THE FUNDING QUESTION

An analysis of the effects of both the change in basis of General Betting Duty from turnover to gross profits, and the increasing competition in the gambling industry, on horserace betting in Great Britain

Contents

Foreword

This paper examines the complex changes currently going on in the betting industry in the UK that are of concern to racing.

Current accusations levelled at betting exchanges - regarding turnover, margin, punter behaviour, bookmaker behaviour, bookmaker profitability, and ultimately the funding of racing - are unfounded.

The accusation that betting exchanges are distorting starting-price returns is not backed by any data. The accusation that betting exchanges are reducing the total gambling spend on horseracing is also false. In fact, the contrary is the case because exchanges provide increased betting opportunities on horseracing to sophisticated punters.

This document demonstrates why this is the case. It does so by using complete data from every single horserace staged in Great Britain over the last eight years.

Its aim is to establish fact over conjecture.

Executive Summary

A flawed basis of calculation

Horseracing has based its funding model in recent years on a study whose assumptions and calculations are fundamentally flawed.[1] It has been neither understood nor accepted that the calculations of the OCP report failed to factor in the effects of changed punter behaviour that might be brought about by the new basis of tax.

The 5-year deal signed between the BHB and the bookmaking community in April 2002 was based on false assumptions.

The basis on which bookmakers are charged tax moved from turnover to gross profits in October 2001. Studies to assess the likely impact of that change were conducted before it was made. Of those, the OCP report concluded that a 45% increase in turnover would compensate for (and directly balance) the fall in margin expected to result. As the horseracing levy moved onto the same gross profits basis, the bookmaking industry subscribed to that figure. Racing's income was forecast to increase from £55m to £97m after a period of consolidation.

But the arguments within that study were flawed: although the possibility was *considered* that gross margins might fall because the tax change would alter punter behaviour**,** that same possibility was not actually factored into the mathematical calculation. The study also made the assumption that punters would recycle 100% of their money through horserace bets.

[1] Organisation Consulting Partnership (OCP) report, 'Determining the 41st Levy Scheme' December 2001

Punter behaviour *has* changed

As a group, punters now bet a higher proportion of their stakes on low-margin favourites and on singles. Less-sophisticated bettors now bet some of their money on the FOBTs, while those who have stayed with racing are the more-sophisticated players, who by definition are lower-margin as a group.

Two years on, punter behaviour can demonstrably be shown to have changed significantly as a result of the new system of taxation. Within the sport itself, analysis shows that there has been a significant switch away from betting on longer-priced horses and on multiple bets, towards betting on shorter-priced horses and single bets - both moves which resulted from the tax change. A fixed turnover tax discriminated most heavily against short-priced bets, and (because the tax was paid on each bet) against single bets. These changes in bettors' behaviour serve to reduce significantly the marginal advantage to the bookmaker.

At the same time, the attraction of new products has proved a significant source of competition. Whereas, historically, horseracing has taken up the vast majority of bettors' turnover, bets are increasingly being diverted into other areas. Singles betting in football, virtual racing, and the FOBT[2] game, roulette, are examples of popular new substitutes. Some of these products provide a greater return for the bookmaker, and (like virtual racing) do not require him to pay away a proportion of his profits for data rights. All of them have only been able to establish themselves because of the tax change, as this document will show.

In addition, many are devoid of any skill. They are therefore far more likely to attract higher-margin, less-sophisticated, gamblers than the more-skilled racehorse gamblers, who lose their money more slowly (or even win). The transfer of any turnover from the high-margin punters from racing- to numbers-betting is likely to have a dramatic effect on horseracing margins, insofar as a growing share of racing turnover is made up of low-margin bets. The overall horseracing margin is reduced in consequence.

[2] FOBT stands for Fixed Odds Betting Terminal. The most popular game on these terminals is roulette.

Turnover target was too low

When underlying structural changes are considered, the turnover increase of 45% that racing has experienced actually represents a dramatic and significant underperformance. A 95% increase is what was needed to hit targets.

The changes in punter behaviour mean that horseracing is not achieving the levels of funding it had hoped for or expected. Although turnover has increased to compensate (as OCP said it must), a full analysis – taking into account the crucial aspects which OCP neglected - shows that the change in turnover required to maintain racing's funding following the tax change was not 45%, but 95%.

An understanding that the original margin calculations were flawed is crucial to the debate on the future of the horseracing industry. The relationship between turnover and margin is fundamental to horseracing's funding,[3] and the required turnover growth was understated. Margin was always *expected* to fall, but it has done so more than predicted; turnover was *predicted* to rise, but it needed to do so more than was stated. Yet now, many who accepted that a given fall in margin would lead to a 45% increase in turnover claim that any further fall in margin cannot lead to a subsequent increase in turnover. Falling over-round per runner, without commensurate turnover change, has been cited as evidence to support that case.

Over-round per runner is an irrelevant metric

Although often cited, over-round per runner is an irrelevant metric for the funding of the horserace industry, because margins on horses are not consistent. Gross punter loss is the only driver of horserace funding. The theoretical over-round is by definition not the actual gross loss.

The analysis of over-rounds per runner, as an argument to demonstrate that bookmaker profitability is down, is based on a false premise. Over-round per runner

[3] Gross profit=margin*turnover

may be a useful notional guide to the likely loss a punter faces, but it is a flawed measure of actual marginal profitability, and over-rounds can increase or decrease independently of the profitability of a book. This is because OPR is based on the false assumption that bookmakers lay every runner in the field to lose a fixed amount. It also assumes that they operate to the same margin on shorter-priced horses as they do on longer-priced horses.

In reality, bookmakers are over-weighted on favourites and under-weighted on outsiders, and the margins that bookmakers achieve on favourites are lower than for outsiders. Margins on favourites are not only unchanged since October 2001, but so far in 2003 are above the 8-year average. If the bookmakers' hypothesis that betting exchanges are the cause of margin change is correct, why is it that the horses on which the exchanges do 65% of their business are unaffected?

Incremental benefits of exchanges have been ignored

> **An understanding of a betting exchange's business model clearly demonstrates that the product it offers is generating incremental money both in horseracing- and tax revenue.**

While debate over the margins of existing players has raged, the turnover of business on the betting exchanges has been growing. This has further confused the issue. Some have mistakenly suggested that if betting-exchange turnover were to be channelled through existing platforms, the money it would yield for the horseracing levy would be greater. This shows a fundamental misunderstanding of the exchange model. More than 60% of horseracing business that goes through Betfair is generated on products which are not offered by traditional operators, who allow their customers neither the ability to trade nor to bet in-running during a race. In addition, 25% of Betfair's business – a figure that is rising more rapidly than any other in its metrics – comes from overseas. It is money that is being attracted to the United Kingdom purely by virtue of the fact that Betfair offers opportunities and prices which are not available elsewhere.

Part One: Why the Horseracing Levy has not risen as forecast

The Levy has not risen to the levels forecast following the abolition of a turnover-based General Betting Duty (GBD) and the switch of both betting duty and levy payments from a turnover to a gross profits basis.[4]

A gross profits charge is dependent on the interaction between turnover and margins. Looking at turnover or margins in isolation is not appropriate under the new system: a fall in margin is not a bad thing if turnover can rise to compensate for the fall. All the studies done prior to the changes made the baseline assumption that punter loss would remain the same, with punters recycling 100% of their losses on horseracing bets. But the introduction of new products into betting shops has prevented 100% recycling of horseracing bets from happening.

Why has the margin on horseracing bets fallen?

The betting margin is defined as the total amount of money the punter loses through betting, divided by the total amount he stakes. Under GBD the money staked and money lost included the 9% turnover tax paid by punters.

There is no debate that the margins achieved in betting shops on the horseracing product have fallen in recent times. The Tote results of 2002/03 described gross profits averaging 10.6% on turnover, as opposed to 13.1% the previous year.[5] More interestingly, an article in the *Guardian* described Tote profits on horseracing falling from 16.9% two years ago to 11.2% in the year to March 2003.[6]

There are four distinct causes for the fall in margin since the abolition of GBD:

[4] The tax change of 2001 saw the Treasury change the basis of General Betting Duty to Gross Profits instead of turnover. The tax retained its name as General Betting Duty, but for the sake of simplicity, betting tax before the change is referred to as GBD, and after is referred to as GPT.
[5] Tote Annual Report and Accounts 2003
[6] The Guardian July 16th 2003

1. The removal of the 9% turnover deduction on every bet placed in a betting shop has led to an increase in the number of bets placed on low-margin favourites.
2. The removal of the 9% turnover deduction on every bet has led to an increase in the number of single bets relative to multiple bets.
3. Starting Price margins on outsiders have fallen.
4. The introduction of more random-number games in betting shops has reduced the proportion of bets on horseracing being placed by low-skill gamblers.

1.1. The effect of tax changes on betting margins

1.1.1. The early studies on the impact of the tax change

Various papers were written concerning the switch from turnover 'tax' to gross profit 'tax'. The Organisation Consulting Partnership summarizes:

> "Both European Economics' study for the Bookmakers' Committee and Henley's for the BHB assumed that bookmakers would remove the 9% charge that they imposed on betting shop bets, and otherwise leave their margin unchanged. Thus, a margin of 22.5% on cash horseracing bets is regarded as a basic margin of 15.5% plus the 9% on turnover, which is itself inflated by 9%. When the 9% disappears the margin will return to 15.5% [(15.5+9)/1.09 = 22.5]." [7]

These studies therefore assumed that the cost of gambling on horses to the punter was 22.5% when turnover 'tax' existed, and would be 15.5% if this 'tax' was changed to a gross profits' basis. The studies had a baseline assumption that punters would continue to lose the same amount in total (that is, they would recycle 100% of their horseracing bets through horseracing products). If they considered the possibility that gross margins might fall, they did not include it in any of the published calculations.

To maintain the same level of gross profits (where gross profits = bookmaker gross profits + racing levy + tax + bookmaker administration charge), it was therefore

[7] Organisation Consulting Partnership 'Determining the 41st Levy Scheme' December 2001. (See Appendix A3 for tax calculation explanation)

calculated that the required increase in turnover was 45%, as shown in Table 1.1. A base turnover figure of 1000 units was used for this table.

Table 1.1 – Theoretical increase in turnover required

Turnover	1000	1450
Gross Margin	22.5%	15.5%
Gross Profit	225	225

This forecast, concluding that a 45% increase in turnover on horseracing bets would signify that 100% recycling had occurred, has become the mantra of both the racing establishment and bookmaking industries. The calculation is flawed.

1.1.2. A more realistic forecast of the effect of the tax change

The assumption that the removal of the 9% would reduce the cost to punters from 22.5% to 15.5% is simplistic. It assumes that there is one price (15.5% of turnover) for every horse regardless of its odds.

1.1.2.1 The flaw in the previous studies: Introduction

Turnover tax on gambling under General Betting Duty was a tax on the *money staked* by punters, not on the *cost of betting* to punters. That is, it cannot be looked at as having the same effect as, for example, Value Added Tax on buying a television.

The cost of buying a television is the total amount the buyer turns over when buying the television. The gambler - who may place a bet and win before betting these winnings on another wager and losing - only loses a proportion of the money he stakes over the long term. But for every bet he placed under the old system, a proportion of the stake had to be paid in tax. This made GBD more like a ‘toll bridge’ tax rather than a tax on spending.

Consider the effect of the removal of a ‘toll bridge style’ tax on the purchasing choices of children in a boiled sweetshop.

Two children are each given £2 pocket money to spend on sweets. Assume that they will both spend all of their money. One child prefers lemon sweets that cost 20p each and the other likes orange sweets that are 50p each. The first child will spend his £2 on 10 lemon sweets. The second child buys 4 orange ones.

Unknown to the children, the boiled-sweet council charges a tax of 10p on every boiled sweet sold. So, half of the 20p cost of the lemon sweet is tax, and 20% of the cost of the orange sweet is tax. Imagine that the boiled-sweet council then decides to abolish the tax in an attempt to increase the total number of sweets sold.

The lemon sweets would now cost only 10p. The first child could now buy 20 lemon sweets instead of 10. If he still spent his entire £2 on lemon sweets the volume of lemon sweets sold would double. The orange sweets would be reduced in price from 50p to 40p. The second child would thus be able to buy 5 orange sweets instead of 4, an increase of 25%.

The total number of sweets sold has gone up from 14 to 25 for the £4 the two children spend between them. The average cost per sweet has fallen from 29p to 16p. This 13p fall is greater than the 10p cut in tax.[8]

It would clearly be unsatisfactory to use the average price of, for example, 30p per sweet in analysing the likely effect of the removal of the 10p tax on children's purchasing habits. Yet this is the logic used when assuming all bets cost punters a flat fee of 15.5% of their turnover and concluding that a 45% increase in turnover is required for punters to maintain their loss level.

1.1.2.2 The flaw in the previous studies: context

The reality is that there is no one price for betting on racehorses. The starting-price margin bookmakers achieve on favourites is far lower than that which they achieve on

[8] To put it another way, 'An Economic Analysis of the Options for Taxing Betting: A report for HM Customs and Excise' by Paton, Seigel, and Vaughan-Williams (Sept 2000) states that "A turnover deduction taxes most harshly lower-odds bets, since these bets yield the highest expected return. For example, bets at odds of evens produce a small overall loss, say 10 per cent, to bettors. Bets at odds of 20 to 1 or greater produce a much larger overall loss, say 50 per cent. A standard deduction of, say, 5 per cent, is a much larger proportion of the former (a half) than the latter (a tenth)."

outsiders. Bookmakers also turn over far more money on favourites than on outsiders.[9] These two biases must be taken into account when producing a margin forecast.

The flaw in the original analysis is acknowledged by the bookmaking industry. David Harding, Chief Executive William Hill, summarised the point:

> 'Assume no new money and 100% recycling of the tax, and the maths looked like a 45% increase in turnover for a flat gross win. Of course this was simplistic – some said that there would be a big increase in bigger bets on short-odds favourites, which would push up the turnover figure for less gross win'[10]

The implication of the concept that turnover could increase and gross win[11] remain stagnant, or even fall, implies that overall margin must fall. The reason for this is that bookmakers make a lower profit-margin on favourites than they do on outsiders.

The lower the margin the bookmaker is operating to, the bigger the positive impact the removal of betting tax will have on the punter.[12] Table 1.2 shows the real cost of betting on all horses in various odds groups when turnover tax exists and is removed:

Table 1.2 – Effect of General Betting Duty on total punter loss

	Tax Free Jan 1996 – Oct 2001	Expected Loss Including Tax	Percentage Reduction
Favourites	5.9%	13.7%	56.9%
<=10/1 Non-Favourites	15.0%	22.0%	31.8%
>10/1 Non-Favourites	42.0%	46.7%	10.1%

The cost of backing favourites without the turnover tax is 5.9% on turnover and 13.7% when turnover tax is applied. Under the old system, *betting tax represented over half the favourite backer's total loss* in the same way as the tax on sweets accounted for half the cost of lemon sweets. But the same tax-change has had very little effect on the cost of betting on horses over 10/1, where it has reduced the cost to the punter by only 10.1%. The effect is therefore similar to that seen with the orange

[9] See Appendix A5 for further explanation of the long-shot favourite bias
[10] Speech at the GBGC Industry Seminar February 2003
[11] Gross win = margin* turnover
[12] Sections A3 and A4 of the Appendix explain how the turnover tax affects different margin bets differently.

sweets when the tax in the hypothetical example changed. *It is a negligible proportion of the total cost.* The punter can still expect to lose a very large proportion of his stake.

Analysis has been conducted that takes into account the distribution of bets for each different odds group. This analysis suggests that if punters recycle 100% of the amount of money lost in each odds category, and multiple bets are taken into account, turnover would need to rise by 85% to maintain punter loss.

The amount bet on favourites would be expected to increase far more than the amount bet on outsiders. The logic for this is the same as in the hypothetical example: the number of cheap lemon sweets being bought will increase far more than the number of expensive orange sweets when the fixed tax-per-sweet-sold is removed. This would cause the overall margin on horseracing bets in betting shops to be reduced from 22.5% (when GBD was included) to 12.2%.[13] This is considerably lower than the 15.5% margin figure used in the analysis that concluded a 45% increase in turnover would produce 100% recycling of horseracing bets.

