to be exactly half as great as consumer expenditure at the relevant price. According to Swiss Institute (2006), French off course horse betting expenditure (gross gaming revenue) in 2005 was €2.2b. Let us suppose (for illustrative purposes only) that 20% of this derives from dysfunctional bettors. And let us, for simplicity, assume unit elastic demand. In this case the annual consumer surplus to recreational bettors at a take-out rate of 27% (calculated from data in the Swiss Institute Report)

was in excess of €800m. According to calculations from United Kingdom data in the Swiss Institute Report, take-out in the competitive retail betting market there was about 9%. If French consumers had faced this take-out instead of that offered by their monopolist pari mutuel operator, the annual gain in consumer surplus would have been approximately €1.5b.

Spectacular gains to consumers can therefore accompany significant reductions in take-out such as might be expected when a market is opened up to competition. On the other hand, it should be noted that not all of this is pure gain to the society as a whole since some of it is simply a transfer *from* the operator (and therefore usually the government) *to* existing consumers, who now pay less for units of the product that they were buying anyway. The element that is a 'pure' social gain is the consumer surplus generated by the *extra* units of the product that are now consumed. For example, Farrell and Walker (1999) calculated the pure social gain from the price reduction they considered for UK Lotto as £0.5b (€0.55b) per year. This represents what the society as a whole will lose from under-consumption of a good where the price is maintained at artificially high levels (in this case to fund Good Causes but in other cases to protect domestic producer interests). It is interesting that, while social costs of gambling from liberalisation will be higher if an alternative and higher elasticity figure is assumed, the value of this social gain will also increase with elasticity. To this extent, the case for minimum prices would not necessarily be strengthened even were elasticity to be discovered to be greater than anticipated.

7. Summary

Advocates of restrictive regulation have proposed that high prices should be retained in a gambling market in order not to encourage over-consumption by existing and potential problem gamblers. For this to be an effective policy, it would have to be the case that any fall in price would raise losses among dysfunctional players. Whether or not this or the contrary occurs depends on whether demand from this pool of players is 'elastic' or 'inelastic'. Inherent problems exist in designing an experiment to settle this issue and, to date, no relevant scientific evidence is available. There is therefore no scientific basis to the proposed policy but, equally, there is no decisive evidence that would allow the policy to be dismissed out of hand.

The closest we have to relevant evidence is the literature on the elasticity of demand for gambling products in total (that is, including *both* problem and non-problem gamblers). Broadly, this indicates that demand tends to be elastic but not hugely so. If take-out were reduced, aggregate player losses would indeed increase but by only a small proportionate amount. If the price cut were deep enough, it is plausible that demand would become inelastic and therefore that player losses might even decrease. In any case, any changes in player losses would be expected to be modest and therefore an unlikely source of increases in the social cost of gambling. At best, the case for claiming that maintaining high prices would allow significant social costs to be avoided is "not proven".

Although it is highly speculative to suggest that maintaining high prices will have a significant benefit in terms of containing the costs of problem gambling, it is, by contrast, known for sure that the cost to consumers is large and that this will carry through to a large societal cost from distortion of consumer choices. Thus, whereas

benefits from maintaining monopoly pricing would be very uncertain, permitting consumers access to cheaper supply would have very definite benefits.

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