

A POLICY RESPONSE TO THE E-COMMERCE REVOLUTION: THE CASE OF BETTING TAXATION IN THE UK*

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Several environmental changes in the 1990s – including the introduction of a national lottery, the rise of Internet gambling, and the reduction of trade barriers within the EU – induced the UK government to initiate a large-scale review of betting duty. As a result of this review, the government recently announced a significant reduction in betting taxes. They also decided to replace the current general betting duty (GBD), levied as a proportion of betting stakes, with a gross profits tax (GPT), based on the net revenue of bookmakers. We examine the economic rationale behind these decisions and demonstrate how these tax changes have broad implications regarding optimal levels of taxation for other sources of government revenue.

Excise duties, chiefly from petrol, alcohol, cigarettes and gambling, constitute approximately 10% of UK government revenue. In recent years, actual revenues from such duties have been significantly less than projected revenues, due to shifts in tax and trade policies and technological change, which have induced substitution within and across national borders. One such policy initiative was the reduction in trade barriers within the EU, which has exposed structural differences in excise duty rates across nations. For example, excise rates on alcohol, cigarettes and petrol are considerably higher in the UK than in some neighbouring countries. In each of these cases, UK suppliers have become especially vulnerable to competition from lower-tax countries. A related problem has been the growth of illegal imports of alcohol and cigarettes. These threats have led consumers and industry representatives to demand that the UK government reduce excise duties.¹

Pressure to reduce betting duty has been particularly intense, due in part to the rapid rise of Internet gambling. Internet gambling allows UK bettors to avoid excise duty by placing wagers with offshore or overseas companies. Thus, the Internet poses a threat to government revenue streams and to the competitiveness of the UK gambling industry. The prevailing sentiment among UK policy makers and practitioners is that such threats will become more severe, unless tax policies are substantially modified.

As a result of this review, the Chancellor of the Exchequer announced a major reduction in the overall level of betting taxation in his budget statement of April 2001. He also announced that ‘general betting duty’ (GBD), levied as a proportion of betting stakes, would be replaced by a ‘gross profits tax’ (GPT) based on the net

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¹ Even so, the influence of the EU single market on gambling is likely to be of relatively limited impact, since much of the movement of gambling activity has been offshore and outside EU jurisdictions.

revenue of bookmakers. The Chancellor proposed a tax rate of 15% for fixed-odds and parimutuel bookmakers, 10% for sports spread bookmakers and 3% for financial spread bookmakers.

Spread bookmakers operate by offering a spread around a quantifiable future event, which can be bought or sold by bettors, much like a 'future'. These companies are regulated as for financial services, rather than bookmaking. The rationale for the lower tax rate on spread bookmakers is that the cost of operating such a business is higher than for fixed-odds bookmakers, especially for financial spread bookmaking. Moreover, the turnover tax, which existed before the change in policy, constituted a much smaller fraction of the profits of spread bookmakers than their fixed-odds counterparts. Thus, a direct shift from a turnover tax to a single rate of GPT would be likely to cause a significant 'shock' to the profitability of spread betting companies.

The decision to change from a turnover tax to a GPT was made following a consultation process involving representatives of the bookmakers and independent analysis undertaken by the authors and others. Final recommendations were issued by officials of HM Customs and Excise to HM Treasury, following a bargaining process between the government and large betting firms. Specifically the largest firms in the betting industry, including the 'Big Four' (Ladbrokes, William Hill, Coral and the Tote), agreed to transfer their offshore business back to the UK, in conjunction with the implementation of the change in the level and structure of betting taxation.

Although revenue from gambling constitutes the smallest of the four goods subject to excise duties (petrol, alcohol, cigarettes and gambling), the consequences of this dramatic change in betting tax policy could have important implications for policy towards duties on petrol, alcohol and cigarettes. Also, similar policy debates on the taxation of gambling and the impact of e-commerce have emerged in other OECD countries, most notably, Australia (Smith, 2000) and the USA (Goolsbee, 2001).² Thus, legislators, academics, and practitioners in many nations will be closely monitoring the impact of this major shift in UK policy.

The purpose of this paper is to explore the economic rationale behind the UK government's response to the e-commerce revolution and to assess its likely effects on tax revenue, the gambling industry and consumers. In Section 1, we contrast policy perspectives on gambling in the USA, UK, and Australia. Section 2 provides some background information on the UK betting industry and the characteristics of these markets. Section 3 describes the key environmental changes that have provided an impetus for the shift in tax policy. Section 4 evaluates the proposed policy shift against several criteria, with a particular focus on economic efficiency. The final section consists of conclusions and suggestions for additional research.

² In the USA, Goolsbee (2000) finds that Internet commerce is highly sensitive to changes in state sales taxes.

1. Policy Perspectives on Gambling in the USA, UK and Australia

There are salient differences in policy and social perspectives concerning the gambling industry in the UK, USA and Australia, as summarised in Table 1.

In the USA, most of the major policy issues are resolved at the state level, since state legislatures have jurisdiction over most aspects of gambling. An important secular trend in the USA is that gambling, especially in the form of lotteries and electronic gaming devices (e.g. slot machines), has become much more socially acceptable. Most US states now have lotteries, which are often used to fund politically popular education programmes.³ In 1978, only one state, Nevada, allowed casino gambling. By 1999, 27 states had authorised some form of casino gambling. Eadington (1999) reports that gambling revenues had risen almost threefold over a 15-year period, rising from approximately \$17 billion in 1982 to approximately \$51 billion in 1997 (in constant dollars), with most of the increase attributed to the spread of lotteries and casinos. Christiansen (1998) estimates that gambling accounts for approximately 10% of leisure expenditures.