Further, this analysis makes the crucial assumption that punter behaviour would remain unchanged, which flies in the face of conventional wisdom. The second child is likely to realise that his friend has doubled his volume of lemon sweets whereas he only has got a 25% increase. He is likely to switch some of his funds from orange sweets to the now heavily-discounted alternative. The fact that the orange sweets have fallen in price by 20% adds little to their relative appeal when compared to the halving in price of lemon sweets. The likely increase in lemon sweet sales, and the decrease in orange sweet sales, will further increase the total number of sweets sold - *but decrease the overall average cost per sweet*.

In the same way, given that the discount in the 'price' of betting has fallen far more for favourites than it has for outsiders, it is likely that the tax change has resulted in punters switching even more money to betting on favourites, and being willing to lose

[13] See Appendix A6 for a full analysis of this calculation

less on outsiders. *The established fact that tax changes make it cheaper for punters to bet on favourites means that they may bet on them even more.*

1.2 Starting-price margin on outsiders

So, a fall in margin from 22.5% to 12.2% is allocated to the tax change and the subsequent movement in distribution. There has also been a small drop in the margins on outsiders following the tax changes.

A study of every single horserace between 1996 and 2003 shows that the margin on favourites remained almost entirely unchanged in that period. The margin on non-favourites less than or equal to 10/1 has fallen from 15.0% to 13.3%, and that of longer-priced non-favourites from 41.9% to 35.4%. The margins before and after the tax change are shown in Table 1.3.

Table 1.3 - Margins on Horseracing 1996-2003

	Jan 1996 - Oct 2001	Nov 2001 – Nov 4th 2003
Favourites	5.9%	5.7%
<=10/1 Non-Favourites	15.0%	13.3%
>10/1 Non-Favourites	41.9%	35.4%

The fall in margins on the outsiders is likely to have reduced the overall betting-shop margin on horseracing to 11.5%. Turnover on horseracing bets would therefore have had to rise by a further 10% (95% overall) in order to maintain punter loss.[14] This additional 10% is insignificant when we consider that analysis has already shown that turnover needed to rise by 85%, rather than 45%, as a result of the tax change.

There has been confusion in recent times that the 'over-round per runner' (OPR) represents the cost to the punter of betting. It does not.[15] The OPR has been falling in recent years, and is being blamed by the corporate bookmakers as the reason for the shortfall in racing's finances. Ladbrokes' Chief Executive Chris Bell was quoted in the *Racing Post* as saying:

[14] See Appendix A6.3
[15] See appendix A9 for a detailed examination of why the OPR is an inappropriate metric

> "…against the average margin of two percent per runner in the days before betting exchanges took hold, the figure this year had generally fluctuated between 1.7 and 1.8 per cent, and fell to an all-time low of 1.67 per cent over one week in July." [16]

The OPR is a guide to the likely loss a punter faces, but is flawed as a meaningful statistic because it is based on the assumptions that bookmakers lay every runner in the field to lose a fixed amount, and operate to the same margin on favourites as they do on outsiders.

In reality, bookmakers are over-weighted on favourites and under-weighted on outsiders. The margins that bookmakers achieve on favourites are generally lower than for outsiders.[17] The terrible results given by bookmakers for the 2003 Cheltenham Festival, when a large proportion of favourites won, are testament to this fact.

A small decline in margin on outsiders has a disproportionate effect on the OPR number. Table 1.3 shows that both before and after the tax changes, margins on horses over 10/1 were large. Outsiders generally attract small amounts of stake money for bookmakers. A change in the odds of a horse from 33/1 to 20/1 in a five-runner race would reduce the OPR by 0.36%, but it would have little effect on bookmakers' overall profitability. Table 1.3 clearly demonstrates that any decline currently occurring in the OPR is being caused by the falling margins on outsiders.

1.3. Analysis of the implications of tax changes on the betting shop environment[18]

Since the abolition of turnover tax, a large number of innovative products have arrived in betting shops. There has been innovation almost everywhere apart from the traditional horseracing product, which is largely unchanged over the last several decades. Win singles, Asian Handicaps and coupons where punters can pick their own players are new to football betting. Numbers betting has seen a growth in roulette, keno and virtual dog- and horseracing.

[16] Racing Post August 29th 2003
[17] See Appendix A5 on the long-shot favourite bias
[18] See Appendix B for more detail on this section

1.3.1. New Numbers games present a threat to Racing turnover and margins

Returning to the sweetshop example, consider the situation where the shopkeeper decided to increase his range of sweets to include orange-flavoured chocolate. Assume that the boiled-sweet council gain zero revenue from the sale of chocolate.

FOBTs and virtual racing represent the betting-shop equivalent of the chocolate being introduced in the sweetshop. If this happened at the same time as the boiled-sweet council removed the tax on sweets, the effect of the tax change is likely to be clouded.

The introduction of chocolate is likely to attract some of the money the children spent on boiled sweets, regardless of the fact that boiled sweets are no longer taxed. The child who purchased the expensive orange-flavoured sweets is more likely to switch than the one who preferred lemon. The reduction in the sales of orange-flavoured sweets is likely to reduce the average spend on boiled sweets dramatically.

So, the average spend per boiled sweet would be reduced for two reasons. More lemon-sweet customers are attracted to lemon sweets by the removal of the boiled-sweet tax; and some of the orange-sweet customers are switching to orange-flavoured chocolate. The fact that the physical number of boiled sweets sold may have increased is little comfort to those in the boiled-sweet industry if the increase does not compensate for the loss in average spend per sweet.

The removal of the boiled-sweet tax will reduce the boiled-sweet council's revenue. Imagine the scenario where the boiled-sweet council hoped to make up this loss in revenue by receiving a share of the profits made on the sale of boiled sweets, only to find their profits were falling because of the introduction of chocolate in sweet shops. This is the exact situation facing the British horseracing industry following the introduction of new products in betting shops.

1.3.2. The effect of new products on Real Horseracing Margins achieved by bookmakers

The margin analysis in the previous section assumes that all punters are of the same level of skill.

This is not the case in reality. For instance, not every punter will back every favourite. The starting-price margin on favourites was around 6%. A more-sophisticated punter may pick out favourites that run well and only lose, for example, only 2% of his turnover. A less-skilled punter will make poor selections on which favourites to back, and may lose 10% on turnover.

The less-sophisticated punter is also more likely to bet on high-margin outsiders, and to place multiple bets, because he is unaware how heavily the odds are stacked against him. These less-sophisticated punters lose a higher percentage of their turnover than sophisticated punters. They are more likely to be attracted to games such as roulette and virtual racing, which are devoid of all skill and allow them to bet more frequently. The virtual racetrack, Portman Park, has 14 race cards as opposed to 6 race cards at a UK track for real racing. A dedicated roulette player could gamble on 100 spins an hour.

Any turnover generated from less-skilled punters produces more gross profits for the bookmakers - and thus more levy revenue for racing - than turnover produced from higher-skilled gamblers. But in the same way as the new orange-flavoured chocolate attracts money from those who buy the expensive orange-boiled sweets, the new games in betting shops are attracting the higher-margin punters in betting shops. And in the same way as the reduction in sales in 40p orange sweets reduces the average revenue per boiled sweet, so too the removal of high-margin punters to new products will reduce the overall margin on horseracing bets. The margin is lower because the remaining racing bettors are more highly skilled and lose their money more slowly.

The real horseracing margin achieved by bookmakers may also be reduced because the removal of betting tax has led to new arrivals in the bookmaking business. In an

effort to build market share, they may offer special concessions that reduce their margin.

1.3.3. The effect of new products on Real Horseracing Turnover achieved by bookmakers

In a closed environment, the theory that punters would recycle 100% of the money they bet through horseracing to lose a fixed amount should have held. The theory of recycling suggests that regardless of the margin achieved on horseracing bets, punters should have increased their stakes to compensate such that the total punter loss remained the same.[19]

In the sweetshop, both children spent their entire £2 pocket money on sweets by increasing the volume they purchase after the removal of tax. The introduction of a new product may mean their spend goes up overall, say to £2.20, but 40p of that is now being spent on what was not previously available, and only £1.80 of it is going on the original offering. The reality of the situation is that punters are losing record amounts in betting shops, but the amount they are losing to horseracing is decreasing.

Before the tax changes, there were limited betting options in betting shops. Horseracing had a near-monopoly on the pound in the punters' pocket. New games, such as roulette, are undoubtedly causing punters to lose an increased amount in betting shops, which explains the bookmakers' record gross win figures. As per the analogy above, new customers are likely to be drawn into the shop because it now sells chocolate. To deny that any of the boiled-sweet shoppers would switch some of their expenditure to chocolate would defy all logical analysis. Yet many influential people in the racing establishment appear to accept bookmakers' claims that no money that would have been lost in horseracing bets has switched to new betting products.

In truth, it is highly likely that turnover is moving from horseracing bets to roulette and other random number games, in particular the high-margin racing bets of unsophisticated punters. This is consistent with the arguments that corporate

[19] For a fuller analysis of price elasticity, see section 2.2 and appendix D

bookmakers made to the government in the 1990s while campaigning for a cut in betting duty to offset the effect of the National Lottery. In the 1995 Budget Speech, the Chancellor, Kenneth Clarke, said:

> "The National Lottery has been an outstanding success. But its success has affected other parts of the gambling industry in Britain. I am satisfied that the industry's concerns are genuine and I propose to cut general betting duty by 1%. The benefits should be spread between the betting industry and horse and greyhound racing."[20]

Any effect that the National Lottery had on horseracing turnover is likely to be magnified many times by the availability of FOBTs and virtual racing. The National Lottery is not available inside betting shops whereas these new products are. They also present punters with far more frequent betting opportunities.

1.3.4. Conclusion

The effect of the movement of turnover to these new games is that 100% recycling on horseracing bets has not occurred.

The new products in betting shops have reduced the overall amount punters lose on horseracing in betting shops in the same way as the introduction of chocolate in a sweetshop is likely to reduce the amount spent on boiled sweets. The fact that more of the original product is being sold than ever before (increased betting turnover on horseracing) is of little comfort to the boiled-sweet industry (the BHB) because the average spend on each sweet (betting margin) is so much lower. A lot of the customers who purchased expensive orange sweets (punters that lose a high percentage of stakes) have switched expenditure to orange-flavoured chocolate (new random number betting products with an underlying attraction specifically targeted at a price-insensitive section of consumers).

[20] 1995 UK Budget Speech

Part 2: Betting Exchanges are NOT the cause of the funding shortfall

Peter Savill, BHB chairman, is convinced that betting exchanges are responsible for the shortfall in Racing's income. Two reasons are cited. The first is that the betting margin achieved is being reduced solely because of betting exchanges; and the second is that if exchange turnover were put through traditional bookmakers it would create more levy for racing. Both arguments are extremely simplistic and naïve.

2.1 Betting Exchanges and Starting-Price Margins

Peter Savill's argument as to why betting exchanges are responsible for the fall in margin achieved by betting shops is as follows:

> "The most significant impact on bookmaker gross profit – assuming that over a long period results even themselves out – is theoretical overround per runner. [….] It is a fact that overrounds per runner have decreased and will continue to decrease for the simple reason that on-course bookmakers can hedge back into exchanges and offer on-course punters longer odds than they would if exchanges did not exist."[21]

The two aspects of this statement are now examined.

2.11 The most significant impact on bookmaker gross profit is theoretical overround per runner

Section 1.2 of this paper explained why overround per runner is NOT 'the most significant impact on bookmaker gross profit.' If OPR is the driver of bookmaker profit why do betting shops achieve a higher margin than telephone bookmakers? Why do telephone bookmakers achieve a higher margin than racecourse bookmakers?

All bookmakers are using the same Starting Prices and operating to the same overround per runner. It has been clearly demonstrated that the betting margins are heavily affected by the distribution of punters' stakes between favourites and non-

[21] Speech by Peter Savill to the IBC Conference 7th October 2003

favourites. This distribution will have changed significantly because of the removal of betting tax on punters. Betting tax protected betting offices from taking too much on favourites. Its effect was to discourage punters from betting on favourites, and that artificially drove up a betting shop's margin.

Betting-shop margins are historically higher than those of telephone bookmakers,[22] who use the same starting prices, because betting-shop punters are less skilled. Unfortunately newly-introduced games which are devoid of all skill, such as roulette, are drawing some high-margin betting-shop punters away from horseracing. This leaves racing with higher-skilled punters, and will, over time, lead to the differential in margins achieved on horseracing by telephone- and betting-shop bookmakers shrinking.

2.1.2. Overrounds will decrease because on-course bookmakers can hedge back into exchanges and offer on-course punters longer odds than they would if exchanges did not exist

The allegations that betting exchanges are being used for arbitrage by on-course bookmakers, and that in consequence the starting price (SP) is being distorted by on-course bookmakers using exchanges, is not backed up by any data.[23]

Table 2.1 shows the margins achieved at SP for our different groups for the last eight years. It has taken data from every single horserace in that period. Eight years of empirical evidence shows that the margin on favourites is broadly unchanged since the advent of the betting exchange model in June 2000.

[22] Speech by Peter Savill to the IBC Conference 7th October 2003 suggested a 14% margin for betting shops and a 7% margin for credit bookmakers.

[23] This is one of many myths that have become established about the impact of exchanges on the behaviour of bookmakers. Another is the allegation that bookmakers would give up their permits to carry on broadly the same business on Betfair, without the need to pay tax or levy. As table D.11 shows in the appendix, neither layers nor backers, as a group, profit on Betfair after commissions. It seems unlikely, not to say foolish, that bookmakers would switch from being profit-making businessmen (a point generally accepted) to loss-making exchange gamblers (a fact). Indeed, why would they move even a part of their business from a pool comprising net winners (bookmakers) to one comprising net losers (punters)?

Table 2.1 Starting Price Bookmaker Margins 1996-2003

	Favs	Non-fav <=10/1	>10/1
1996	5.9%	13.3%	45.5%
1997	6.2%	14.6%	41.7%
1998	6.4%	15.6%	38.8%
1999	4.5%	15.7%	37.1%
2000	5.9%	16.9%	46.5%
2001	6.7%	13.6%	40.6%
2002	5.4%	14.3%	36.5%
2003[24]	5.9%	12.0%	32.8%

Betting on favourites represents 65% of Betfair's horseracing business. It is also the area that determines the profitability of on-course bookmakers.

If direct trading by on-course bookmakers with betting exchanges were distorting the SP of horses, these margins would be expected to shrink. The empirical evidence shown in Table 2.1 does not support this theory. Margins on favourites were at an all time low in 1999. This was at a time when the pitch reforms had just occurred on the racecourses, and pre-dates Betfair. Tom Kelly, BOLA's director-general, said at the time (in 1999):

> "It is a serious situation and is impacting heavily on profitability. The problem is that bookmakers are getting less margin out of the fancied horses. If a favourite should be 15-8, it is starting at 9-4. The major explanation is pitch reform."[25]

The situation now is nothing like the situation in 1999. New on-course bookmakers believed that they could operate at a lower margin on favourites. It is apparent from the data that these bookmakers soon realised that they could not operate to these margins, and reverted to roughly a 6% gross margin on favourites. This margin still applies in the exchange era.

Margins on favourites have reverted back to their long-term average in 2003 after dropping slightly in 2002. This is despite the fact that on-course bookmakers are using betting exchanges more than ever. Pat Middleton (part of the Barry Dennis operation) wrote to the *Racing Post*:

[24] Jan 1st – 4th Nov 2003 data
[25] *Racing Post* 12/07/1999

> "On 2002-03, our laying turnover was £1.16m and our backing turnover £700,000. In the first quarter of 2003-04, our laying turnover was £1.1m and our backing turnover £514,000. The overall result of our use of exchanges is to bring money into the betting ring."[26]

So, in reality, the increased use of betting exchanges by on-course bookmakers is not distorting the starting-price markets. Evidence outlined in Appendix C demonstrates that the ability of off-course bookmakers to lay-off bets and influence the on-course market is unchanged since the introduction of betting exchanges. The bias examined in Appendix C5 shows that an existing distortion – and one that is of benefit to off-course bookmakers - remains in the exchange era. This is in direct contrast to allegations that exchanges are distorting the on-course market away from representing the true probabilities of horses winning. There is a much more logical reason why the theoretical overround per runner figure has declined.

