Submission on behalf of

TATTERSALL'S

INQUIRY INTO THE AUSTRALIAN GAMBLING INDUSTRY

by the
PRODUCTIVITY COMMISSION

Prepared by
ACCESS ECONOMICS Pty Ltd

March 1999

PRODUCTIVITY COMMISSION INQUIRY INTO THE AUSTRALIAN GAMBLING INDUSTRY

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Preface

This submission to the Productivity Commission Inquiry into Australia's Gambling Industries has been prepared for Tattersall's by Access Economics. Tattersall's is subscribing also to a submission by the Gambling Industry Group, that provides an industry perspective across the full range of the Commission's terms of reference. The purpose of this submission is to provide the Commission with specific insights drawn from Tattersall's unique and lengthy involvement in the lottery industry and its more recent involvement in gaming, particularly in Victoria.

These insights contribute to several aspects of the current inquiry, notably terms of reference:

a) the participation profile of gambling
   - with particular reference to lotteries and gaming;

b) the economic impacts of gambling
   - especially the interaction with other forms of consumer expenditure, and between one gambling product and another;

c) the effects of regulatory structures;

d) the implications of new technologies; and

e) the impact of gambling on government budgets.

In approaching terms of reference (e), (f) and (g), the goal is to explore the relationship between consumer wellbeing, regulation, taxation revenues, and industry development, as it has evolved in the specific case of Tattersall's lottery and gaming businesses.

Executive Summary

Gambling in Australia

There is strong demand for recreational gambling activities

Recreational gambling activity is as old as civilisation itself. Fall of the dice, and other chance events, were commonly used in early civilisations as signals of divine will. There was a strong belief that man could sometimes intervene so that providence would flow his way.

Such beliefs still influence the behaviour of many modern gamblers.

Gambling reflects powerful forces in human nature and society. Human progress has depended on a willingness (indeed a desire) to take risks. The action of taking a risk can itself be rewarding.

Many economic, recreational and cultural activities involve a form of gambling (interpreting the word at its broadest). Given the prevalence of 'gambling' activities in economic life, it is not surprising that there is a strong demand also for recreational gambling activities.

Gambling: an integral part of the Australian economy

Gambling is an integral part of the Australian economy. Expenditure on gambling (i.e. the amount lost by bettors) totalled $11 billion in 1997/98 – equivalent to 3.3 percent of private consumption expenditure.

This amount – which also represents the gross revenue of gambling providers – is a better measure of the impact of gambling than the total amount wagered (estimated at $80 billion in 1996/97).

About one third of gambling expenditure goes to governments in the form of levies and taxes, and the remainder to venue operators and providers of gambling services.

There is strong social acceptance of gambling in Australia

There is general social acceptance of gambling in Australia, and strong consumer demand. By meeting that demand, Tattersall's and other gambling providers are contributing to the consumer wellbeing of Australians.

The vast majority of Australians have enjoyed gambling in moderation for decades. To the extent that they have increased their participation in some forms of gambling in recent years, this mainly represents the free exercise of consumer choice in response to changing product availability and innovation in the gambling market.

Increased expenditure on gambling has not been at the expense of lower savings

Over the past fifteen years there has been a rise in the proportion of consumer expenditure devoted to gambling. It is sometimes claimed that the household saving ratio has fallen as a result.

However, there have been a number of other substantial changes in household expenditure in recent years, and an expansion in consumer credit.

There is no reason to single out changes in gambling expenditure as having in any way a "special" impact on saving.

The increase reflects the spread of casinos and electronic gaming machines

The increase in gambling expenditure has largely reflected the spread of casinos and electronic gaming machines to states where they were previously prohibited.

Traditional forms of gambling, such as lotteries, have seen sales plateau or decline. They have responded with innovations designed to preserve market share.

In the process, previous sharp distinctions between one form of gambling and another have become blurred.

The large prize is the principal attraction of lotteries

The principal attraction of lotteries and similar products is the (small) chance of winning a very large prize in return for a modest stake.

Since many tickets need to be sold to fund the prize, draws are held infrequently (e.g. weekly).

EGMs offer more continuous involvement and feedback

Newer forms of gambling, such as electronic gaming machines (EGMs), offer more continuous, active involvement and feedback in a social situation.

The experience is more interactive, though maximum prizes are lower.

There has been rapid innovation in gambling

Recent years have seen innovations designed to:

- provide more involvement and feedback in lotteries, through the introduction of the Tattslotto numbers game, the televising of prize draws, and the introduction of variations on the basic game such as OzLotto and Powerball;
- increase the size of the Lotto prizes through pooling across state boundaries, and the introduction of less frequent superdraws with larger maximum prizes;
- provide larger maximum prizes through EGMs by linking jackpots across venues; and

- provide a Lotto-like game (Club Keno) in casinos and EGM venues.

The internet has created new challenges

The internet has triggered a new wave of innovation in gambling.

Offering a complete range of gambling activities in the home, it presents challenges to service providers and regulators.

A small minority experience gambling problems

As with most other things that people do keenly, gambling can be habit-forming. In a small minority of participants this habit can become so strong that it causes problems for other people.

Tattersall's strongly advocates a responsible approach to gambling.

There is no evidence that lotteries cause gambling problems

There is no evidence to suggest that lotteries and similar products are a source of gambling problems.