The growth in casino gambling is mainly due to the rise of Native American (Indian) casinos and riverboat casinos. Indian casinos are assigned to a particular local tribe. Under US law, these tribes are considered sovereign nations and, thus, are not required to pay taxes to states. While tribal casinos in remote, rural areas

Table 1
Comparison of Gambling Public Policy Issues in the UK, USA, and Australia

Aspect of gambling	UK	USA	Australia
Level of policymaking	National level	Mainly state level	State and national levels
Social/cultural attitudes towards gambling	Traditionally has been socially acceptable	Has recently become more socially acceptable Strong religious opposition to legalised gambling in some states Strong opposition to sports betting	Traditionally has been socially acceptable Bookmakers on course only
Key trends	Growth in Internet gambling Growth in sports betting Rise of the National Lottery	Rapid growth in casinos (Indian casinos and riverboats)	Rapid growth in Internet gambling
Focus of public policy debate	Maintaining industry competitiveness Maintaining tax revenues	Emphasis on positive/negative externalities of gambling Use of gambling to promote economic development/tourism (especially in poor communities)	Maintaining industry competitiveness Some emphasis on negative externalities

³ See Clotfelter and Cook (1989) for trenchant analysis of the rise of lotteries in the USA.

are typically quite small and unprofitable, those located near major metropolitan areas (such as New York City, Boston, Phoenix, Miami/Fort. Lauderdale and Minneapolis) yield high financial returns. Riverboats, which are subject to taxes, are especially popular in the Southern and Midwestern states.

Despite the growing popularity of gambling in the USA, there is still strong religious opposition to this activity in many states and almost no support for legalising gambling on sporting events. For instance, only Nevada and Oregon allow sports betting; and, in Oregon, it is permitted only on a very limited basis. Thus, there is considerable variation within the USA in gambling activity and tax rates across regions and states.

In the UK, gambling is relatively socially acceptable and has rarely engendered any strong religious opposition. Regulation and taxation issues are resolved at the national level. Also, casinos are not as popular in the UK. Finally, a major source of revenue growth in the UK industry is the rise in gambling on sporting events, including spread betting.

Perhaps the most striking difference between the USA and UK lies in the nature of the public policy debate regarding gambling. In the USA, much of this debate focuses on the magnitude of externalities that are linked to an increase in gambling. Opponents of the gambling industry tend to focus on negative externalities, such as the social costs of problem gambling and associated criminal activity. Some religious groups also oppose expansion of gambling on moral grounds. Supporters of the industry contend that gambling can be used to promote economic development and tourism in depressed areas, such as Indian reservations and inner-city neighbourhoods. They also argue that legalisation of gambling can help states to avoid tax revenue leakage to neighbouring states that allow such activity.⁴

In 1996, the US Congress mandated the National Gaming Impact Study Commission (NGISC), which recently released its final report (see <http://www.ngisc.gov>). The NGISC report focused mainly on the social and economic implications of the rise of gambling. It also contains a considerable amount of material on the pernicious influence of sports betting on the 'purity' of athletics, especially at the university level. The bottom line is that it is not likely that legalised sports betting will grow in the USA.

In the UK, many of the issues explored in the NGISC report are virtually absent from the public policy debate. Instead, the major focus appears to be on maintaining the viability and competitiveness of the industry. Likely reasons for this difference are that UK firms have established a strong competitive position in this sector and there is a high level of social acceptability regarding gambling. However, it is important to note that this industry does not operate in a vacuum. Environmental and tax changes will have implications for the level of gambling activity and, more importantly, for substitutes and complements. We consider these factors in subsequent sections of the paper.

It is clear, then, that there are major differences in the nature of gambling activity and how it is perceived and regulated in UK and the USA. While Sauer

⁴ See Gazel (1998) for a discussion of these issues. He concludes that casinos have generated net economic losses for most states.

(2001) contends that cycles of regulation and deregulation of gambling activity in the USA are the result of contests between conflicting interest groups, such cycles are not apparent in the UK. An explanation of this difference may lie in the fact that, in the UK, policy decisions are resolved at the national level, where the major political parties do not appear to have any critical disagreements on betting issues.

An example of this non-partisan approach was the publication in July 2001 of the report of the Gambling Review Body, established by the UK government to review the betting and gaming industry and to generate a set of proposed recommendations. In this report, the authors endorse further deregulation of the industry to encourage the growth of 'betting complexes' or licensed betting offices (LBOs). These LBOs would be permitted to expand the range of betting media they offer, notably to increase the allowed number and pay-out maximum of casino-type games of chance. The report also proposes additional deregulation of casinos, including allowing the consumption of alcohol on the casino floor and abolishing the current 24-hour cooling-off period before permitting access to a casino. On the other hand, apart from casinos, the authors recommend that betting not be permitted in establishments where alcohol is served or in establishments that are not licensed primarily for the purpose of betting. The overall thrust of this report is to promote deregulation of gambling within a regulated licensed betting environment.

As evidenced in Table 1, Australia falls somewhere in between the USA and the UK. Policy making occurs at both state and national level. Smith (2000) reports that, in Australia, as in the USA, states have become increasingly dependent on gambling taxes as a source of revenue. The author also finds that the growth in gambling tax revenue in Australia is being fuelled by casinos and electronic gaming devices. While gambling has traditionally been socially acceptable, bookmakers operate on-course only. Finally, although the primary focus of the public policy debate is on maintaining industry competitiveness, as in the UK, there has been some consideration given to the issue of negative externalities associated with gambling.

It was such concerns that led the Australian government to impose a ban on new virtual casinos. This ban was not applied to other forms of gambling, such as dog racing, horse racing or sports events. As in the USA, casinos and casino-type establishments are quite popular in Australia. In particular, betting in cafés and so-called 'TAB' (the Australian 'Tote') bars are widespread in Australia, and so-called 'pokie' machines (electronic poker or fruit machines) are prevalent outside of formal gambling and gaming establishments.

In Section 2, we present background information on the UK betting industry and the characteristics of these markets.