2.1.3. Theoretical margins are falling on outsiders because bookmakers face less risk

Table 2.1 shows that theoretical margins on non-favourites have fallen in the last several years. Section 1.2 demonstrated why this theoretical drop has a disproportionate impact on the overround per runner figure. It is important to note that these are *theoretical* margins that assume that the bookmaker can lay every outsider to lose the same amount.

In reality this does not happen. The theoretical profits on long shots listed above rarely transform into real profit for racecourse bookmakers. They usually manage to lay only fancied outsiders. The theoretical margin is merely a defensive mechanism. Off-course bookmakers are likely to get the full benefit of the margin caused by this anomaly in the racecourse market.

[26] Letter, 11/08/2003

Margins on non-favourites are disproportionately high for bookmakers compared to the Tote.[27] This may have been because British bookmakers focus their books around the favourite; or because they feared offering a large price on horses, in case they rapidly contracted in the market.

It is possible that betting exchanges have helped remove some of this fear, because exchange markets have already been running for many hours before bookmakers price up on course. The bookmakers are therefore less 'on the front line' than they were before. This is one possible explanation as to why starting price margins on outsiders have fallen since the tax changes and the growth of betting exchanges.

This fall in the theoretical margin on outsiders is not necessarily a bad thing. The margin on outsiders is much higher than it is on favourites. The fall in theoretical margin on outsiders means that the differential between favourites and outsiders is smaller. The net effect of this could be to cause a transfer of turnover from favourites to outsiders and thus actually increase the real margin achieved.

2.2 Betting Exchange Turnover Analysis

We now come to the second of the claims put forward by Mr. Savill and the traditional bookmakers: that if exchange turnover were put through traditional bookmakers it would create considerably more levy for racing.

Many claim that racing turnover in betting shops has failed to rise (and horseracing funding likewise as a result) not because punters are betting on different, higher-margin and non-levied, products offered by those shops, but because punters are transferring betting turnover from bookmakers to betting exchanges. The Bookmakers' Committee stated the following in their submission to the Levy Board in 2002:

> "A further effect of diverting money through the betting exchanges is to reduce the amount of revenue which that money would otherwise have

[27] See Appendix C2 for comparison of starting price odds on outsiders compared to the UK Tote pool returns.

> generated for the levy and for racing. This is because the gross profit margin on which the exchanges pay levy is very much lower that that of a commercial bookmaker. If we assume that the exchanges charge, on average, 4% commission and that this is their sole source of income, then their gross profit margin is 4%; this compares with a combined average margin of around 12.5% across the LBO, telephone and internet channels of other bookmakers. If £1.3m in levy is derived from 10% of a 4% margin, it follows that up to an additional £2.76m would have been payable had that money been channelled through the conventional platforms. If the betting exchange gross margin were 3%, up to £4.1m extra would have been payable."[28]

Peter Savill, stated on *Attheraces* - in a claim he has repeated since - that racing would be £20 million a year better off if all the money bet through betting exchanges were instead channelled through traditional bookmakers.[29] However, analysis shows that it is highly unlikely that much of the money turned over on betting exchanges would be bet with traditional bookmakers.

David Harding, Chief Executive of William Hill, agrees with this second view. He countered Peter Savill when he said:

> 'We have consistently said that we're not particularly worried about losing mainstream custom to the exchanges – this is not a product for the average punter'[30]

Peter Savill's analysis is chronically flawed for two main reasons. It fails to take into account the fact that a lower-margin model is balanced by a higher turnover (a fact conceded in the original analysis, which stated that a reduced tax take-out would lead to people betting more); and it fails to recognise how much of the betting turnover on an exchange is money which is new to the betting industry, rather than money which has moved from one spending source to another. The betting exchange allows sophisticated punters to increase their turnover while reducing their risk.

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[28] Judgment in *R (on the application of Sporting Options) v Horseracing Betting Levy Board, EWHC 1943 (Admin), [2003] All ER (D) 560 (Jul),* 31 July 2003, para 25.
[29] June 26th 2003
[30] Speech at the GBGC Industry Seminar February 2003

A third fundamental error committed by the critics of betting exchanges is to fail to recognise that turnover recorded by Betfair (which is merely twice the backer's stake in any matched bet) bears no relation whatsoever to turnover recorded by traditional bookmakers (which is the backer's stake in any bet received).

Before examining these arguments in greater detail, it is worth noting in passing the weakness of the further allegation that racing's funding is under threat because bookmakers will give up their permits to lay books tax- and levy-free on an exchange. Appendix D4.2 analyses data from 433 races between August and September 2003, which demonstrates the efficiency of the Betfair market. Neither backers nor layers have an advantage – when such an advantage is crucial to running a business. It shows that both, as a group, lost money after commission was taken into account. This reflects the status of both as gamblers.

2.2.1 Elasticity of demand

It is fundamental to consider how demand responds to price. Because betting, like any other product, is price sensitive, the more a customer is charged, the less of the product he is likely to buy – or in the case of wagering, the less he will be prepared to lose.

Less sophisticated punters – for example those who bet on the lottery – are likely to be relatively insensitive to effective price changes, as is proved by their willingness to bet for a very poor rate of return. As you increase the level of punter sophistication, the more conscious your audience becomes of whether its rate of return makes it worth placing a bet. An increase in the cost of betting makes a fundamental difference to a sophisticated player, since – unlike his less-sophisticated counterpart - he recognises that an increase in cost is the same as the odds moving against him.

This report has assumed that punters limit themselves to an overall spend regardless of the cost of betting. The reality is that there exists what economists call an elasticity of demand,[31] which grows in proportion to the sophistication of the gambler. The least

[31] For further discussion of this topic, see Appendix D2.4

sophisticated show little response to a change in price, and demonstrate what is termed as a 'price elasticity of demand' close to zero.

The overwhelming balance of academic opinion concludes that the price elasticity of demand for gambling is high, and rising. For the general population, it is at least 'unit' at the margin. That is, as the price falls, betting activity will increase such that the total take will at the very least remain the same.[32]

However, just as the overall sports bettor is more sophisticated than the lottery punter, so is the *exchange* bettor likely to be more sophisticated than his average sports-betting counterpart, by virtue of the platform he uses to bet. His level of elasticity is therefore likely to be at least as great, and probably greater, than the average. He is therefore more responsive to a cut in the take-out of the operator.

This has a two-fold effect. The sophisticated consumer who is seeking a better-priced product will be prepared to spend (i.e. lose) at least as much, and probably more, on it. Equally, the operator can set his overall take-out at a lower level and still maintain the efficiency of his business, than can an operator targeting a less-sophisticated audience with a spend that does not increase as the price falls.

Given that one of the key attractions of betting exchanges is their superior pay-out rate, there is little doubt that the price sensitivity amongst betting exchange punters is on average significantly higher than amongst the general population. It can therefore safely be concluded that the typical exchange user would considerably reduce their overall gambling spend if betting exchanges were not available.

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[32] See for example the following analyses:

- "The Impact of Taxation on the Demand for Gambling" by Paton, Siegel and Vaughan Williams (November 2002) concluded that "…the overall demand for gambling is extremely price elastic. The short run elasticity estimates are -1.058 and -1.139, while the long run estimates are -1.718 and 2.071,…" and "A key result is that the demand for betting appears to be highly sensitive to changes in tax rates. Not surprisingly, the reduction in the rate of betting tax in October 2001 induced a large increase in the demand for betting.
- "A Time Series Analysis of the Demand for Gambling in the United Kingdom" by Paton, Siegel and Vaughan Williams (2001) ran two tests resulting in estimates for gambling elasticity of demand of -1.19 and -2.50;
- "Elasticity of Demand for Gambling" by Suits (1979) concluded that the elasticity of demand for gambling was between -1.36 and -1.82;
- "An Inquiry into the Economics of Race-Track Gambling" by Green (1976) estimated the elasticity of demand for gambling at -1.57.

2.2.2 Incremental activity

It is clear that betting exchanges have revolutionised certain aspects of the betting experience: a live exchange market offers the opportunity to bet on prices which change in real-time to reflect market expectations, as well as on prices which do not include over-rounds which a sophisticated punter recognises stack the odds against him. It also provides the opportunity to bet on an outcome to happen or not to happen, or to "trade" price fluctuations.

When those advantages are combined with the ability to bet in-play - again, in a live market with prices changing in real-time – and the opportunity to request better odds , the exchange model enhances the experience of the established punter to a significant degree.

Much of the betting activity on betting exchanges is as a result purely incremental: it simply would not have occurred in the absence of betting exchanges. The interest generated by the above innovations does not simply convert into an equivalent spend with a traditional bookmaker. Betting is fundamentally another form of entertainment and consumers will pay more for new and better entertainment.

It should also be noted that betting exchanges are considerably broadening the punter population contributing to UK horseracing and the Treasury: nearly 25% of all betting turnover on Betfair is now derived from non-UK users. That proportion is increasing constantly over time.

In addition, many relatively successful punters who would soon have their accounts closed or limited by traditional bookmakers – or who otherwise would take money from their gross profits (and therefore the racing industry) - are able to participate freely on Betfair. Not only do they generate considerable liquidity, and eventually recycle their winnings through the system and into the pockets of revenue-collecting authorities, but they generate funding as winning punters.

2.2.3 Understanding what "turnover" means for a betting exchange

Many of the activities described above lead to an enormous inflation of turnover figures recorded which bear no relation to the amount actually risked by the individual punters.

Betfair has been matching well over £50m in bets each week since August 2002. But in many events the majority of turnover recorded is actually the product of factors such as intense trading activity (in which huge turnover is generated for very little risk taken), or people backing an outcome in-play as it shortens from well-fancied favourite to absolute dead-cert. It is absurd to suggest that this volume generates a 4% margin for Betfair as suggested in the Bookmakers' Committee submission quoted above, or that it would convert into £50m at a 12.5% margin for traditional bookmakers.

As a result, any comparison of tax or levy contribution based on equating turnover is fundamentally flawed.

2.2.4 Empirical Evidence[33]

Table 2.2 shows analysis of a sample race that attracted 6036 bets from 3154 individual Betfair accounts. 1802 individuals just placed back bets on the race, with 74% of those backing just one horse. 799 people just laid bets, of whom 78% laid just one horse.

Table 2.2 Salisbury 4:15 4th September 2003 - summary data

	No. Accounts	Matched	% Accounts	% Matched
Back Only	1802	£191,636	57.1%	28.3%
Lay Only	799	£164,293	25.3%	24.3%
Both (Traders)	553	£320,075	17.5%	47.3%
Total	3154	£676,004		

17.5% of the total number of bettors on the race matched 47% of the bets, by having both back and lay bets. 51% of those did so on one horse alone. These punters are

[33] Detailed calculations and discussion can be found in Appendix D

betting essentially on price movements, and taking advantage of Betfair's commission structure, which charges only on winnings. This ability to trade is attractive to sophisticated gamblers, and constitutes a phenomenon which is entirely new to the world of horseracing. It is therefore, by definition, incremental turnover that is providing a new source of funds for racing.

In addition more than 9% of the total matched sum is matched in-running. This, too, is entirely new turnover from sophisticated horserace punters, which is generating money for horseracing.

The majority of turnover generated by traders, layers, and in-running bets would simply not occur with traditional bookmakers. These bets represent over 70% of the total bets matched on Betfair.

The remaining 30% might be matched through traditional bookmakers, but because it is cheaper to bet on Betfair, the backers' money can be expected to be recycled more times to lose at least the same amount. Analysis shows that in the Salisbury race, Betfair could have been expected to turn over about five times the number of backing bets that bookmakers do.[34] *This means that the Betfair turnover figure on this race represents a figure that is more than 16 times greater than a traditional bookmaker's turnover on win single bets.*

It is likely that any substitution that might limit the recycling effect - say, between horseracing and other sports - will be reciprocal on Betfair. This is because punters pay the same commission rate for all bets, and casino-style games are not on offer.

[34] See Appendix D3.1

Conclusions

It is clear that the assumptions under which the current "10% of gross profits" data agreement was made are fundamentally flawed. They are flawed because betting shop punters do not appear to be recycling 100% of the money they used to gamble on horses through horseracing products.

The original assumption that margins in betting shops would remain stable at 15.5% has been found to be incorrect. Betting margins are falling mainly because of the increased attractiveness of short-priced horses and single bets, and the loss of low-skilled punters to numbers betting.

The fall in margins themselves would not necessarily result in a failure of racing's income target to be achieved. Leading players in the betting industry expected betting turnover to rise by about 50% when margins were anticipated to fall from 22.2% to 15.5%, as punters would recycle their money. Now that margins have fallen further than expected, recycling is rarely mentioned. It has been easier, instead, to lay the blame for funding difficulties at the feet of the exchanges.

The facts, though, suggest another story. An exchange is more than likely actually to increase the amount of profit that can be made from the underlying product – in this case, the horseracing industry. The radical enhancements to the betting experience that exchanges provide – enhancements which are drawing in significantly more activity from the UK and abroad – represent an opportunity rather than a threat. It is strongly arguable, given the sophistication of the average betting exchange customer, that a punter who moves his betting activity from a traditional betting service to an exchange is likely to generate at least the same profits to racing via his new platform as he did with his original bookmaker. The explanation for the funding shortfall is found elsewhere.

The theory of recycling has worked. Overall betting-shop margins across all products are much reduced, but profits are at record highs. The corporate bookmakers have succeeded in creating a low-margin high-turnover business. The low-margin game of

roulette is a great success story for high-street bookmakers. However, recycling has failed racing: racing turnover has switched into the multitude of new betting products being offered by bookmakers, for the same reasons that a proportion of it switched to the National Lottery in the 1990s. The bookmakers' goal is to maximise profit over their entire business. They may not think that trying to maximise profit through horseracing bets will help achieve this goal.

Since the start of the National Lottery and the end of turnover tax, in particular, a large number of innovative products have arrived in betting shops. There has been innovation almost everywhere apart from the traditional horseracing product, which is largely unchanged over the last several decades. Win singles, Asian Handicaps and coupons where punters can pick their own players are new to football betting. Numbers betting has seen a growth in roulette, keno and virtual dog- and horseracing.

Punters, a proportion of whose gross loss goes to the underlying product via the bookmakers, make a significant contribution towards funding the racing industry. The challenge for the racing industry is to maintain its market share of that gross loss in a competitive world.

Appendix A:
Margin Calculations

A1. Cost of win single bets to the punter

A1.1 Theoretical calculation

The cost of betting to the punter is defined as the percentage of stakes that the punter expects to lose every bet he places.

Imagine gambling on the outcome of a European roulette wheel. There are 37 possible outcomes. 18 are red, 18 are black and one is green. The punter betting on red is given odds of even money. The chance of a fair roulette wheel landing on red is 18/37. The expected loss of the punter betting is:

(Probability of winning * amount would win) + (Probability of losing * amount would lose)

If the punter placed £1 on red to win, his expected return would therefore be:

$$\left(\frac{18}{37} * £1\right) + \left(\left[1 - \frac{18}{37}\right] * £1\right)$$

$$= - £0.027$$

So the punter can expect to lose 2.7p for every £1 he bets on a colour on a European roulette wheel.

A1.2 Empirical calculation

Unlike roulette, where the probabilities of winning or losing are known, sports and horseracing represent one-off events of unknown probabilities. The only way to calculate the cost of betting to the punter is therefore to use historical data. The calculation is:

1 - [(Sum of winnings + Sum of stakes on win bets) / Sum of stakes]

A1.21 Empirical calculation for roulette

Imagine the croupier spins the roulette wheel 37 times. The ball lands on red exactly 18 times. For the punter placing a £1 bet on red for each of the 37 spins, the *actual* return for each £1 bet would be:

1- [(£18 + £18) / £37]

= - £0.027

A1.22 Empirical calculation for sports and horserace betting

The same formula is used. Data can be filtered in any group required, and the expected loss to the punter can be calculated for that particular group. For this study, all calculations are done to win one unit, rather than using a level one-unit stake. This is because biases exist in sports and racing data that do not exist in roulette data. For instance, favourites tend to be cheaper to bet on than outsiders.