2. Characteristics of UK Betting Markets

Over £8 billion was spent on betting in the UK in 2000, generating more than £500 million in GBD. The betting industry consists of three distinct sectors: off-course betting at licensed outlets (the dominant venue), on-course betting

(which is not subject to GBD), and betting by telephone (through deposit or credit accounts, or via debit cards). Of all betting turnover, 80% is generated off-course, in LBOs; about 10% of turnover is on-course, with the remainder consisting mainly of telephone betting. There is also a growing market for wagering via the Internet and interactive betting through the television. Betting can be further sub-divided into fixed-odds betting with bookmakers, pool (parimutuel) betting with the Horserace Totalisator Board (the Tote), 'spread betting' and bet brokerage ('betting exchanges').

In fixed odds betting, wagers are settled at specific odds. This is the major form of betting in the UK. In pool betting, winning bettors share the pool of all winning bets, net of fixed deductions. Within the off-course market, pool betting plays a very small role. In addition to straight win bets, there are a wide variety of other types of bets available. These include 'each way' bets, allowing the bettor to nominate win and place (usually in the first three), multiple bets on cumulative outcomes, and forecast bets which normally involve nomination of the first two or three past the post in the correct order.

Spread betting companies operate by establishing a market for uncertain outcomes, such as the price of gold or the number of goals in a football match. The market makers set a 'spread' regarding a specified outcome, and clients of these companies are invited to buy at the top end of the spread or sell at the bottom end. The outcome of the trade is calculated as the number of units by which the actual outcome differs from the level at which the trade is enacted. Spread or 'index' trades are available on numerous financial instruments, including stock market indices as well as various types of options, and futures. Spread betting is still, however, a very small segment of the gambling industry, particularly in terms of the proportion of all bets placed, and the number of bettors involved. For example, it is estimated that revenue from spread betting makes up little more than 0.2% of GBD (Paton *et al.*, 2000).

A form of betting which is even more novel than spread betting is 'bet brokerage' in which the bookmaker acts as an intermediary (for a small commission) to match up clients who lay and accept bets among themselves. This also constitutes a small but growing percentage of total betting turnover.

Traditionally, the bookmaking industry has been highly concentrated. Three large chains dominate the off-course fixed odds market: Ladbrokes, William Hill and Coral. These three firms account for about 60% of the turnover in off-course licensed betting offices. Along with Tote Credit, they account for about 90% of the telephone betting market. Recent efforts by Ladbrokes to acquire Coral suggest further consolidation is likely in this sector. There are currently four major companies, regulated by the Financial Services Authority, operating in the spread-betting sector: IG Index, Sporting Index, Spreadex and Cantor Index.

Over 70% of wagers in betting offices are on horse racing. However, according to the 1998 Monopolies and Mergers Commission report on this industry, the share of football betting is increasing, especially by telephone, via the Internet, interactive TV and through spread betting. For example, in 1997, 4.3% of betting office turnover was on football compared to 8% of turnover by telephone (MMC,

1998, p. 81). In the spread betting market, the majority of turnover is on football betting. Industry experts predict that football betting will also fuel the growth of Internet betting.

The Mintel (2001) survey of adults aged 18+ found that, in a period of six months, 68% had bet on the National Lottery, while only 11% had bet on any form of sports betting in a betting office (although this rose significantly since 1997). Just 8% had bet on the football pools and 3% in a casino.

A key trend has been a precipitous decline in the amount wagered on football pools. Between 1993 and 1999, such turnover dropped by about 60%. Although the number of bingo clubs also fell sharply between 1993 and 1999, turnover has recently recovered sharply. This could be due to additional deregulation of this sector, which has led to more AWP (automated win payout 'slot machines'), higher prizes and further promotional opportunities.

Onshore bookmakers were, until 6 October 2001, subject to payment of 6.75% on turnover, and to an additional levy on horse racing turnover averaging about 1.25%, but which varies on a sliding scale linked to turnover. These costs were typically passed on to customers in the form of a 9% 'tax' on stakes or deduction from pay-outs. The issue of taxation of financial spread betting is different than taxation of sports spread betting, due to the special need in the financial spread betting sector to hedge bets in conventional financial markets, as part of the risk management procedures. A consequence of this financially oriented wager is that a losing trade for a client is often also, to a lesser extent, a losing trade for the bookmaker.

Quarterly data for 1986–2000 on betting turnover are presented in Fig. 1. These data are seasonally adjusted and an index for each series is presented. Five key events are denoted on the graph: the abolition of on-course duty at the end of March 1987, reductions in GBD in April 1992 and March 1996, the introduction of the National Lottery in November 1994, and the May 1999 announcement by Victor Chandler (a major firm in this industry) that it was establishing operations in Gibraltar. It is clear that from a peak in 1989, there has been a gradual downward trend in turnover, with the sharpest decline in the early 1990s.

In Section 3, we describe changes in the environment that provided an impetus for changes in the UK betting tax.

3. Changes in the Industry Environment

A major factor in the UK government's ultimate decision to reduce the betting tax was the rapidly changing competitive environment in this industry, due mainly to the growth of e-commerce and the introduction of the National Lottery. In this regard, it is helpful to distinguish between the LBO sector and telephone/Internet betting. Three environmental changes have been especially important. Two of these are relevant primarily to the telephone/Internet sector and the third to the whole betting industry.

First and most obviously, there has been an increase in the incidence of Internet betting in recent years, with a substantial rise in the number of independent

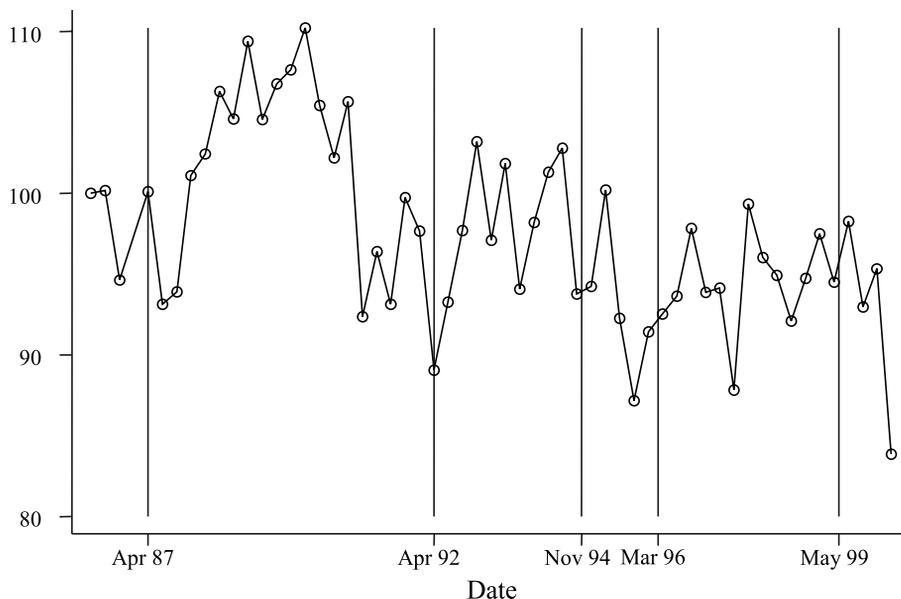


Fig. 1. Trends in Off-Course Betting Turnover: 1986–2000

Notes: Source is HM Customs and Excise. The dates denoted on the graph refer to the following events: April 1987, abolition of on-course duty; April 1992, reduction in general betting duty; November 1994, introduction of the National Lottery; March 1996, reduction in general betting duty; May 1999, Victor Chandler moves to Gibraltar

bookmakers offering Internet access to betting sites. Data on recent trends in betting turnover and gross profits of the five largest bookmakers indicate that turnover from Internet betting was just 0.1% of industry turnover in September 1999. Since then, the share of industry turnover derived from Internet betting has increased dramatically, rising from 0.2% in February 2000 to 0.7% in May (the last month for which data are available). Further, the *Racing Post* Usage and Attitudes Study (June, 2000) indicates that Internet access had increased by 50% in the previous eighteen months (12–18% with access to the Internet at home or work). This penetration was very much higher at the middle to upper end of the socio-economic groupings. Among *Racing Post* readers, 40% had access to the Internet, with a further 9% intending to acquire access. These findings are broadly consistent with the findings of Datamonitor (2001), who predict that the number of online gamblers in the UK will expand rapidly as advertising proliferates and the technology becomes ubiquitous. They estimate that online gambling currently generates about \$700m in turnover the UK (July 2001), a figure that is expected to rise to more than \$1.6b by 2005. The authors of this report assert that stronger regulation will inspire greater confidence in consumers, which will fuel some of the growth. They also predict that more sophisticated online offerings and improvements in the quality of the online experience will also serve to increase demand. Similarly, the Henley Centre, a leading UK forecasting company, predicts

that the share of Internet gambling in the market will increase from 2% in 2001 to 9% in 2005 (Paton *et al.*, 2000), a trend that is likely to enhance competition in this industry.

The key feature of the growing Internet/telephone sector is that competition is much more intense in this sector than in the LBO sector. For example, start-up costs for firms are much lower than those associated with High Street bookmakers, while search costs for consumers are quite low, in the sense that bettors can easily shop around and find bookmakers offering the best odds on a particular wager.

A second key environmental change is that several large bookmakers have established offshore operations, mainly to avoid the UK betting duty. The first was Victor Chandler, the UK's leading independent rails bookmaker, who set up a firm in Gibraltar. Although, Victor Chandler's Gibraltar operation was not subject to the betting duty, the firm originally charged bettors a 3% 'administration charge' on bets. Subsequent competition has forced many on-line companies to waive 'tax' on bets altogether, at least in the short term. More recently, the largest bookmaking chains, notably Ladbrokes, William Hill and Coral, have also developed offshore operations.

Both of these environmental changes imply that UK telephone/Internet bookmakers are now competing in a global market with lower entry barriers and greater substitution possibilities, populated by firms who are subject to a much lower tax burden.

Concomitant with the rise of e-commerce has been an increase in the number and availability of substitutes for betting. The most important of these is the National Lottery, introduced in November 1994, along with subsequent National Lottery branded games such as Scratchcards, the Thunderball draw and the National Lottery Extra draw. This development has meant that, even though the LBO sector continues to be dominated by a few firms who are able to exert considerable monopoly power, their influence has diminished somewhat in the face of increased substitution possibilities.

Taken together, these three trends pose a serious threat to the UK betting industry and, thus, to the tax base for betting duty. Based on these trends, we hypothesise that the demand for betting will be relatively elastic with respect to changes in the tax rate.

Unfortunately, there is only limited evidence on the elasticity of demand for betting. Exceptions include the work of Suits (1977, 1979) who found that the demand for horse racing with respect to price in the USA was moderately elastic (-1.59). Paton *et al.* (2001) report own-price elasticity estimates for UK betting that range from -1.19 to -1.25.⁵

A further motivation for the proposed tax reduction is its potential impact on the underground or shadow economy. In this context, we refer to illegal betting activity on which taxes are not paid. Schneider and Enste (2000) provide

⁵ Several authors have analysed tax revenue from lotteries (Mikesell, 1994; Szakmary and Szakmary, 1995) or estimated the price elasticity of demand for lotteries (Gulley and Scott, 1993; Farrell and Walker, 1998; Farrell *et al.*, 1999; Farrell *et al.*, 2000; Forrest *et al.*, 2000), generally reporting an elasticity that is either close to or slightly greater than unity.

evidence of growth in the shadow economies of all OECD countries. In the UK, the authors estimate that the percentage of GDP represented by the shadow economy has risen from 9.6% in 1990 to 13% in 1997. Unfortunately, Schneider and Enste cannot disaggregate these figures by type of activity, such as tobacco, alcohol, drugs, prostitution and gambling, so we cannot determine how much gambling activity has actually gone underground. More generally though, the authors attribute at least some of the rise in the shadow economy to increases in taxes on items such as alcohol and tobacco. It is interesting to note that the same individuals or groups that smuggle alcohol and tobacco, i.e. organised crime, can also potentially provide gambling services. That is certainly the case in the USA.