The data was split into three groups:

- Favourites
- Non-favourites of odds of less than or equal to 10/1
- Non-favourites of odds of greater than 10/1

These groups were used because the favourite is the key horse determining bookmaker profitability (and therefore punter loss) in the race. Betfair data shows that over 65% of money is bet on the favourite. Odds over 10/1 were grouped to show outsiders in the race, and how the theoretical margin on these horses is exceptionally large. The remaining group shows horses that are neither favourites nor big outsiders.

A2. Cost of multiple (accumulator) bets to the punter

Multiple bets are bets on the outcome of more than one event. If the punter's bet wins on the first event, the winnings and the original stake are then put onto the next event.

A2.1 Example of roulette multiple bet

Imagine a punter puts all his money (£1) on red. If the ball lands on red, he then puts all his money on red again. The chance of the punter winning is:

Chance of ball landing on red * Chance of ball landing on red

$$= \frac{18}{37} * \frac{18}{37}$$

$$= \frac{324}{1369}$$

The potential winnings for the punter are:

[(Stake * Payout of ball landing on red) * Payout of ball landing on red] - Stake

= [£1 * (2.0) * (2.0)] - £1

= £3

Using the expected-return calculation (above, A1.1), the expected return for an accumulator bet for the ball to land on red twice in a row would be:

$$= \left(\frac{324}{1369} * £3\right) + \left(\frac{1045}{1369} * -£1\right)$$

= -£0.053

This means that the punter can expect to lose 5.3p for every £1 he bets on two colours in a row on a European roulette wheel.

From these calculations, it is clear that the operator of the roulette wheel will earn a higher percentage of the turnover which is generated by a punter who places multiple bets, than he will from someone who places single bets.

A2.2 Example of a multiple bet on horseracing

The same effect can be seen in horserace betting.

Assume that a punter puts a £1 multiple bet on five 5/1 shots, all to win. In order for the bookmaker to make a profit, assume that the chance of each 5/1 shot winning is actually 15% rather than the 16.6% implied by the price. The chance of all five events winning is:

$$0.15 * 0.15 * 0.15 * 0.15 * 0.15$$

$$= (0.15)^5$$

The potential payout of the bet is:

$$[£1 * (5 + 1) * (5 + 1) * (5 + 1) * (5 + 1) * (5 + 1)] - £1$$

$$= £7775$$

Again using the expected return calculation (above, A1.1) the expected return for an accumulator bet is:

$$[(0.15)^5 * £7775] + [(1-(0.15)^5 * - £1]$$

$$= -£0.41$$

This means that for every £1 that a punter places on this example multiple bet he can expect to lose 41p. A gross margin of 40% is assumed for multiple bets on the calculations used in this document.

A3. Cost of General Betting Duty to the punter

In October 2001, the government changed the tax regime on gambling from a turnover-based general betting duty (the turnover-tax is referred to for simplicity as "GBD" throughout this document) to Gross Profit Tax (GPT). Under GBD, punters were charged 9% of their turnover in 'tax'. This tax was made up of:

- 6.75% government betting tax
- 1.25%-1.4% horseracing levy
- 0.8%-1% bookmaker administration charge

Under GPT and the new racing levy scheme, bookmakers pay 15% of their gross profits (turnover - payouts to punters) in betting tax, and 10% of their gross profits on British horseracing in racing levy. The bookmakers pay these costs, and thus there is now no deduction for punters. This change means that the cost of betting to punters has fallen.

If we assume that the bookmakers' margins on bets is constant at 15.5%, then the effect of the removal the 9% GBD on punter cost on turnover will be as follows:

$$\text{Cost including GBD} = \frac{\text{(Bookmaker profit margin + 'tax' rate)}}{(1 + \text{tax rate})}$$

$$= \frac{(15.5\% + 9\%)}{(1 + 9\%)}$$

$$= 22.5\%$$

Returning to the roulette example, instead of betting £1 on the ball landing on red, the punter paying betting tax actually bets £1.09.

(Probability of winning * amount would win) + (Probability of losing * amount would lose)

$$= \left(\frac{18}{37} * £0.91\right) + \left(\left[1 - \frac{18}{37}\right] * -£1.09\right)$$

$$= -£0.117$$

This shows that the imposition of the 9% turnover tax increases the cost to the punter of colour-betting on roulette from 2.7% on turnover to 10.7% (£0.117/£1.09) on turnover. That is, if GBD still existed, it would be almost four times as expensive to colour-bet on roulette than it is at the moment. Or, to put it another way, under the new regime it is four times cheaper.

The above calculation is proved by using the new formula:

$$\text{Cost including GBD} = \frac{\text{(Bookmaker profit margin + 'tax' rate)}}{\text{(1 + tax rate)}}$$

$$= \frac{(2.7\% + 9\%)}{(1 + 9\%)}$$

$$= 10.7\%$$

A4. Cost of duty varies for different expected loss levels

The cost of GBD on the punter varies for different expected-loss levels. The lower the expected loss, the greater the relative cost.

The percentage of total punter loss attributable to GBD is calculated as follows:

$$\frac{\text{Cost } \textit{in}\text{cluding GBD} - \text{Cost } \textit{ex}\text{cluding GBD}}{\text{Cost } \textit{in}\text{cluding GBD}}$$

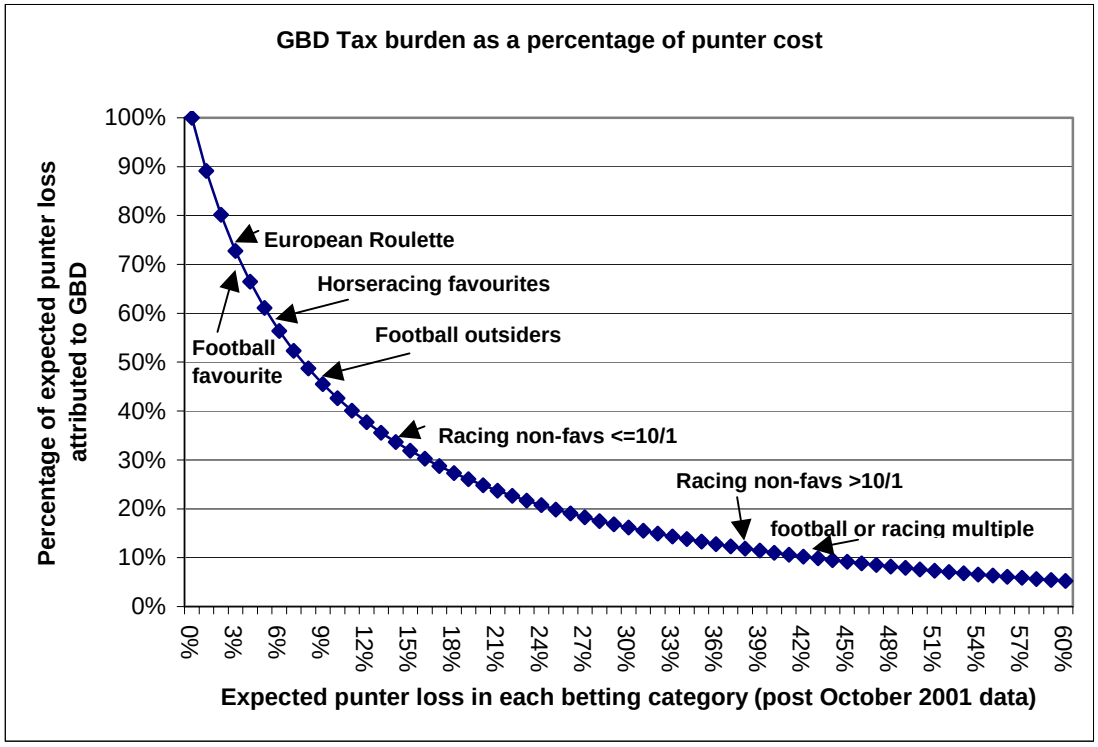
For the roulette example, the calculation is as follows:

$$\frac{10.7\% - 2.7\%}{10.7\%}$$

$$= 75\%$$

This means that had roulette machines existed when General Betting Duty was in place, 75% of the amount punters lost while using them would be paid in tax.

Chart A.1 (below) shows the percentage of total expected loss attributed to GBD for different margins:



(Chart A.1)

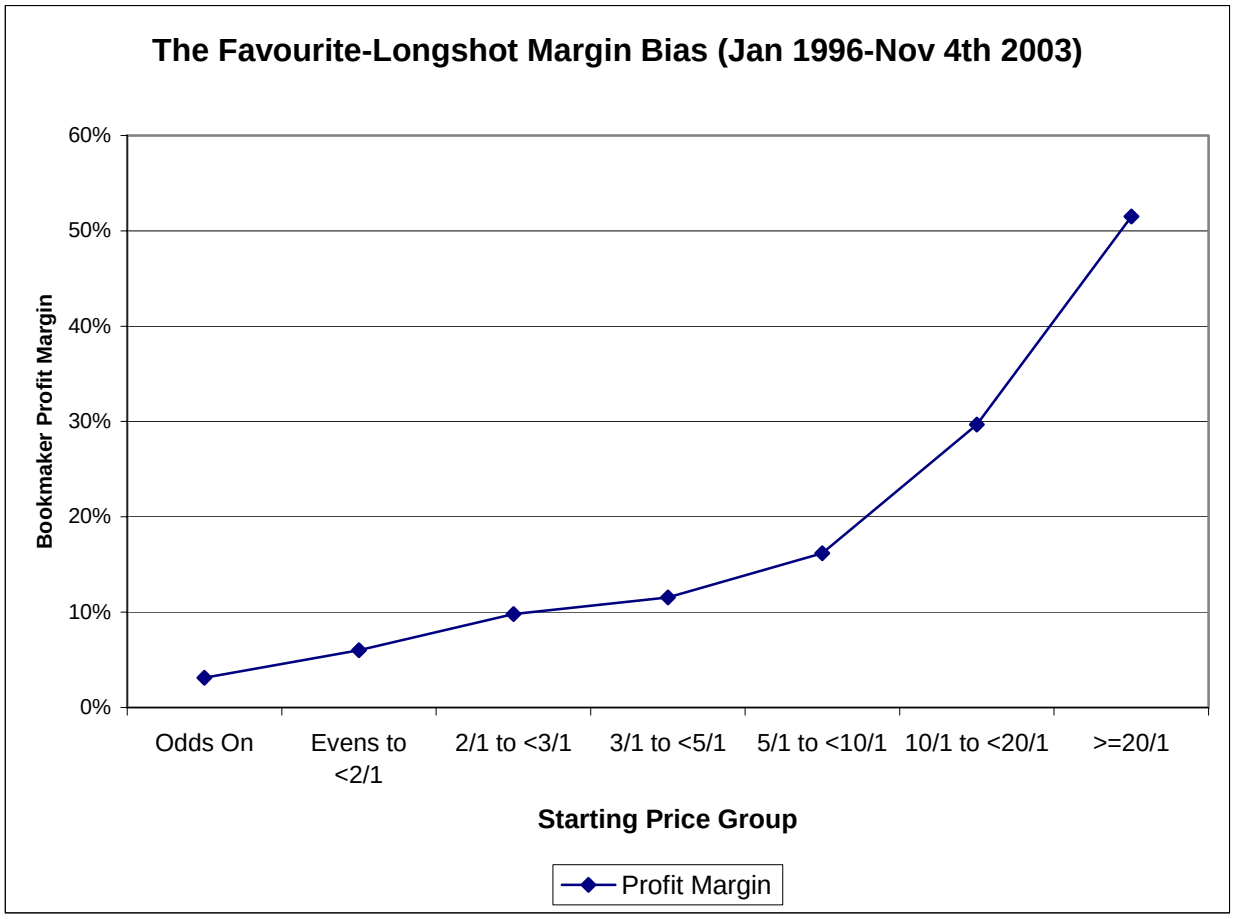
Every betting product can be placed on the curve in Chart A.1. The punter expected loss, excluding the 9% turnover charge, for any betting product can be matched on the X-axis. The corresponding point for the curve can then be read off on the Y-axis. This shows the percentage of total punter loss that would be attributed to the 9% turnover tax when it was in place. For the Roulette example marked on the graph the figure is 75%.

A5. The Favourite-Longshot Margin Bias

There are two major biases in British horserace betting markets. The first is that bookmakers take a disproportionate amount of stake money from punters on favourites relative to outsiders. This is the reason why bookmakers usually lose on a

race when the favourite wins. This study takes account of this bias by using Betfair distributions in the calculations. Appendix A8 shows how these calculations were done.

The second (and standard) favourite-longshot bias is that starting-price bookmakers achieve a far lower profit margin on favourites than they do on outsiders. That is, the expected return on bets at lower odds exceeds that on bets at larger odds.[35] Chart A.2 (below) shows that as the odds of a horse increase, the betting margin also increases.



(**Chart A.2)**

A bookmaker laying every odds-on horse for the last eight years to pay out £1 would have made a gross profit of 3% on turnover. If the same bookmaker had laid every horse over 20/1 he would have achieved a gross margin in excess of 50% on turnover. Analysis in this report splits the data into favourites, non-favourites less or equal to 10/1, and horses over 10/1 in order to remove this bias from calculations.

[35] See, for example, Economic Journal: Shin, 1991, 1992, 1993; Vaughan Williams and Paton, 1997

The assessments in the OCP report and by Peter Savill ignore the implications of these vital biases on betting margins following the tax change and introduction of new products in betting shops.

A6. The Impact of tax change within horseracing betting

The reality is that there is no *one* price for betting on racehorses. *The assumption that the removal of the 9% would reduce the cost to punters from 22.5% to 15.5% is simplistic.*

This is because horses that are shorter odds are *cheaper* for punters to bet on. The long-shot-favourite bias means that punters have to pay more for the excitement of getting a big payout.

A6.1 The effect of the tax on different odds groups

Sections A3 and A4 explain how the turnover tax affects different-margin bets differently.

The lower the margin the bookmaker is operating to, the bigger the positive impact of the removal betting tax will have on the punter. If we consider the pre-tax-change horseracing data, the impact of General Betting Duty has the following effect on total punter loss:

Table A.1 – Effect of General Betting Duty on total punter loss

	Tax Free Jan 1996 – Oct 2001	Expected Loss Including Tax	Percentage Reduction
Favourites	5.9%	13.7%	56.9%
<=10/1 Non-Favourites	15.0%	22.0%	31.8%
>10/1 Non-Favourites	42.0%	46.7%	10.1%

The cost of backing favourites without the turnover tax is 5.9% on turnover, as opposed to 13.7% when turnover tax *is* applied. Betting tax used to represent over half the favourite-backer's total loss. But the same change in tax has had very little effect on the cost of betting on horses over 10/1; there, it has reduced the cost to the punter by only 10.1%.

To clarify, Table A.1 shows clearly that the impact of the change in tax has *more than halved* the cost to punters of betting on favourites. The same tax change has had very little effect on the cost of betting on horses over 10/1, reducing the cost to the punter by only 10.1%. On the longer-priced horses, the punter can still expect to lose a very large proportion of his stake.

A6.2 The increase in turnover required to maintain punter loss in each group

The OCP assumptions suggest that if the bookmaker margin is 15.5%, turnover has to increase 45% in order to maintain the level of punter loss. To assess this in more detail, it is necessary to know the distribution of stakes for the bookmaker. In the absence of access to bookmaker data the proportion of bets in each group has been split as follows:

Table A.2 – Estimation of distribution of horseracing bets

Bet Type	Spilt of turnover
Favourites	54.20%
<=10/1 Non-Favourites	24.37%
>10/1 Non-Favourites	2.93%
Multiple Bets	18.50%

The distribution estimates in Table A.2 were formed from data taken from Betfair thirty seconds before the off for 119 sample races. The amount of turnover attributed to multiple bets was added to boost the overall gross margin to 15.5%. The full calculations used to form these estimates are described in Appendix A7.

Table A.3 (below) shows the breakdown of turnover and profits that would have occurred under General Betting Duty using these distribution estimates. A base figure of 1000 units has been used to represent total betting turnover on horseracing.