The limited evidence that is available on elasticity of demand and the extent of the underground economy, together with the observed changes to the competitive environment suggest that, *ceteris paribus*, the proposed reduction in betting tax will lead to a large increase in turnover. If the overall tax burden on betting is not reduced, we predict a continuing decline in the UK betting industry and the tax base for betting duty.

One factor not considered thus far is the possibility that tax changes in a given gambling sector will affect tax revenue in other gambling markets and in related industries. The magnitude of such impacts will depend on the strength of substitution across different types of gambling and in related industries. There is some limited evidence on these effects in the USA and UK. Siegel and Anders (1999) found that an expansion of riverboat gambling in Missouri was associated with a decline in revenue in other businesses in the entertainment and amusement sector. The same authors (Siegel and Anders, 2001) reported that an expansion in Indian casinos in Arizona was associated with a reduction in lottery revenues, especially for Lotto games. They did not, however, find evidence of substitution between horse and dog racing and lotteries. The strongest displacement effects were found for the big prize lottery games.

In the UK, Paton *et al.* (2001) find significant evidence of substitution between betting demand and the UK National Lottery. They estimate a cross price elasticity of Lottery turnover with respect to betting price, which falls in the range of +0.48 to +0.61. This finding implies that a reduction in the betting tax will also result in lower lottery revenue, as some punters substitute from the lottery to betting.

In Section 4, we examine the welfare implications of two alternative tax regimes.

4. Evaluating Changes to Betting Tax Policy

The consultation document issued by HM Customs and Excise (2000) on modernising betting duty asserts that potential changes to betting taxation should be judged against criteria that include allocative efficiency, distributional efficiency, industrial competitiveness and the maintenance of government revenue. We attempt in this section to provide a framework for evaluating the proposed changes against each of these criteria. In our analysis, we assume for

the sake of simplicity that incentive effects and ease of evasion will be similar under each.⁶

Conventionally, the quantity of output in betting markets is specified as the number of unit bets placed. Using £1 as the standard unit, the quantity of bets is equivalent to the total amount staked by punters. Further, the price of each unit bet is typically measured as the percentage of the stake that the punter expects to be returned in winnings. Based on this approach, the total revenue received by bookmakers is the amount they retain after paying out winnings (rather than the total amount of money received in stakes) and the so-called GPT is, in fact, a tax on net revenue. Thus, it follows that GBD, levied as the percentage of stakes, is equivalent to a *commodity* (or unit or specific) tax. On the other hand, the GPT is effectively levied as a proportion of the price charged to betters and is equivalent to an *ad valorem* tax, levied as a proportion of the price charged to consumers.

Having established this, the economic analysis of the policy shift in the UK reduces to a standard comparison of *commodity* and *ad valorem* taxes. Such a topic has been the subject of a long-standing literature dating back at least as far as Wicksell (1896). It is easy to show that, under perfect competition, an *ad valorem* tax leads to the same price and quantity equilibrium and is welfare equivalent to an equal-yield commodity tax. Fig. 2 illustrates the simple case of a linear industry demand curve and constant marginal costs. A commodity tax levied at a rate of c per unit bet shifts the marginal cost curve upwards. An *ad valorem* tax, levied at a rate of $v\%$ of the price, causes the average revenue curve faced by producers to swivel inwards around the intercept on the quantity axis. In both cases, the equilibrium price and quantity are (P^*, Q^*) and tax revenue is equal to c times Q^* .

A more interesting case occurs in the presence of imperfect competition, and many scholars have examined the relative incidence of each type of tax on consumers and producers. Several authors assess whether taxes will be 'over-shifted' or 'under-shifted' to consumers under a range of assumptions about market structure and interdependence of firms (Stern, 1987; Baker and Brechling, 1992; Delipalla and O'Connell, 2001).

⁶ Another potentially important issue is the geographical incidence of the tax. For example, central to US and Australian gambling policy is taxation based on the location of the bettor rather than (as in the UK) based on the location of the bookmaker. In the USA, out-of-state betting is prohibited, except in carefully defined circumstances. In the context of the UK, the advantage of such a 'place of consumption' (POC) tax, levied on the bet based on where it is placed is that it might discourage UK bookmakers from establishing operations overseas, and be less easy to avoid. A potential disadvantage of a POC tax, however, is that it may encourage new bookmakers, with no LBO operations, to establish solely as tele-Internet operations, not register for the tax, and undercut the established UK betting sector. Moreover, a POC tax on a service such as betting may discriminate against domestic purchasers of the product in a manner that has negative political and trade implications. That is, it might explicitly encourage bookmakers to target overseas markets. Bookmaking is a highly controversial issue in the USA, and a tax structure which, in effect, actively promotes the development of UK-based campaigns into the USA and elsewhere may have negative implications for UK industry and trade. Most importantly, a POC tax might conflict with EU law.