Table A.3 - Turnover and profits that would have occurred under GBD

Bet Type	Split of 1000 units under GBD	Gross Margin Inc Tax	Gross Profit Inc Tax
Favourites	542	13.7%	74
<=10/1 Non-Favourites	244	22.0%	54
>10/1 Non-Favourites	29	46.7%	14
Multiple Bets	185	45.0%	83
Total	1000	22.50%	225

Table A.4 (below) shows the amount that turnover on horseracing would have had to increase *if each group is looked at as a separate entity* in order to maintain the same punter loss. The gross profit (including tax) figure is kept the same for each of the groups. The new gross margins used do not contain the 9% turnover tax.

Table A.4 - Turnover and profits required to maintain punter loss post-GBD

Bet Type	Turnover required under GPT	Gross Margin	Gross Profit
Favourites	1250	5.9%	74
<=10/1 Non-Favourites	359	15.0%	54
>10/1 Non-Favourites	33	41.9%	14
Multiple Bets	207	40.00%	83
Total	1849	12.2%	225

The changes in turnover required to maintain the same level of punter loss under the two tax systems is shown in Table A.5 (below).

Table A.5 - Changes in turnover required to maintain the same punter loss

Bet Type	Split of 1000 units under GBD	Turnover required under GPT	Percentage Increase
Favourites	542	1250	131%
<=10/1 Non-Favourites	244	359	47%
>10/1 Non-Favourites	29	33	14%
Multiple Bets	185	207	12%
Total	1000	1849	85%

Table A.5 shows the impact of differently-priced horses being affected differently by the tax change. It is not true to say that in order to get the same total revenue for punters, turnover has to increase more than 45%, because clearly, the turnover-

increase required for favourites is considerably greater than 45%. Equally, the turnover-increase required on multiple bets is significantly less than 45%.

The overall impact is that to maintain the same total punter loss, turnover would have to increase by 85%. The combined gross margin would fall from 22.5% (15.5% without GDB) to 12.2%.

A6.3 How much further does the margin fall when post-tax margins are applied?

The calculations in section A6.2 assume that the gross margins for each group are stable at the pre-November 2001 levels. Table A.6 (below) applies the November-2001-to-November-4th-2003 margins.

Table A.6 – Turnover/profits required to maintain punter loss post Nov 01 Data

Bet Type	Turnover required under GPT	Gross Margin	Gross Profit
Favourites	1298	5.7%	74
<=10/1 Non-Favourites	406	13.3%	54
>10/1 Non-Favourites	40	35.4%	14
Multiple Bets	207	40.00%	83
Total	1951	11.5%	225

The margin reduction for each group since the tax changes has reduced the expected margin from horseracing slightly more to 11.5%. So, the overall effect of both the reduced margins in each group and the increased attractiveness of short-priced horses, has moved the overall gross margin from 15.5% to 11.5%.

A6.4 Will punter habits change under the new tax system?

Table A.6 (above) shows that if punters are willing to lose the same amount of money in each of the four sectors then turnover would have to rise 95% on average across the board, assuming that punters' betting habits stay unaltered by the impact of a change in tax basis. In reality, though, the differences in the expected loss of each of the bet types may actually cause punters to change their betting habits, which could further increase the effect. The established fact that tax changes make it cheaper for punters to bet on favourites means that they may bet on them even more.

That is, the discount in the 'price' of betting has fallen far more for favourites than it has for multiple bets. Noticing this, punters may switch even more money to betting on favourites and be willing to lose less on outsiders. This is basic instinct. If one washing powder halved in price, and another one fell in price by 10%, supermarkets would expect a large volume of shoppers to switch to the powder that had halved in price. The fact that the other one fell by 10% adds little to its relative appeal.

A7. Telephone- and Internet-Betting margins

This paper has focused on the margins achieved in betting shops on horseracing. This is because the majority of money bet on horseracing is bet in betting shops. To put telephone betting in perspective, it should be noted that Ladbrokes made a gross win of £275m in betting shops in the first six months of 2003 compared to only £13.3m for their telephone operation.[36]

The margins of telephone bookmakers and internet bookmakers are considerably lower than those of betting shops. This is because these punters are more sophisticated. They tend to shop around more between firms for the best prices and place fewer multiple bets.

Reliable figures on telephone-betting margins for racing are not available. The picture is further clouded by the fact that the major bookmakers moved off-shore and offered 'tax-free' betting before the tax changes occurred in the UK.

A8. Notes to distribution approximations

Without access to bookmaker data, it is unclear exactly what percentage of bets are taken on each group of odds. Betfair provides transparent access to how much is bet on each horse in the field. Table A.7 (below) shows the total matched on a group of horses to win taken from 119 races from 6th to 9th August 2003. The amount matched

[36] Hilton Group (Ladbroke's parent company) Interim Results, 28th August 2003

was taken 30 seconds before the off for each race. Starting-price odds were used to split the data into favourites, non-favourites less than or equal to 10/1, and non-favourites over 10/1. This is the same way as starting-price odds were used to split all the data in the study.

Table A.7 – Betfair distribution

	Total Matched	Percentage
Favourites	£20,379,608	66.47%
<=10/1 Non-Favourites	£9,179,483	29.94%
>10/1 Non-Favourites	£1,102,152	3.59%

A8.1 Win Singles Margin Calculations

To calculate the win-single margins, £100 is split proportionally between the starting-price groups (favourites, non-favourites <=10/1, and non-favourites >10/1). The expected punter-loss is then calculated for each of the groups by multiplying the amount of money bet in each group by the expected margin of each group:

Table A.8 - Margins on Horseracing

	Jan 1996 - Oct 2001
Favourites	5.92%
<=10/1 Non-Favourites	15.04%
>10/1 Non-Favourites	41.95%

Expected loss for SP group = £100 * Betfair percentage in this group * expected punter loss this group

Favourites = £100 * 66.5% * 5.92%
= £3.94

<=10/1 Non-Favourites = £100 * 29.9% * 15.04%
=£4.50

>10/1 Non-Favourites = £100 * 3.59% * 41.95%
=£1.51

TOTAL expected loss = £3.94 + £4.50 + £1.51

= £9.95

The total expected loss on £100 of bets is £9.95. The win margin of an SP bookmaker can therefore be expected to be 9.95%.

A8.2 Margins for Licensed Betting Offices

Currently, the majority of bets are placed through Licensed Betting Offices (LBOs). If the win single margin is 9.95%, multiple bets are needed to boost the overall margin to 15.5%. 15.5% is the figure used by the Organisation Consulting Group for their report titled 'Determining the 41st Levy Scheme'. The percentage of bets that need to be multiple bets is calculated as follows:

PS = Percentage of bets which are single bets
MS = Margin on single bets
PM = Percentage of bets which are multiple bets
MM = Margin on multiple bets
FM = Final margin

$$FM = (PS * MS) + (PM * MM)$$

$$FM = ([1-PM] * MS) + (PM * MM)$$

$$PM = \frac{FM - MS}{MM - MS}$$

$$PM = \frac{15.5\% - 9.95\%}{40\% - 9.95\%}$$

$$PM = 18.5\%$$

So the estimate is that 18.5% of bets in LBOs are multiple bets. This leaves 81.5% of bets left for win singles. Therefore, the following estimates apply for the turnover distribution of bets in LBOs:

Favourites = 66.5% * 81.5%
= 54.20%

<=10/1 Non-Favourites = 29.9% * 81.5%

= 24.37%

>10/1 Non-Favourites = 3.59% * 81.5%
= 2.93%

Multiple bets = 18.5%

A9. The over-round per runner (OPR)

The OPR has been falling in recent years, and is being blamed by the corporate bookmakers as the reason for the shortfall in racing's finances. Ladbrokes' Chief Executive Chris Bell was quoted in the *Racing Post* as saying:

> "……against the average margin of two percent per runner in the days before betting exchanges took hold, the figure this year had generally fluctuated between 1.7 and 1.8 per cent, and fell to an all-time low of 1.67 per cent over one week in July." [37]

The OPR is a guide to the likely loss a punter faces, but is flawed as a meaningful statistic because it is based on the assumptions that bookmakers lay every runner in the field to lose a fixed amount, and operate to the same margin on favourites as they do on outsiders.

In reality, bookmakers are over-weighted on favourites and under-weighted on outsiders. *The margins that bookmakers achieve on favourites are lower than they get for outsiders.* The terrible results given by bookmakers for the 2003 Cheltenham festival when a high proportion of favourites won are testament to this fact.

Consider the odds presented for the race in Table A.9 (below):

[37] Racing Post, August 29th 2003

Table A.9 – Example of two sets of odds for same race

Horse	Odds 1	Odds 2
Horse 1	13/8	15/8
Horse 2	100/30	3/1
Horse 3	5/1	9/2
Horse 4	6/1	11/2
Horse 5	7/1	13/2
Horse 6	16/1	14/1
Horse 7	33/1	20/1
Horse 8	33/1	20/1
Overround	*116.4%*	*122.9%*

Table A.9 shows two different sets of odds for the same race. In the first case (Odds 1) the OPR is 2%, whereas in the second case (Odds 2) the OPR is 2.9%. On the surface this implies that Odds 2 provides a more profitable margin on the race for bookmakers than Odds 1.

A9.1 Adding Probabilities and Distributions

In order to demonstrate our example, assume that the each horse in the race has the following chance of winning:

Table A.10 – Win Probabilities

Horse	Chance of winning
Horse 1	34.0%
Horse 2	20.0%
Horse 3	15.0%
Horse 4	13.0%
Horse 5	10.5%
Horse 6	4.5%
Horse 7	1.5%
Horse 8	1.5%

The gross margin for each horse can be calculated using the following formula (See A1.1 for explanation):

(Probability of winning * amount would win) + (Probability of losing * amount would lose)

Consider Horse 1 in the Odds 1 example. It has a 34% chance of winning the race. The odds are 13/8. If the horse wins, the punter who stakes 1 unit on the horse wins 1.625 units. The expected cost to the punter is therefore calculated as follows:

(0.34 * 1.625) + (0.66 * -1)
= -10.75%

This means that the punter can expect to lose 10.75% of the money he stakes on Horse 1 under the Odds 1 scenario. Therefore the bookmaker can expect to achieve a gross win of 10.75%. The gross margin calculated for every section of Table A.9 is shown in Table A.11 below.

Table A.11 – Bookmaker Gross Margins

Horse	Odds 1	**Odds 2**
Horse 1	10.8%	2.3%
Horse 2	13.3%	20.0%
Horse 3	10.0%	17.5%
Horse 4	9.0%	15.5%
Horse 5	16.0%	21.3%
Horse 6	23.5%	32.5%
Horse 7	49.0%	68.5%
Horse 8	49.0%	68.5%

To calculate the expected margin a bookmaker achieves on a race, it is also necessary to know how the money the bookmaker takes in stakes is distributed. Betfair data for 433 races in August and September 2003 was used to estimate the distributions. The estimates are as follows:

Table A.12 – Estimated Turnover Per Runner[38]

Horse	**Split of 1000 units**
Horse 1	650
Horse 2	125
Horse 3	90
Horse 4	60
Horse 5	45
Horse 6	20
Horse 7	5
Horse 8	5

[38] Figures estimated from Betfair sample data

The profit margin on each horse is calculated by multiplying the number of units bet on each horse by the profit margin on each horse. So for Horse 1 in the Odds1 scenario the expected win for the bookmaker is 650 units multiplied by 10.75%. This results in a 70 unit profit. The expected profit for the race is calculated by summing the expected win for each horse. Table A.13 (below) shows the expected bookmaker-profit for Odds1 and Odds2:

Table A.13 – Estimated Gross Margins

Horse	Odds 1	Odds 2
Horse 1	70	15
Horse 2	17	25
Horse 3	9	16
Horse 4	5	9
Horse 5	7	10
Horse 6	5	7
Horse 7	2	3
Horse 8	2	3
Total	**118**	**88**

Table A.13 (above) shows that a bookmaker using Odds1 could expect to achieve a profit of 118 on every 1000 units bet. This is a gross margin of 11.8%. The bookmaker using Odds2 can only expect a gross margin of 8.8%. So for this example the following over-round per runner and expected gross margins are all follows:

Table A.14 – Gross Margins Compared to OPR

	Odds 1	Odds 2
Over-round Per Runner	2.1%	2.9%
Expected Gross Margin	11.80%	8.80%

The scenario with the higher over-round per runner (Odds2) can expect to achieve the lower gross margin. This example demonstrates how important the gross margin that the bookmaker achieves on the favourite is to his overall profitability. Boosting the over-round per runner by offering poor odds to punters on outsiders does little to increase the overall expected gross margin.

Appendix B:

Substitution from racing to other products

Prior to the National Lottery starting in the UK, gambling products in the UK consisted of mainly horseracing, dog racing, and multiple bets on football matches. These games all involved subjective probabilities, and it was necessary for the bookmakers to have considerable risk-management skills to make profits.

Table B.1 shows the percentage of gross win attributed to the different products for William Hill bookmakers.[39]

Table B.1 William Hill Gross Win Split By Product

Indicative % Group GW	1999	2001	2002	2003 (1-6)
Horseracing	59%	52%	48%	41%
Greyhounds	16%	19%	18%	18%
Football (inc World Cup)	7%	11%	14%	12%
Numbers (inc FOBT, Virtual)	5%	4%	8%	16%
AWP	7%	7%	6%	4%
Casino	-	2%	4%	6%
Other (inc stadia)	6%	5%	2%	3%

It is noticeable that there has been an increase in football and non-skill games at the expense of horseracing. Each betting product will now be examined.

B1. Greyhound Racing

The percentage of profits from greyhound racing is stable at a time when overall gross win is rising. Punters are losing a greater amount to greyhound racing than ever before. This implies that the price elasticity of demand for greyhounds is greater than minus one. It is likely that less price-sensitive punters will switch some of the tax savings they make on horseracing bets into higher-margin greyhound bets.[40]

[39] William Hill Interim Report Presentation, September 2003
[40] See appendix D for a full explanation of price elasticity of demand

The majority of greyhound bets taken in betting shops are on BAGS meetings. The number of BAGS meetings has expanded in recent years. BAGS racing produces higher margins than horseracing as Table B.1.1 shows.

Table B.1.1 Horseracing margins compared to Dog racing margins

	Horses Nov 01 – Nov 4th 03	BAGS Jan – Aug 2003
Favourite	5.7%	12.9%
Non-Favourite <=10/1	13.3%	24.1%
>10/1[41]	35.4%	14.7%

This makes them a more desirable product to supply to less price-sensitive punters. There is also unlikely to be much insider trading on BAGS racing as it is based around experienced and fully-exposed dogs who run against one another all the time. Greyhound racing also has the additional benefit of only being subject to a *voluntary* levy of 0.4% of turnover. It should be noted that some bookmakers refuse to pay any levy at all.

B2. Soccer Betting

Football margins have fallen since the tax changes. There is no starting price for soccer betting. Each bookmaker sets his own prices for each match. The calculation for the betting margin on soccer betting has been done by taking the best price available from William Hill, Coral and Ladbrokes on all English and Scottish Premier league matches and English Division One matches from August 1998 to May 2003. Consider the odds in Table B.2 (below) for the match between Manchester City and Arsenal on August 31st 2003.

Table B.2 - Manchester City versus Arsenal, August 31st 2003

	Coral	Hills	Ladbrokes	Best Odds
Man City	10-3	**7-2**	10-3	**7-2**
Arsenal	**4-6**	**4-6**	8-13	**4-6**
Draw	12-5	23-10	**13-5**	**13-5**

[41] Very few dogs are over 10/1 – only 265 out of 57,470 in the dataset

The odds used in margin calculations are the odds in the 'best odds' column.

Win-single bets on football have three outcomes: home win, away win or draw. The data has been split into two groups. The first is the outcome that is the favourite, and the other group represents the other two outcomes. So in the case of the Manchester City versus Arsenal match, Arsenal would be classed as the favourite and Manchester City and the draw would be classed as non-favourites.

Table B.3 – Margins on Soccer

	Aug 1998 – Oct 2001	Nov 2001 - May 2003
Favourites	5.0%	3.0%
Non-Favourites	8.9%	10.1%

Table B.3 appears to show that the tax changes, coupled with the introduction of win singles on football matches, have led to fierce competition between the leading bookmakers when setting the odds of the favourite. The best-available margin for punters on favourites has dropped from 5% to 3%. At the same time, the margin on the other two outcomes of a football match has increased slightly.

In Hong Kong, the turnover on racing has fallen from HK$92.3 billion in 1997 to HK$72 billion in the 2002-03 season. The decline has been blamed on the growth of illegal soccer betting which is due to the increased number of matches being shown live on cable and satellite television. In response to this threat, the Hong Kong Jockey Club has been authorised to take bets legally on soccer matches.

The Hong Kong experience demonstrates the substitution from horseracing betting to soccer betting. The ever-increasing number of European and English games on network and pay TV, and the introduction of win-single bets, is only going to increase this substitution. The margins on win singles are low, so bookmakers are unlikely to push them onto customers. But these same reduced margins are likely to attract more money from price-sensitive punters. As soccer favourites are cheaper to bet on than horseracing favourites, there is likely to be some substitution.

Intelligent punters have had an effect on betting, particularly on the minor Scottish leagues, where some bookmakers have reduced the range of games on which they take singles bets. Premier League games are unlikely to give bookmakers many risk-management problems. Soccer betting is also an important recruitment tool for bookmakers. Every two years there is either a World Cup or European Championship. These events draw new punters into betting shops and onto integrated online casino/sportsbooks.

B3. Numbers Betting

The introduction of Fixed Odds Betting Terminals in the UK is likely to have had a dramatic effect on both the turnover on horseracing bets, and their profitability, in licensed bookmakers. The experience of the introduction of poker machines in Australia and the National Lottery in the UK supports this.

The Australian Gaming and Statistics Report 1994-95 said that poker machines had had a negative impact on all other forms of gambling. Betting duty was reduced in the UK in 1996 specifically because of the threat of the lottery to traditional betting products. It should be noted that the lottery betting was not available physically alongside horseracing in betting shops. Numbers games are. Fixed Odds Betting Terminals tend to be placed close to the cash desks in most betting shops, ideally located for winnings to be recycled through them. It seems more-than-likely that punters will spend some of the money they would have recycled on horseracing on these new products.

These products are the latest additions to the betting companies' portfolio. Random-numbers games include lottery-style draws, and are also disguised in virtual racing and roulette graphics. As a group, they have grown from contributing 13% of William Hill's gross win in 1999 to 26% in 2003. More significantly, they have grown from 18% in 2002 to 26% in 2003. There has been some switching within this sector between AWP and the more modern FOBTs.

The Bookmakers' Committee detailed some of the research done into the effect of the National Lottery - a random-numbers game - on off-course betting turnover in 1999.

> "According to the latest Home Office analysis, turnover is currently 13.2% below the level it would have reached in the absence of the lottery. [...] The Henley Centre, which conducted studies in 1995 and 1996, found that, even then, off-course turnover was 8.5% lower that it would otherwise have been, with profitability down by almost 35%."[42]

The evidence in the Bookmakers' Committee document shows that the lottery had a much more dramatic effect on bookmaker *profitability* than on *turnover*. This can only have been caused by high-margin (the most losing) customers switching some of their gambling spend from horseracing bets to National Lottery bets. This is consistent with the concept of that the least-skilled gamblers are the most willing to play games that are devoid of skill, such as roulette. ***The loss of their business on the horseracing product will decrease the overall margin achieved on racing to a greater extent than the volume of turnover they remove from racing.***

The roulette example can be used to examine the possible substitution. A price-sensitive gambler will notice that the margin on roulette is about 2.7% compared with almost 6% on horseracing favourites. It is therefore likely many will switch from racing to roulette.

Under General Betting Duty, games such as roulette would have been unable to compete with casinos. The imposition of the 9% turnover tax would increase the cost to the punter of colour-betting on roulette from 2.7% on turnover to 10.7% on turnover. That is, if GBD still existed, it would be almost four times as expensive to colour-bet on roulette than it is at the moment. Or, to put it another way, under the new regime it is four times cheaper. (See Appendix A3 for detailed explanation.) The change in tax system has now made gambling on European Roulette the cheapest game in betting shops. It competes directly against racing turnover and is the single greatest beneficiary of the tax change.

[42] Recommendations for the 39th Annual Levy Board Scheme by the Bookmakers Committee

Those products provide three main advantages over traditional products for the corporate bookmakers. First, they are capable of producing consistent profits that are not subject to bad one-off results, such as a poor Cheltenham Festival. They are also generally random games devoid of all skill on the punters' part. They therefore do not require risk-management skills to defend against intelligent or informed punters.

Secondly, the number of events available in a day is far greater. Portman Park, the virtual racetrack, produces 14 race cards, as opposed to 6 race cards for real UK racing. A dedicated roulette player could have in excess of 100 bets in one hour. Third, it is cheaper to produce virtual events than it is to pay the 10% of gross profits to the BHB for real racing.

Ladbrokes' interim report of 2003 shows the contrast between the almost risk-free profits available from numbers and casino games compared with traditional betting products. Gross win for their entire eGaming (Sportsbook and Casino) department was up 15%, but gross win for their online sportsbook fell by 27%.

Profits of £30m, 80% of Ladbrokes growth between the first half of 2003 compared to the same period the year before, were attributed to the Fixed Odds Betting Terminals.[43] This occurred at a time when the number of FOBTs in betting shops was growing. The real concern for those relying on profits from horseracing betting is the corporate bookmaker's commitment to the growth of machine betting. David Michels, Hilton Group, stated when talking about the growth of fixed odds betting terminals (FOBTs):

> "What you shouldn't forget is that the industry has introduced something which our customers really like, and [which has] only become possible because of the tax changes. In this high-tech age FOBTs will not be the last development for a business which some of you said was dead three or four years ago."[44]

The transfer of gambling spending from racing to numbers can only be expected to grow as competition for the 'punter's pound' increases.

[43] Racing Post article 29/08/2003
[44] Hilton Group (Ladbroke's parent company) Interim Results Presentation, 28th August 2003

Appendix C:
Betfair, the On-Course Market and Starting Prices

The central conclusion of the margin analysis in the main paper was that bookmaker margins had remained static on favourites but declined for longer-priced horses. This section analyses why the margin on favourites - the horses that account for 65% of the money traded on Betfair - have not changed with the growth of exchanges.

A common argument by the detractors of betting exchanges is based upon the theory that bookmakers sometimes attempt to guarantee themselves a risk-free profit by backing a horse on a betting exchange that they have laid on course at a shorter price. The argument that follows is that on-course bookmakers will lay horses at inflated prices as a result, rather than continuing to lay as short a price as they can.

It is also believed that the deeper market provided by exchanges to on-course bookmakers has reduced the ability of the off-course bookmakers to lay-off bets on course. Ladbrokes' spokesman Sean Boyce said:

> "There is no doubt that the distorted influence of the exchanges is having a serious impact on the strength of the on-course market. In the past, off-course firms bet into the on-course market, providing a true reflection of the movement of money."[45]

The allegations that betting exchanges are being used purely for arbitrage by on-course bookmakers, and that the starting price is being distorted by on-course bookmakers using exchanges, are not backed up by any data. This section examines why this is the case. It will show that UK on-course bookmakers who run their businesses looking to maximise their long-term profits will not find arbitrage attractive.

[45] Racing Post, 30/01/2003

C1. Starting Price Data

The allegations that on-course bookmakers using betting exchanges have distorted starting prices (SPs) are not consistent with the data. Table C.1 shows the margins achieved at SP for our different groups for the last eight years.

Table C.1 Starting Price Bookmaker Margins 1996-2003

	Favs	Non-fav <=10/1	>10/1
1996	5.9%	13.3%	45.5%
1997	6.2%	14.6%	41.7%
1998	6.4%	15.6%	38.8%
1999	4.5%	15.7%	37.1%
2000	5.9%	16.9%	46.5%
2001	6.7%	13.6%	40.6%
2002	5.4%	14.3%	36.5%
2003[46]	5.9%	12.0%	32.8%

The data in Table C.1 shows the increased use of betting exchanges by on-course bookmakers is not distorting the starting-price markets. The only effect it has had is partially to remove a long-standing bias where punters were paying too much to gamble on long-shots.

Table C.1 shows that margins on outsiders have fallen in 2003. One reason is that on-course bookmakers feared offering a big price on an outsider in case that horse was gambled on. The growth of betting exchanges, where money is traded on all events for hours before the race, removes some of this risk.

The comparison of pool odds at the Tote with the bookmaker starting price demonstrates the risk-averse nature of the on-course bookmakers to long-shots. Table C.2 (below) shows the average Tote and Starting price odds for various different starting price odds groups. The races selected were from 22nd to 26th September 2003.

[46] Jan 1st – 4th Nov 2003 data

Table C.2 - SP compared to Tote Prices

SP Grouping	Average Starting Price	Average Tote Odds
<2/1	2.17	2.12
2/1 to <4/1	3.90	3.81
4/1 to <6/1	5.71	5.72
6/1 to <10/1	8.45	8.91
10/1 to <20/1	14.17	18.08
20/1 to <40/1	27.20	41.83
>= 40/1	77.58	112.62

Table C.2 (above) shows that the average Tote prices are slightly worse than bookmaker prices for horses under 4/1. For horses over 6/1 the Tote returns are superior. This can be attributed to the fact that the betting-service operator providing the pool-betting service does not face any risk. The Tote odds are set by the weight of money that the punters put on each horse. A big gamble on an outsider is unlikely to be done through the UK Tote for the two reasons that the pools lack depth, and it is impossible to lock-in a price. The bookmakers charge a risk premium for pricing up long-shots to guard against their fear of potential gambles.

It is possible that betting exchanges have helped remove some of this fear, because exchange markets have already been running for many hours before bookmakers price-up on course. The bookmakers are therefore less ‘on the front line’ than they were before. This is one possible explanation as to why starting-price margins on outsiders have fallen since the tax changes and the growth of betting exchanges.

Outsiders were also one area where on-course bookmakers had the facility to reduce their margins and compete, when their tax-free status against the off-course bookmakers was removed in October 2001. This reduction in margin on outsiders is not a distortion in the market. It is the partial removal of an anomaly that off-course bookmakers have been free-riding for decades.

C2. Price Sensitivity of bookmaking

When analysing the changes in SP margins, one should note that a small change in price by a bookmaker leads to a big change in his expected margin on the race. Table C.1 (above) shows margins on favourites ranging from 4.5% to 6.7%. These changes can only be brought about by very subtle changes in the activities of on-course bookmakers.

Table C.3 (below) shows the expected profit margin that a bookmaker would make if a particular horse won 31% of the time. Consider the situation where the bookmaker offers odds of 2/1 about the horse. The gross margin is calculated as follows:

(probability horse wins * amount would win) + (probability horse loses * amount would lose)
= (0.31 * 2) + (0.69 * - 1)
= - 7%

This means that the bookmaker could be expected to win 7% on turnover if he lays the horse at 2/1.

Table C.3 Bookmaker Margin 31% win chance

Bookmaker Odds	Expected Gross Margin
5/4	30.25%
11/8	26.38%
6/4	22.50%
13/8	18.63%
7/4	14.75%
15/8	10.88%
2/1	7.00%
9/4	-0.75%
5/2	-8.50%
11/4	-16.25%
3/1	-24.00%
7/2	-39.50%

Table C.3 (above) shows that if the bookmaker can secure bets at a lower price than 2/1 his profitability is increased. If he can find backers at 7/4, instead of 2/1, his profit margin is up to almost 15% and has doubled. If he offers the next price out, 9/4, the

bookmaker's profit margin is removed. If the odds move out to 5/2, the bookmaker is running a loss-making enterprise.

C.3 Arbitrage by on-course bookmakers

There is a common misconception that the desire of some on-course bookmakers to attempt to arbitrage the market by backing a horse on a betting exchange and laying it at the racecourse at a shorter price leads to those bookmakers then failing to continue to offer as short odds as possible on course. It is widely suggested that this is affecting starting prices. The example outlined below demonstrates why the analysis of the data above concludes arbitrage is not affecting starting prices.

A bookmaker wishing to maximise his long-term profits would not offer a longer price on course because he can back the same horse on a betting exchange. He would continue to lay the horse at as short a price as he can on course. Equally, only if the bookmaker's own estimate of the true odds lies between the exchange odds and the on-course odds should the profit-maximiser actually want to do both trades.

Consider the potential arbitrage possibility for an on-course bookmaker. He could back a horse on Betfair at 9/4 and lay it on-course at 2/1.

Assume that the Betfair market is efficient, as evidence and analysis suggests it is. This would mean that the 9/4 horse has an expected chance of winning of 31% (1/3.25). The on-course bookmakers would expect to make 7% on turnover laying the horse at 2/1. If the bookie takes £2000 in bets he can expect to make £140.

Now consider that he decides to lock-in at 9/4, as is often suggested. Assume that the bookmaker has the lowest rate of commission on Betfair – namely, that he pays 2% of his net winnings. This means that, taking the commission payable into account, the 9/4 on Betfair actually equates to odds of 3.205 rather than 3.25. If the bookmaker laid-off the £2000 bet he had taken at 2/1, he would have to bet £1902 on Betfair at 3.205 to guarantee an equal profit whatever the race outcome.

If the horse lost, the bookmaker would make £2000 from the on-course market and lose £1902 on Betfair. If the horse won he would lose £4000 on-course and win £4096 on Betfair. Both scenarios give the on-course bookmaker a profit of around £97.

The on-course bookmaker has a choice. In theory, he can either make a guaranteed profit of about £97 or an expected profit of £140. A risk-averse bookmaker would probably take the guaranteed profit of £97. However, British bookmakers have proved themselves to be profit-maximisers rather than completely risk-averse. Any bookmakers in for the long haul should take the expected profit of £140. It would only be beneficial for a bookmaker to back a horse on Betfair if the Betfair market was inefficient, but even then the bookmaker is effectively backing a horse he thinks is value.

The practicalities of arbitrage should also be considered. While it may be theoretically possible, both the on-course market and the betting exchange markets are extremely dynamic. Potential arbitrage opportunities may disappear before an on-course bookmaker has time to perform both the on-course laying and the exchange backing transactions. The on-course bookmaker could be left with an unfavourable position if the market moves against him before he can complete the arbitrage. First-hand experiences of this are likely to make the bookmaker less likely to attempt it again.

C4. The effect of exchanges on off-course hedging

C4.1 Historical Perspective

The Monopolies and Mergers Commission's (MMC) report into the Ladbroke/Coral takeover[47] gives a valuable insight into Ladbrokes' role in the on-course market. It revealed that in 1998, their laying-off of bets represented only about 1% of the total on-course market. Ladbrokes also said that the level of hedging had been declining as

[47]The Monopolies and Mergers Commission, *Ladbroke Group Plc and the Coral betting business: A report on the merger situation*, 1998

they and other bookmakers had learnt more about the benefits and drawbacks of the activity.

Ladbrokes told the MMC that they hedged when:

- They believed that a horse's price in the on-course market was bigger than its real possibility of winning the race in question; and
- The company had a substantial liability.

Ladbrokes also told the Commission about the workings of their Trading Manager. The Trading Manager had access to important information even in 1998. It is likely that the advent of new technology has given him still more real-time information today.

> 'Ladbrokes' trading manager was also provided with information about bets which had exceeded 'traded principles', i.e. those bets for which its LBOs were required to telephone Ladbrokes' trading department for authorisation before accepting them. […] The trading manager also had a 'field book' of bets taken by telephone and would be made aware if any connections or other well-informed customers had backed a particular horse.'[48]

The on-course bookmakers will be aware that Ladbrokes have this type of information when the firm lays-off bets in the betting ring.

C4.2 Laying-off and Exchanges

It has been argued that rather than trying to profit from arbitrage, on-course bookmakers will simply absorb all the money off-course bookmakers attempt to lay-off with them and not change the odds they offer. The on-course bookmakers will then back those horses back at larger prices on betting exchanges and lock in a profit. This, it is claimed, distorts the SP from truly reflecting the weight of money in the off-

[48]Ibid

course market. It is also claimed it is likely to mean that horses' SPs do not reflect their true chances of winning.

If the off-course company has a substantial liability, the increased depth of the market means they can lay-off money at a bigger price. Many off-course bookmakers can now take larger win-single bets that have become so attractive since the betting tax reforms. This is because they can lay them off on exchanges. In theory, the corporate bookmakers can also obtain better prices when laying-off their liabilities on-course.