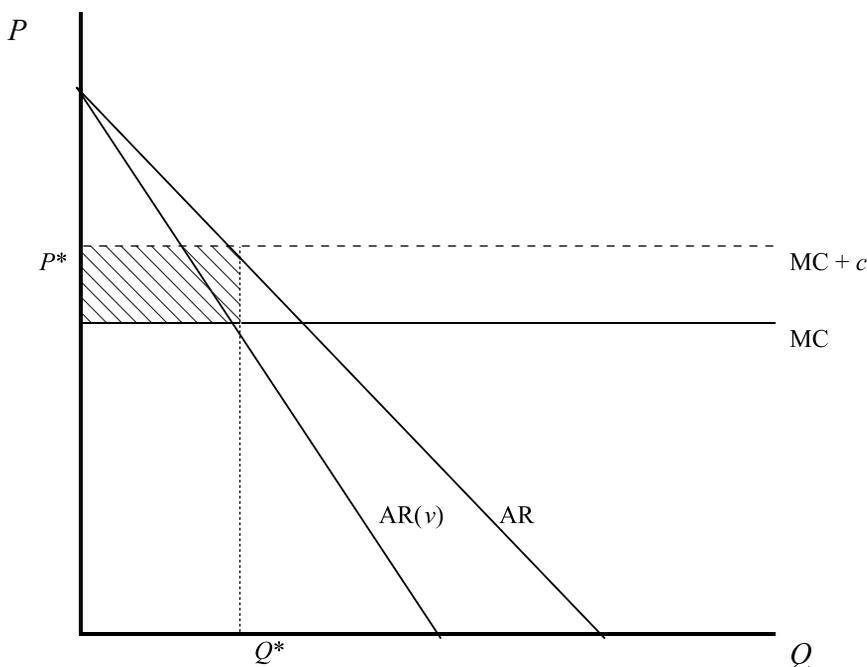


Fig. 2. *Impact of Commodity and Ad Valorem Taxes under Perfect Competition*

Notes: P^* = the equilibrium price under a commodity tax or an *ad valorem* tax; Q^* = the equilibrium quantity under a commodity tax or an *ad valorem* tax; \square = tax revenue from commodity or *ad valorem* tax

Of more direct relevance to the current policy debate is research assessing the relative impacts of each type of tax. There is a consensus in this literature that, in monopolistic and oligopolistic markets, an *ad valorem* tax generates a welfare-superior outcome relative to a commodity tax (Delipalla and Keen, 1992). Furthermore, Skeath and Trandel (1994) find that for any unit tax imposed on a monopoly, 'there exists an *ad valorem* tax ... that produces larger profit, tax revenue and consumer surplus' (p. 53). The authors also show that this result generalises to all symmetric Cournot-Nash oligopolies. For the non-symmetric case, the result holds only given certain conditions. Specifically, an *ad valorem* tax is more likely to welfare dominate a unit tax that raises an equal amount of revenue when the number of firms in the market is small and when elasticity of demand in the market is relatively high (p. 67). These conditions correspond directly to the situation in UK betting markets in which the LBO sector at least is dominated by very few firms and elasticity of demand is likely to be decreasing due to the environmental changes outlined above. Even in the case where the conditions for welfare dominance are not satisfied, Skeath and Trandel (1994) show that consumer surplus will still be higher under an equal yield *ad valorem* tax.

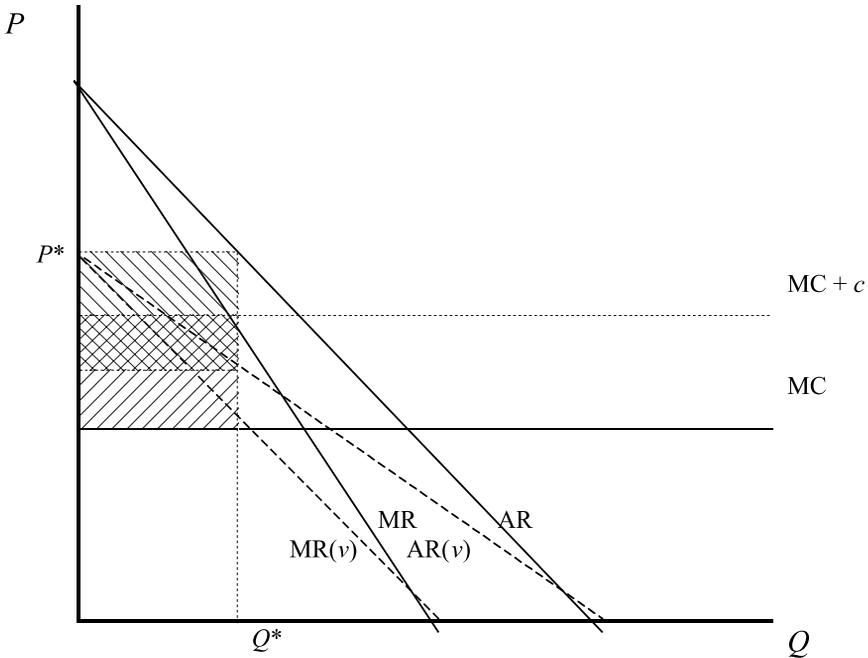


Fig. 3. *Impact of Commodity and Ad Valorem Taxes under Monopoly*
 Notes: P^* = the equilibrium price under a commodity tax or an ad valorem tax; Q^* = the equilibrium quantity under a commodity tax or an ad valorem tax; \boxtimes = tax revenue from commodity tax; \boxdot = tax revenue from ad valorem tax

Fig. 3 illustrates this in the context of a pure monopoly. Tax revenue under the commodity tax is given by the equilibrium quantity, Q^* , times c . Under the ad valorem tax, revenue is given by Q^* times the difference between AR and $AR(v)$. In order to achieve the same equilibrium price and quantity in each case, it is clear that $(AR - AR(v))$ must be greater than c and that revenue under the ad valorem tax is higher. It directly follows that a revenue equivalent ad valorem tax will result in lower prices and higher turnover in equilibrium, than will a commodity tax.

The intuition behind these theoretical results is that an ad valorem tax (such as the GPT) provides an incentive for firms that have some price-setting ability to follow a low-margin/high-turnover strategy rather than the low-turnover/high-margin strategy encouraged by a commodity tax (such as GBD). A related issue is that the GPT provides more favourable incentives for firms to innovate and to improve their technical efficiency in that the resultant lower prices (due to lower costs) induce lower taxation.⁷

The majority of empirical studies of such models analyse data on cigarette taxes. For example, Delipalla and O'Donnell (2001) use data from a range of European countries to confirm that commodity taxes do indeed have a greater

⁷ We are grateful to a referee for this point.

impact on prices than *ad valorem* taxes. Given that the cigarette industry possesses many similar characteristics to betting, in that, it is highly concentrated and faces a similar threat from 'imports' being sold at tax free prices (in the case of cigarettes, illegally so), this evidence is likely to be relevant to betting markets.

In summary, the available theoretical and empirical evidence suggests that the proposed switch from GBD to a GPT will, at worst, have a neutral impact on allocative efficiency and welfare losses in the UK betting industry. The greater the extent of monopoly power in the industry, the greater will be the efficiency benefits of a gross profit tax. Despite the increased competition from the Lottery and other forms of betting, there is clear evidence of high margins and monopoly pricing in the larger LBO sector of the UK market; see, for example, Paton and Vaughan Williams (2001). Consequently, the move to the GPT is likely to bring significant efficiency gains in this sector.

The telephone/Internet sector operates on much lower margins, so gains from allocative efficiency are much less likely here. However, a key issue facing this sector, in particular, is the threat of international competition from companies that operate offshore and, thus, can avoid paying duty. In light of this, the GPT still offers a considerable advantage to UK companies operating in this competitive sector. With a turnover tax, if margins are squeezed due to competition, the level of duty payable is not altered. On the other hand, with a GPT, if margins are reduced, the level of duty is automatically lower. In other words, the GPT provides an automatic adjustment mechanism to companies in the face of changes to the competitive environment. In industry segments where competition is intense (e.g. Internet and telephone betting), the tax burden will be relatively light. In sectors that are characterised by less intense competition (e.g. licensed betting offices), the tax burden will be relatively high. If competition is so intense that any non-zero level of tax renders it impossible for UK bookmakers to survive in this sector, then the choice between GBD and GPT is irrelevant. However, given that the political situation is such that a zero tax rate for this sector is unrealistic in the short or medium term, GPT still offers considerable advantages even to the telephone/Internet sector. There is also reason to believe that UK bookmakers have an advantage in terms of reputation for probity that might temper price competition.

The corollary of the beneficial impact of a GPT on the competitiveness of UK firms is that changes in the competitive environment will result in automatic adjustments to government revenue. These adjustments will occur because tax revenue from a GPT will depend on the price charged, which is itself determined by the market environment. An increase in competition will lead to a decrease in tax revenue. Thus, the *ad valorem* type tax is likely to lead to a much less secure stream of government revenue than the commodity type tax. In effect, the move to a GPT would shift the burden of risk away from the private sector and on to the government.

Paton *et al.* (2000) outline a simple model of the UK betting market, to estimate the impact on prices and tax revenue of a switch from GBD to a GPT. Their analysis is based on a range of different assumptions regarding the extent of

monopoly power and the magnitude of the demand elasticity with respect to tax. Some summary results of this model are reported in Table 2. The model requires estimates of price, quantity and the elasticity of demand for betting with respect to deductions. During 1999, total UK betting turnover subject to GBD was £7.3 billion, while the mean price for the whole industry is estimated to be close to 0.23 (23%). The authors use 'high' and 'low' elasticity scenarios and simulate the rates of a GPT that would be revenue equivalent to the current value of the commodity tax under different assumptions regarding the extent of monopoly power in the industry.

In the case of perfect competition, a switch to a GPT would leave equilibrium price and quantity unchanged. The revenue equivalent GPT rate is equal to 29.3% ($= t/P^*$ where t is the current level of GBD and P^* is the current equilibrium price). For every other assumption relating to the extent of monopoly power, the equilibrium price is decreased and quantity increased on a move to a revenue equivalent GPT regime. In fact, there is considerable evidence (Monopolies and Mergers Commission, 1998) indicating that bookmakers in the off-course market have significant market power. Using the mid-point assumption for the monopoly power coefficient, Paton *et al.* (2000) find the simulated revenue equivalent GPT rate to lie between 0.252 and 0.271. This implies a reduction in equilibrium price

Table 2

Revenue Equivalent (RE) Gross Profits Tax (GPT) Rates: High and Low Elasticity

Assumption regarding market structure	Revenue equivalent GPT rate	Price (current)	Price (GPT)	Quantity (current)	Quantity (GPT)
<i>High elasticity</i>					
Perfect competition	0.293	0.230	0.230	7.30	7.30
Monopolistic competition	0.252	0.230	0.215	7.30	9.12
Monopoly	0.248	0.230	0.213	7.30	9.32
<i>Low elasticity</i>					
Perfect competition	0.293	0.230	0.230	7.30	7.30
Monopolistic competition	0.271	0.230	0.213	7.30	8.55
Monopoly	0.266	0.230	0.207	7.30	8.92

Notes: The high and low elasticity estimates are -1.09 and -0.67 respectively, measured with respect to total deductions.

The monopoly power assumptions relate to the monopoly power coefficient discussed in Paton *et al.* (2000), which ranges from 1 to 2. Perfect competition corresponds to a coefficient of 1, monopolistic competition to a coefficient of 1.5, and monopoly to a coefficient of 2. This corresponds closely to the Lerner index of monopoly power.

Revenue figures are in £ billion per year. Current quantity is total betting turnover in the UK for 1999 in billions of pounds. Price is the average proportion of a £1 bet that is retained by the bookmaker (including deductions).

to between 0.215 and 0.213 and an increase in betting turnover of between 17 and 25%.⁸

The proposal to introduce GPT at a rate of 15% represents a significant reduction in the overall burden of taxation on betting. This implies an even lower equilibrium price and, consequently, a further boost to turnover. Despite this effect, the proposed rate of duty almost certainly implies a significant decrease in government revenue from betting. However, given the rapid change in technology and growth of competition, it is likely that maintaining the status quo would also result in a significant decrease in tax revenue. If the tax reduction is successful in boosting consumer demand and in reducing the offshore operations of UK bookmakers, government revenue may well be higher in the long run than under the 'no action' scenario.