The integration of the on-course market with exchanges is unlikely to mean horses' SPs do not reflect their true chances of winning. The whole concept that on-course bookmakers will simply absorb all off-course laying-off money and lay it back on exchanges is not substantiated by any facts. They are unlikely to continue to offer a larger price than a horse's chance of winning just because they can back through betting exchanges. On-course bookmakers may back 'value' bets on exchanges but they are likely to offer the least possible price they can when laying bets to racecourse punters and corporate bookmakers who are laying off bets.

Returning the arbitrage example in C3, if a horse has a 31% chance of winning, the bookmaker can expect to make £140 laying £2000 at 2/1. If the bookmaker locks in a profit at 9/4 on an exchange, his guaranteed profit would be only £97 (after commissions). Now consider an influx of new money pushing the horse into 7/4. The margin at 7/4 is 14.75%. If the bookmaker can lay the £2000 bet at 7/4, his expected profit is £295. This is three times the expected profit of the arbitraged £97. There is no incentive for the on-course bookmaker to force starting prices to be high. It would reduce their profitability.

Ladbrokes have made it clear that they have knowledge of where intelligent money is being bet before they lay-off on course. The on-course bookmakers will be aware of this. The likely effect of this is that when Ladbrokes lay-off a horse in the betting-ring, all on-course bookmakers will reduce their odds for that horse. The fact that a horse is being laid-off means that the on-course bookmakers are probably being too generous about a well-fancied horse.

It should also be noted that there is two-way interaction between exchanges and on-course markets. As Pat Middleton wrote to the *Racing Post*:

> "There are numerous individuals arbitraging the exchanges/on-course markets, providing a further valuable inflow of money to the betting rings i.e. these people are shortening horses up with money that originated through exchanges."[49]

This two-way interaction is more likely to make the on-course market reflect the chances of each horse winning.

C5. Example of unchanged on-course practices

Starting-Price margins have been analysed on a market anomaly that pre-dated betting exchanges and the tax changes. The anomaly is that the more favourites that win on a racecard, the higher the expected gross margin of the bookmakers for the favourites in the following races. Table C.4 shows this anomaly prior to November 2001.

Table C.5 Jan 1996-Oct 2001 Margins/Number of favourites won so far

Number of favs won so far on card	Gross Margin	Volume
0	5.2%	18419
1	5.1%	15003
2	7.8%	9087
3	7.2%	3552
>=4	14.0%	1119

Table C.5 (above) shows that when zero or one favourite had already won on the card, margins on subsequent favourites were around 5%. As the number of winning favourites increased, the on-course bookmakers increased the margins. This could be for several reasons:

- Punters at the racetrack, having won on the first few favourites, reinvest in favourites in the last few races. The weight of money causes the bookmakers to reduce the odds on the favourites to reduce their liabilities.

[49] Letter, 13/02/2003

- Off-course bookmakers could be laying-off into the on-course market to force the margins up on the favourites artificially. This might be because they have multiple bets on favourites building up large liabilities.
- The racecourse bookmakers could increase the margins on favourites because they have already lost on the day and are trying to limit the damage. This seems unlikely as bookmakers are in for the long haul. The last race on one day is the same as the first race the following day.

If the theory that on-course bookmakers absorb money from on-course punters and corporate bookmakers and lay-off on betting exchanges is correct, it would be expected that this anomaly would be removed in the exchange era. Gamblers on exchanges, aware that the anomaly exists, would offer far bigger prices on the favourites in the later races than the racecourse bookmakers did in the pre-exchange era. Logic would suggest that on-course bookmakers would back those horses on exchanges and absorb the money flowing in from on-course punters and the corporate bookmakers.

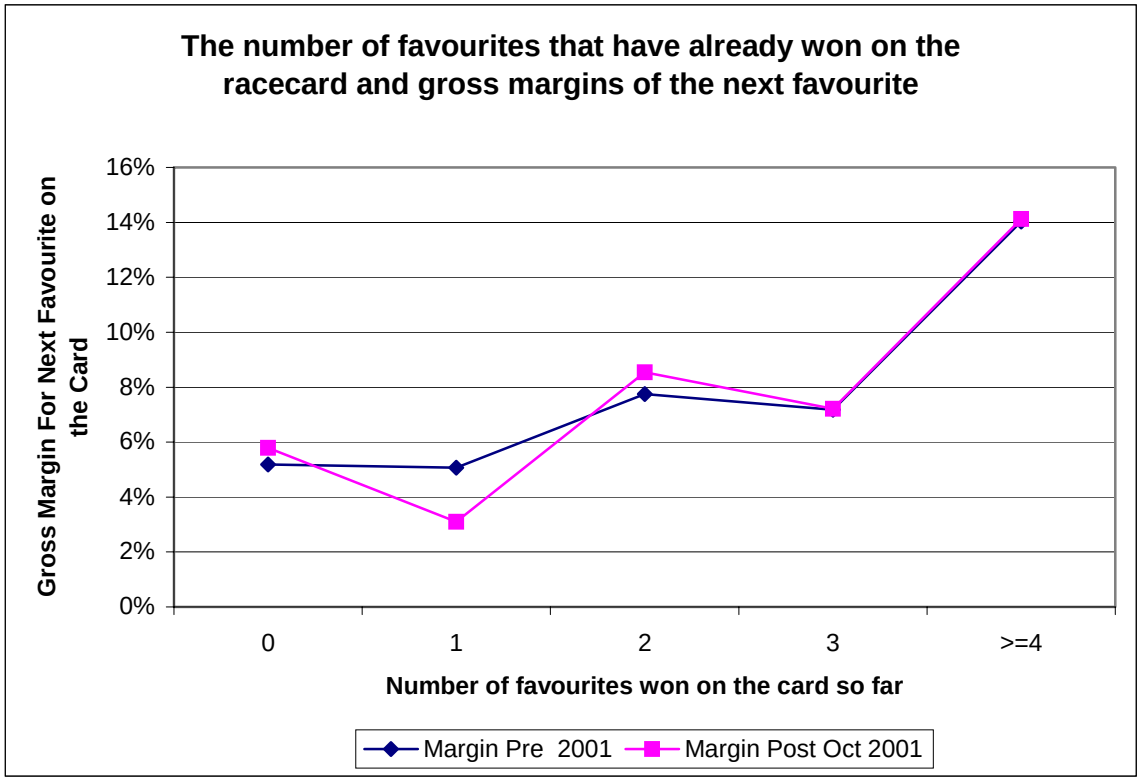
However, Table C.6 shows that the anomaly *does* still exist in the exchange era:

Table C.6 Nov 2001-Sept 2003 Margins/Number of favourites won so far

Number of favs won so far on card	Gross Margin	Volume
0	5.8%	6239
1	3.1%	4912
2	8.5%	3083
3	7.2%	1313
>=4	14.1%	396

This completely defies the logic that on-course bookmakers are changing their profit-maximising practices in the exchange era. Bookmakers are still trying to lay horses at the shortest price that they can attract money at. Chart C.1 (below) depicts the comparison for this anomaly, and demonstrates that there is no differential between the pre- and post-exchange era:

Chart C.1


The number of favourites that have already won on the racecard and gross margins of the next favourite
Gross Margin For Next Favourite on the Card
16%
14%
12%
10%
8%
6%
4%
2%
0%
0
1
2
3
>=4
Number of favourites won on the card so far
Margin Pre 2001
Margin Post Oct 2001

Appendix D:
Betting Exchange Turnover Analysis

This section examines the various types of betting activity carried out on Betfair in one race. It makes an assessment of how much of that activity is likely to be purely incremental (i.e. it would not have happened but for the existence of betting exchanges). It determines whether any sensible estimate can be made as to how much of the turnover bet on Betfair would have been bet through traditional bookmakers had the exchange not existed.

The race selected is the 4:15 from Salisbury on 4th September 2003.

D1. Summary data

Table D.1 (below) shows the amount of money matched on each horse for this race, the average odds at which bets were matched on Betfair, and the Starting Price (SP) of each horse.

Table D.1 Salisbury 4:15 4th September 2003 - summary data

	Total Matched	Betfair Average Matched Price	Starting Price
Nyramba	£388,037	2.98	2.75
Ruby Rocket	£103,750	4.58	4
Crafty Fancy	£48,883	8.13	7
Anthos	£40,498	8.92	8
Indiana Blues	£9,651	13.24	12
Changari	£5,501	25.98	21
Why Dubai	£9,651	24.46	15
Cape Trafalgar	£4,725	29.49	21
Dowager	£2,896	41.93	34
Hilites	£1,883	71.11	26
Dontstopthemusic	£1,331	116.03	51

D2. Definitions

D2.1 Total Matched

This is the amount of money staked by the backer of the horse, multiplied by two. It acts as a rough guide to the amount of money that has been bet on the race. It is, however, a relatively meaningless number unless it is examined in conjunction with the price of the horse.

Imagine a two-horse race where Horse 1 has odds of 1/3 and Horse 2 has odds of 3/1. Backing Horse 2 is the same bet as laying Horse 1. However, if you backed Horse 2 to win £300 the backer stake would be £100. The total matched on Betfair would be £200. If you laid Horse 1 to win £300 at 1/3 the backer's stake would have to be £300. The total matched on Betfair would be £600.

In this example the same bet results in the total matched figure being either £200 or £600. This warning is particularly applicable when examining in-running betting where bets are placed at very short odds.

D2.2 Betfair Average Matched Price

The market for a UK race typically opens the night before the race. From the initial gambling until the race starts, bets are matched at a multitude of different prices for the same horse. The average matched price is calculated by summing the total payout that would occur if the horse won, and dividing that figure by the total amount bet on that horse. It is a useful guide, but it does not imply that those prices were ever available to back or lay at the same time.

D2.3 Starting Price

This is the official price reported to be available at the track at the start of the race. Over 80% of horseracing bets are settled at this price.

D2.4 Price Elasticity of Demand and the Recycling Theory

The theory of recycling suggests that gamblers have a certain amount of money to lose through gambling, and they will continue to bet until that money has been lost - regardless of the cost of each individual bet. In economic terms, the recycling theory is expressed by saying that the "price elasticity of demand" for gambling is -1 or that the product is 'unit-elastic'. If a product is unit-elastic, then a 1% decrease in its cost would lead at the margin to demand increasing by the amount necessary to maintain the same overall expenditure by the consumer. If horserace betting demonstrated this as a characteristic, the price charged for betting would be irrelevant, because the punter spend would adjust in inverse proportion to the change in cost, to keep gross profits roughly constant.

In some situations, turnover can increase by *more* than is required to keep the consumer's spend constant. In this case, the product is described as "elastic". If the reverse is true, the product is 'inelastic'.

Empirical literature suggests that gambling is *elastic*[50]. Studies of the phenomenon also suggest that the more sophisticated the gambler, the higher his elasticity of demand is likely to be. The less sophisticated the punter, the more likely it is that a change in price will *not* affect his behaviour.

For example, the average punter on the National Lottery is extremely unsophisticated from a betting perspective: he is likely to be relatively unaware of and/or relatively indifferent to changes in the likelihood of actually winning his money back. The take-out per £1 bet is so high that any variation in the take-out will affect his willingness to bet more far less than it would a more sophisticated and price-sensitive punter.

Equally, the more sophisticated the punter, the more likely it is that he will be prepared to bet (and, by virtue of recycling, ultimately lose) more as the operator's takeout per £1 bet is reduced.

[50]See footnote 32

There is no doubt that the punters who are attracted to a betting exchangewill include the most sophisticated and price sensitive punters, whose price elasticity of demand is highly elastic .

However, for the purposes of this analysis, racing is considered, under a 'worst-case scenario', to be 'unit-elastic'. We have also assumed no increases in spend due to the enhanced punter experience provided by Betfair other than the incremental activity of laying, trading and in-play. These factors would obviously imply that the true situation is better still for racing than that painted below.

D3. Basic Analysis

For this section, we split the bets placed on the race into back bets and lay bets. In order to do the basic analysis, we need to estimate the probability of each horse winning the race. There is very little bias in the Betfair average-matched price. We therefore convert this into probabilities for each horse winning. Table D.2 (below) gives these estimates:

Table D.2 Estimated Probabilities for each horse

	Chance of Winning	Chance of Not Winning
Nyramba	34.0%	66.0%
Ruby Rocket	22.0%	78.0%
Crafty Fancy	12.0%	88.0%
Anthos	11.0%	89.0%
Indiana Blues	7.0%	93.0%
Changari	3.5%	96.5%
Why Dubai	4.0%	96.0%
Cape Trafalgar	3.0%	97.0%
Dowager	2.0%	98.0%
Hilites	1.0%	99.0%
Dontstopthemusic	0.5%	99.5%

D3.1 Back Bets

Backing a horse has always been possible with a traditional bookmaker. If punters who place back bets on the exchange are unit-elastic, they will be willing to lose the same amount of money with a traditional bookmaker as on Betfair. The commission charged by Betfair is between 2% and 5% of punters net profit per race. For this analysis we assume that all backers only bet on one horse per race and that their commission is 3.5%.

Paying a commission of 3.5% of winnings effectively reduces the odds the backer receives. Nyramba has an average matched price of 2.98. The effect of paying the commission can be calculated using the following formula:

Price including commission = 1 + [Potential winnings * (1 – commission rate)]
Price including commission = 1 + [(Betfair Price – 1) * (1 – commission rate)]
Nyramba inc commission = 1 + [(2.98-1)*(1-3.5%)
Nyramba inc commission = 2.91

Table D.3 (below) shows the price including commission for all the horses alongside the starting price, the amount backers staked on Betfair, and the estimated win probabilities.

Table D.3 Salisbury Race Details

	Stake	Chance of Winning	BF Av Inc Comm. 3.5%	Starting Price
Nyramba	£194,018	34.0%	2.91	2.75
Ruby Rocket	£51,875	22.0%	4.45	4
Crafty Fancy	£24,442	12.0%	7.88	7
Anthos	£20,249	11.0%	8.64	8
Indiana Blues	£4,825	7.0%	12.81	12
Changari	£2,750	3.5%	25.11	21
Why Dubai	£4,825	4.0%	23.64	15
Cape Trafalgar	£2,363	3.0%	28.49	21
Dowager	£1,448	2.0%	40.50	34
Hilites	£942	1.0%	68.66	26
Dontstopthemusic	£665	0.5%	112.00	51

The gross margin for each horse can be calculated using the following formula (See Appendix A1.1 for explanation):

(Probability of winning * amount would win) + (Probability of losing * amount would loss)

Nyramba has a 34% chance of winning the race. The Betfair price is 2.91. If the horse wins, the punter who stakes 1 unit on the horse wins 1.91 units. The expected punter return is therefore calculated:

(0.34 * 1.91) + (0.66 * -1)
= -1.04%

This means that the punter can expect to lose 1.04% of the money he stakes on Nyramba on Betfair. Table D.4 (below) shows the expected loss for all the money that backers placed on the race. The overall amount lost by backers to Betfair is expected to be £7,669.

Table D.4 Backer Expected Punter Loss on the race

	Stake	Expect Margin Loss	Expected Punter Loss
Nyramba	£194,018	1.04%	£2,010
Ruby Rocket	£51,875	2.00%	£1,036
Crafty Fancy	£24,442	5.37%	£1,314
Anthos	£20,249	4.93%	£998
Indiana Blues	£4,825	10.32%	£498
Changari	£2,750	12.13%	£334
Why Dubai	£4,825	5.66%	£273
Cape Trafalgar	£2,363	14.52%	£343
Dowager	£1,448	19.01%	£275
Hilites	£942	31.34%	£295
Dontstopthemusic	£665	44.00%	£293
Total	**£308,403**		**£7,669**

Table D.5 (below) shows the turnover that would occur with a Starting-Price bookmaker who made the same gross profits as Betfair.

Table D.5 Estimated backer turnover using an SP bookmaker

	Stake	Expect Margin Loss	Expected Punter Loss
Nyramba	£30,930	6.50%	£2,010
Ruby Rocket	£8,631	12.00%	£1,036
Crafty Fancy	£8,238	15.95%	£1,314
Anthos	£8,318	12.00%	£998
Indiana Blues	£3,112	16.00%	£498
Changari	£1,259	26.50%	£334
Why Dubai	£680	40.13%	£273
Cape Trafalgar	£927	37.00%	£343
Dowager	£860	32.00%	£275
Hilites	£399	74.00%	£295
Dontstopthemusic	£393	74.50%	£293
Total	**£63,746**		**£7,669**

It shows that to make the same profits out of the backers, the Starting-Price bookmaker would have to turnover over £63,746. This is almost a fifth of the turnover backers bet on Betfair. This suggests that in the long run, even if the elasticity of the product is conservatively – and in contradiction to the empirical literature – estimated to be only at 'unit' level rather than greater, Betfair punters will turnover five times as much on Betfair as they would if restricted to traditional bookmakers.