Another economic issue that arises from our analysis of the impact of tax changes is the importance of substitution. It is reasonable to assume that a decline in the price of betting, arising from a switch to an *ad valorem* type tax and/or from a decrease in the overall level of taxation, will reduce the demand for substitute products. As noted in Section 3, Paton *et al.* (2001) report evidence of a high degree of substitution between the National Lottery and betting markets. Thus, any decrease in betting taxes is likely to lead to a decrease in government revenue from the lottery (which is currently taxed at a rate of 12% of sales).⁹ A natural extension of this analysis is to examine substitution and revenue impacts beyond gambling. Understanding these substitution effects is critical to providing an accurate estimate of the global impact on tax revenue of a reduction in betting duty, since several potential substitutes for gambling constitute significant sources of tax revenue for the UK government. For example, casual observation suggests that tobacco consumption is prevalent at UK betting establishments. Thus, it would be interesting to examine the impact of a change in a gambling tax on the demand for alcohol and tobacco.

Another area of concern relates to distributional or equity issues associated with the tax policy change, i.e. whether the shift to a GPT will have an adverse affect on small firms. We consider two issues here. The first is the possibility that larger bookmakers can exploit economies of scale and, thus, have substantially lower costs than their smaller rivals. The second is the fact that large bookmakers in the UK may attract a higher proportion of high margin business than do small

⁸ Paton *et al.* (2001) show that this assumption implies that just over four pence out of each pound bet is taken as monopoly profits. The figures used imply that a typical £1 bet in an off-course shop would be broken down as follows:

Returned to bettor	0.77
Tax	0.0675
Levy plus costs (including a normal profit)	0.12
Monopoly profits	0.0425

Analysis of profit margins within the industry using published accounts data and additional information supplied by Customs & Excise suggests that the largest bookmakers have a profit margin about 4 percentage points higher than smaller bookmakers. If we take mean profit margins for the latter to be representative of a normal rate of return, this lends credence to our assumption.

⁹ Although total receipts from all gambling duties in the UK are significant (£1.51 billion in 1999/2000, for example), their share of total government revenue is less than 1% and the (direct) public finance implications of the change to betting duty seem minimal.

bookmakers. Specifically, it appears that large bookmakers derive a higher percentage of their turnover from highly profitable betting on customised numbers games.

Considering the cost differential first, tax models can easily be extended to a case in which large firms have lower costs than small firms. Assume that large firms set the market price at a level sufficient to provide them with monopoly profits. Small firms only achieve normal profits and are effectively sheltering under the monopoly price set by the larger firms. As we have seen, the switch to a GPT is likely to lead to a lower equilibrium price relative to GBD. In this case, it is conceivable that this switch would result in bankruptcy for some small, marginal bookmakers. One interpretation of this exit is the failure of inefficient firms, in the face of increasing competition. It is important to note, however, that increased concentration may have a countervailing negative impact on long-run efficiency. Also, there might be important social and political considerations that make the exit of small bookmakers undesirable.

The issue of whether small bookmakers attract a greater proportion of low margin business is less ambiguous. As argued above, a GPT is effectively a tax on margins or prices. Low-priced betting products will attract a lower rate than high-priced products. Consequently, the shift to a GPT, other things being equal, is likely to benefit small firms relative to the larger firms. For example, consider two £1 bets on alternative betting products. The first product is offered by large bookmakers and returns 50 pence to the bettor before tax. The second product is offered by a small bookmaker and returns 90 pence. Under a turnover tax of 10%, both firms will pay a tax of 10 pence and tax revenue is 20 pence. The gross profits from the two bets are 60 pence, so a GPT of 33.3% would be required to maintain revenue. At such a rate, the large firm would have to pay tax of 16.7 pence and the small firm only 3.3 pence. On balance, there seems to be insufficient evidence to support concerns that the small bookmakers will be relatively worse off under the new policy regime.

5. Conclusion

The UK government has decided to base its betting taxation policy on economic criteria, such as reducing allocative inefficiency and maintaining competitiveness. This contrasts significantly with the approach taken by other countries such as the USA and Australia, where an assessment of the social costs of gambling has played a much more important role in the consideration of policies regarding betting activity.

The decision to reduce the overall level of betting taxation in the UK demonstrates an awareness of the fact that market conditions in the betting industry have fundamentally changed in recent years. Also, the switch from General Betting Duty (GBD) to a Gross Profits Tax (GPT) appears to have been directly influenced by economic theory on betting taxation. Specifically, the current method of levying duty on stakes is equivalent to a *commodity* tax, while the proposed alternative of a GPT is equivalent to an *ad valorem* tax. Assuming the existence of at least some monopoly power in the betting industry, the proposed switch to a GPT is likely to

lead to lower prices and enhanced consumer welfare, compared to a situation in which GBD is retained. The intuition behind this result is that by levying the tax on margins instead of turnover, producers with at least some market power have an incentive to reduce their price. Further, the switch will reinforce the proposed cut in the overall level of taxation in enhancing the ability of UK betting firms to compete in an increasingly competitive environment.

Under the new tax regime, we predict that the UK betting industry will be better able to cope with further changes in their competitive and technological environments. The downside of the move to a GPT is that the revenue stream from betting taxes is likely to be less stable than under GBD. In effect, the risk burden will be shifted from the private to the public sector. Still, given the rapid pace of technological change, more intense global competition and their desire to shelter firms in this industry from the deleterious effects of these environmental changes, there is a strong case that the government should assume this additional risk.

The political motivation for the proposed policy changes in the UK arises partly from the fact that the betting industry has been especially vulnerable to the growth in e-commerce. However, given the well-publicised pressure for changes in other excise duties (e.g. petrol), it is crucial to note that a change in the tax regime for betting could have important revenue implications for other products that the government depends on even more as sources of tax revenue. This is especially true for such goods as alcohol, petrol or tobacco, which could constitute substitutes or complements for betting.

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