D3.2 Lay Bets

Lay bets are when a gambler bets on something not to happen. The following analysis shows that in most cases, this gives punters a new avenue in which to gamble.

Throughout history, gamblers have bet more money on short-price horses than outsiders. By allowing punters to bet on horses not to win, Betfair gives them numerous new short-priced betting opportunities. In our example race, 3154 people choose to place a bet of some sort on the race. Only 1802 of those gamblers choose to not have a lay bet. The facility to bet on events not to happen has also given punters the opportunity to bet on price movements in the market.

It has been possible to oppose all horses in most races using spread betting for many years. Sporting Index price-up every race daily in their 'individual race index'. Punters are able to spread-bet on the performance of each horse based on a different

score being allocated for the place the horse finishes in. The Sporting Index Website describes this market:

> "This market gives one an opportunity to back or oppose a horse, something which traditional fixed odds betting does not offer."[51]

Using a traditional bookmaker, it is very expensive to oppose a horse. This is because of the long-shot favourite bias (see Appendix A5).

Consider the favourite in the example race. Its average price on Betfair was about 2/1. This means that punters could bet on the field to beat Nyramba at 2/1 on. Now imagine that a punter bet on every horse in the field to win a fixed sum with a Starting-Price bookmaker. The formula used to calculate the decimal odds he would receive is:

1 / [1/ Decimal odds of horse 1) + (1/Dec odds of horse 2) + …+ (1/ Dec odds of horse X)]

For example if you wished to back two horses at 2/1 to win a race, the odds on the pair would be:

1/ [(1/3) + (1/3)]
= 1 / 0.67
= 1.5

This formula has been used to calculate the inferred odds that a Starting-Price bookmaker is offering a punter on our race:

[51] Sporting Index Website, Help Section - http://www.sportingindex.com/help/help_frame_content.asp?siteID=1001&NODEID=41

Table D.6 Implied Betfair and SP prices for horse to NOT win

	Betfair Average	Starting Price
Nyramba	1.50	1.18
Ruby Rocket	1.28	1.04
Crafty Fancy	1.14	N/A
Anthos	1.14	N/A
Indiana Blues	1.08	N/A
Changari	1.04	N/A
Why Dubai	1.04	N/A
Cape Trafalgar	1.03	N/A
Dowager	1.02	N/A
Hilites	1.01	N/A
Dontstopthemusic	1.01	N/A

Only two horses have odds not to win at starting price. The reason for this is that if a punter tried to back the field to beat any of the other horses, he would lock in a guaranteed loss.

Now consider the price of the field against Nyramba being offered by the SP bookmaker. The price of 1.18 means that the punter would, in effect, have to lay the SP bookmaker 11/2 about Nyramba winning the race. It seems highly unlikely that in reality any punter would do this when the bookmaker was only laying the horse at 7/4. The transparency of the situation would be extremely unappealing.

The case for Ruby Rocket is even more extreme. The bookmaker is laying the horse at 3/1 but if a punter wished to back all the other horses in the race, he would effectively be laying it at 27/1.

Table D.7 below shows the amount of funds from layers, on which Betfair could expect to charge commission for this race, using the probabilities outlined above. The expected commissionable amount for each horse is calculated by multiplying the amount the layers would win if the horse loses, by the chance of the horse losing.

Table D.7 Betfair's expected commission from Layers

	Layers' Win If Horse Loses	Chance of Horse Losing	Expected Commissionable Amount
Nyramba	£194,018	66.0%	£128,052
Ruby Rocket	£51,875	78.0%	£40,462
Crafty Fancy	£24,442	88.0%	£21,507
Anthos	£20,249	89.0%	£18,022
Indiana Blues	£4,825	93.0%	£4,488
Changari	£2,750	96.5%	£2,654
Why Dubai	£4,825	96.0%	£4,633
Cape Trafalgar	£2,363	97.0%	£2,292
Dowager	£1,448	98.0%	£1,419
Hilites	£942	99.0%	£932
Dontstopthemusic	£665	99.5%	£662
Total	**£308,403**		**£225,123**

If the average commission rate paid by layers is 3.5% Betfair would expect to make £7879 from the layers in this race.

It is arguable that this is totally new income that would not have existed without betting exchanges. The best someone who wanted to oppose Nyrama could have done previously would have been to back Ruby Rocket instead. Possibly, some turnover may have been transferred from spread betting to betting exchanges, but this is likely to be limited because the spread betting bets includes a place element.

The choice and flexibility given by betting exchanges means that most of this revenue is new money from which both the BHB and the government draw revenue.

D4. More Detailed Analysis

The 4.15 Salisbury race had 11 runners. This means that there were 22 individual potential betting opportunities for punters on Betfair.

For the purpose of this analysis, a bet is defined as the total amount bet on one of those 22 outcomes by an individual. Multiple bets on the same outcome are regarded

as one bet. The type of gamblers that use Betfair have been split into three groups for the purpose of this analysis: backers, layers, and traders.

The race attracted 6036 bets from 3154 individual accounts. A total of £676,004 was matched on the event. Table D.8 shows the breakdown of accounts and volume matched by each of the groups. It should be noted that some gamblers have multiple exchange accounts. This means that some people labelled as a backer or layer by the Betfair data may in fact be traders between exchanges.

Table D.8 Activities of the three groups on the race

	No. Accounts	Matched	% Accounts	% Matched
Back Only	1802	£191,636	57.1%	28.3%
Lay Only	799	£164,293	25.3%	24.3%
Both (Traders)	553	£320,075	17.5%	47.3%
Total	3154	£676,004		

Each of the three groups is now analysed in turn.

D4.1 Backers

Backers are defined as accounts that only placed bets on horses to win in the race. 1802 individuals just placed back bets on the race. Table D.9 (below) shows the breakdown of those bets:

Table D.9 Breakdown of Backer bets

No. of horses	No. of Accounts	Amount Matched	% of Accounts	% of backs Matched
1	1335	£140,429	74.1%	73.3%
2	273	£30,830	15.1%	16.1%
3	93	£7,673	5.2%	4.0%
4	55	£5,566	3.1%	2.9%
5	19	£1,120	1.1%	0.6%
>=6	27	£6,017	1.6%	3.2%
Total	1802	£191,635		

74% of backers just back one horse. They are taking advantage of the betting value Betfair has to offer on the race. Very few backers attempt to back more than half the horses in the field. Only 3 individuals backed the entire field.

D4.2 Layers

Layers are defined as accounts that only placed bets on the field to beat a horse in the race.

Table D.10 (below) shows the breakdown of the layers' bets.

Table D.10 Breakdown of Layer bets

No. of Horses	No. of Accounts	Amount Matched	% of Accounts	% of lays Matched
1	624	£93,010	78.1%	56.6%
2	88	£9,045	11.0%	5.5%
3	31	£13,341	3.9%	8.1%
4	14	£3,222	1.8%	2.0%
5	3	£182	0.4%	0.1%
>=6	39	£45,493	5.0%	27.6%
Total	799	£164,293		

799 of the 3154 individuals that had a bet on the race just placed lay bets. Of those 799 individuals 78% only laid one horse in the race. These gamblers are taking the opportunity to place a bet on the field to beat a horse - which is prohibitively expensive with bookmakers (as described above).

5% of the people who just placed lay bets, or 1%??% of all gamblers, laid 6 or more horse in the field.] However, as a group, those who laid the field lost money on this race. There is no reason why layers should be at an advantage to backers using betting exchanges. Table D.11 (below) shows the Betfair aggregate results of 433 races taken from August and September 2003.

Table D.11 Betfair gamblers' aggregate results for 433 races in Aug/Sept 2003

Betting Order	Total Matched	Laying Post EC	Backing Post EC	Estimated Commissions (EC)
1 (favourite)	£131,032,378	-£1,762,218	£280,775	£1,481,443
2	£39,840,707	£1,304,835	-£1,899,549	£594,714
3	£17,323,225	£2,193,856	-£2,471,401	£277,545
4	£8,769,467	-£2,929,268	£2,748,621	£180,647
5	£4,807,257	£476,238	-£560,194	£83,956
6	£2,866,636	£1,273,970	-£1,315,779	£41,810
7	£1,538,271	-£1,232,833	£1,192,744	£40,089
8	£827,118	-£496,591	£475,965	£20,626
9	£459,066	-£94,972	£85,218	£9,753
10	£223,363	£130,425	-£133,549	£3,124
11	£73,907	-£135,865	£133,093	£2,772
12	£28,542	£28,257	-£28,542	£285
13	£7,904	£7,824	-£7,904	£79
14	£2,176	£2,154	-£2,176	£22
Total	**£207,800,015**	**-£1,234,187**	**-£1,502,679**	**£2,736,865**

Table D.11 shows that both layers and backers lost money on Betfair after commission is taken in account.

There appears to be a bias in the data, with backers winning slightly on favourites. However, it should be noted that layers won on the second and third favourites. This could be simply because the favourites shorten in odds and the second-favourites drift. It should also be noted that two or three different results could change the balance back in favour of layers.

The net result is that the Betfair market appears to be efficient. Neither layers nor backers are at an advantage. It seems highly unlikely that bookmakers will follow Bookmakers' Committee member Will Roseff's observation in the *Racing Post*:

> "Longstanding bookmakers are presumably handing in their permits so that they can trade on exchanges tax and levy-free" [52]

The lack of any advantage to either layer or backer in the exchange market means that the bookmaker would be switching from being a bookmaker to becoming a gambler.

[52] Letter, 17th September 2003

D4.3 Traders

Traders are defined as any individual who placed both a back and a lay bet on the race.

Table D.12 Breakdown of Traders' bets

No. Bets	No. Accounts	Matched	% Accounts	% Matched
2	281	£126,246	50.8%	39.4%
3	92	£32,606	16.6%	10.2%
4	70	£36,867	12.7%	11.5%
5	30	£17,933	5.4%	5.6%
>=6	80	£106,424	14.5%	33.3%
Total	553	£320,076		

These individuals represent only 17.5% of the total number of bettors on the race but 47% of the matched bets. About 51% of traders gamble on only one horse. They have both a back and a lay bet on the same horse. This represents a new form of gambling in horseracing more akin to share trading, because the punter is essentially betting on price movements.

For instance, if a punter thinks a favourite is too short at 2/1 he may lay it in the hope that he can back the same horse at a bigger price later. The market may or may not move in his favour; this is his gamble. If it does he can then back the horse at the bigger price and lock-in a profit, regardless of the result of the race. If the market moves against the punter he is left with two choices. He can either let the bet ride in an unfavourable position or he can close out the bet at a loss.

As with betting-exchange layers, there is no reason why betting-exchange traders should make a profit any more than is the case with any other gambler. This is because – as the data in Table D.12 shows - the market is efficient. But the advent of betting exchanges allows sophisticated punters to bet on potential price movements, rather than on the final outcome, if they so choose. **This represents almost 50% of the total matched on Betfair and could not occur with traditional bookmakers.**

D5. Additional Benefits of Betting Exchanges

D5.1 In-running betting

Betfair offers in-running betting on horseracing. This allows punters to gamble against each of the outcomes of the race as it is taking place. This is a service not offered by traditional bookmakers. Table D.13 shows the total matched in running on 15th September 2003.

Table D.13 15th September 2003 in-running bets matched by track

Track	Pre-Race	Inrunning	Total	Percentage IR
Redcar	£1,875,631	£240,665	£2,116,296	11.37%
Bath	£2,358,950	£229,667	£2,588,617	8.87%
Musselburgh	£3,376,213	£310,035	£3,686,248	8.41%
Total	**£7,610,794**	**£780,367**	**£8,391,161**	**9.30%**

The data suggests that over 9% of the total matched on the races is matched in running. *This is turnover that would not have occurred without betting exchanges.*

D5.2 Place Betting

Traditional bookmakers in Britain do not offer place-only betting, but they do offer each-way betting. This allows punters to bet on a horse to win and to be placed in the same bet.

The method used to calculate the place portion of the bet is crude and often results in the bookmakers offering inefficient bets on the place bet. The result of this is that bookmakers are often reluctant to accept each-way bets. Betfair allows punters to bet more efficiently on a horse to be placed. Table D.14 (below) shows that the place market is normally about 10% of the size of the win market. This turnover cannot be claimed to be totally new, but a large proportion of it probably is.

Table D.14 15th September 2003 win and place bets matched by track

Track	Win	Place
Bath	£2,588,617	£199,913
Musselburgh	£3,686,248	£395,867
Redcar	£2,116,296	£238,703
Total	**£8,391,161**	**£834,483**

D5.3 Early Prices All Races

Betfair opens a market for all UK horse races the night before the race. Traditional bookmakers tend only to offer early prices on specially selected races on the morning of the race. This service gives punters the opportunity to get a fixed-odds bet earlier in the day than traditional bookmakers. The early trading on exchanges can also be used as a valuable risk reduction tool for traditional bookmakers in setting their own odds.

D6. Conclusions on Betfair Turnover

The basic analysis showed that if betting is unit-elastic or better, betting exchanges would gain more revenue than bookmakers. They respond positively to the lower price charged, and they have a new means to bet because the prohibitive charge bookmakers make for betting on horses not to win is removed by the opportunity to take either or both sides of the bet.

In the Salisbury race Betfair could have been expected to turnover about five times the number of backing bets that bookmakers do. Combined with the laying bets, £10 bet on Betfair represents about £1 bet with a traditional starting-price bookmaker.

The basic analysis contained the assumption that gamblers paid 3.5% commission on every bet. In reality Betfair makes about 1.2% on its 'turnover' figure. This means that Betfair made about £6500 on the Salisbury race. However, it also means that gambling on Betfair is considerably cheaper than the figures used in the basic backing analysis. Any reduction of the cost of gambling present on Betfair means the expected loss of Betfair gamblers per bet is lower. The lower expected loss per bet means that

punters can recycle their money more times on Betfair to lose the same amount of money than with a traditional bookmaker. Both the empirical literature and the experience of Betfair and its punters suggests that this is the case. It means that Betfair's turnover figure attributable to backing alone will be significantly higher than that of a traditional bookmaker in the absence of exchanges.

Betfair's gross margin of 1.2% of turnover on horseracing bets compared to an average commission of 3.5% is the result of Betfair only charging commission on net winnings per race. This enables imaginative punters to back and/or lay as many selections as they like in a race. The effect of these activities is to boost significantly the Betfair 'turnover' figure, but decrease the margin on turnover.

Adding these complexities makes it hard to estimate the exact amount of turnover £1 on a betting exchange equates to with traditional bookmaker. The majority of traders' and layers' bets would simply not occur with traditional bookmakers. These bets represent over 70% of the total bets matched on Betfair. The remaining 30% might be matched through traditional bookmakers, but because it is cheaper to bet on Betfair the backers' money can be expected to be recycled more times to lose the same amount.

It is likely that any substitution that might limit the recycling effect between horseracing and other sports on Betfair will be reciprocal. This is because punters pay the same commission rate for all bets, and casino-style games are not on offer. For each of the horses in the race the following formula could be applied to calculate the bookmaker turnover 'lost' to exchanges:

$$\text{Volume of bets matched by backers only} * \frac{\text{expected bookmaker margin on horse}}{\text{Customer's commission rate as \% of race turnover}}$$

For example, imagine a punter backs £100 on the favourite and expects to pay 2% overall in the race for commission compared to a 6% bookmaker expected margin. The punter would expect to pay £2 in costs to the exchange for the £100 bet. If the

same punter only wanted to expect to lose £2 with the bookmaker the bet would be one third the size, or £33.

In summary, it is concluded that any switch in turnover from traditional betting service operators to exchanges is likely to generate at least the same profits as bookmakers. The betting opportunities provided by exchanges are more than likely actually to *increase* the amount of profit that can be made from existing horseracing punters.