There is evidence that more continuous forms of gambling such as race track betting and EGMs can give rise to problems from excessive gambling. But the consequences are serious for only a very small proportion of the adult population

We provide a detailed examination of gambling behaviour

The ABS Household Expenditure Survey (HES) is an important source of information on gambling behaviour. It relates gambling to a wider range of household characteristics and other expenditures than any other source.

In this submission, we conduct a detailed analysis of HES data on gambling patterns, more sophisticated than any previous study. The results differ in some respects from those obtained by the Victorian Casino and Gaming Authority (VCGA) research program.

Tattersall's unique contribution

Tattersall's is unique in the Australian gambling industry

Tattersall's is unique in the Australian gambling industry for:

- the length and success of its involvement in the industry;
- its unusual trust structure that provides
  - (a) strong commitment to long term development of the business;
  - (b) strong commitment to social responsibility and philanthropy, and
  - (c) flexibility to respond to a changing market and regulatory environment; and

  its extensive track record of innovation, efficiency and honesty.

Tattersall's has a unique track record

Tattersall's achievements include:

- conduct of a successful evolving lottery business that, over a period of more than 100 years, has become a household name and a national institution;
- development of successful partnerships, first with the New South Wales Government, then with the Queensland, Tasmanian, and currently the Victorian Governments. Tattersall's Victorian lottery operations have been in existence for some 35 years. The license was won again, in open competition, in 1982;
- introduction to Australia of the Lotto numbers game, and the provision of leadership in its subsequent development Australia-wide, through product innovation and through the formation of the Australian Lotto Bloc;
- achievement of the lowest cost lottery business in Australia, or indeed the USA;
- payment of the highest sustainable tax rate to a State government of any Australian lottery business;
- attaining high market penetration for lottery products, in Victoria and other Australian jurisdictions, where operation is permitted together with the development of a successful international operation in six other countries;
- development of a successful EGM business in Victoria, involving large scale deployment of sophisticated electronically linked machines, incorporating advanced gaming features and security; and
- a deep commitment to enhancing the well-being of the Australian community, as demonstrated by Tattersall's unmatched record of philanthropic activities.

Gambling and government

Gambling is subject to intense regulation

Direct government involvement in running gambling operations is diminishing, but the industry continues to be subject to intense regulation. This involvement reflects the industry's importance as a source of revenue, the importance of excluding criminal elements from the gambling industry, the importance of fairness in the conduct of all forms of gambling, as well as a perceived need to monitor and control social impacts in an time of rapid change.

Important lessons from Tattersall's history

Tattersall's history illustrates the changing nature of government/industry interactions in the lottery and gaming sectors. Lessons to be drawn from that history include:

- the strength of underlying demand for gambling products, whatever the official attitude towards their desirability or legality;
- the impossibility of controlling interstate (and for that matter international) trade in gambling services unless there is effective cooperation between all jurisdictions;
- that gambling's effectiveness as a revenue raising device means that governments have not long been able to maintain a policy of prohibition and non-involvement. The potential for revenue loss to other jurisdictions has also been a strong factor encouraging the spread of gambling services within jurisdictions;
- that regulation of gambling which lacks popular legitimacy is likely to be ineffective and to tend to discredit those supposed to enforce it. It may also invite accusations of hypocrisy against government;
- the importance of efficiency, honesty and fair dealing in determining which providers of gambling services will succeed in the long term. These attributes reflect both the provider of the gambling service and the regulatory framework within which it operates;
- the importance of full, objective examination of options and consequences before major changes are made to gambling legislation. Change should balance the response to market dynamics against the need to preserve revenue and to monitor and control the impact on society.

Lotteries: a legislated monopoly

In the case of lotteries, state governments have traditionally licensed a single provider in each jurisdiction. This has allowed them to generate high revenues, as well as facilitating social control.

Tattersall's currently has the lottery licenses in Victoria, Tasmania, the ACT and the Northern Territory.

There are substantial economies of scale and scope in provision of lottery services, that are not fully exploited in the market offered by an individual state. Led by Tattersall's, the pooling of prizes across state boundaries has allowed the achievement of some economies of scale.

More competition would lead to greater efficiency

Lack of competition between lottery providers means that costs are high in some jurisdictions.

If in 1996/97 providers in all jurisdictions had achieved the same level of costs as Tattersall's Victorian operations, total costs Australia-wide would have been some $150 million less than actually observed.

Had there been effective competition between service providers across state boundaries, this saving would have been available to governments as higher revenues, or to bettors as a higher maximum prize or expected return.

Lottery providers should be able to compete across state borders

In future Australian consumers are likely to obtain increasing access to large scale lotteries operated by foreign organisations such as Camelot (UK) and G-Tech (USA).

It is essential that governments allow Australian lottery providers to anticipate that competition by removing the regulatory barriers that currently prevent lottery providers competing across state/territory borders.

This would allow the emergence of strong national organisations, capable of meeting future international competition.

The regulation of EGMs

EGM regulation differs among the states

The regulatory regimes in each of the States have developed in light of their different historical experiences with gaming machines and reflect different attitudes towards the clubs industry. New South Wales, the State with the longest history of gaming machine operation in Australia, has the most fragmented and decentralised approach to regulation. The States that have introduced EGMs in the 1990s – Victoria, Queensland and South Australia – have been influenced in designing their regulatory arrangements by both the technological possibilities provided by modern IT systems for centralised monitoring and by the desire to adopt regulations that are conducive to the efficient operation of the gaming machine industry. These States also have been more willing than New South Wales to place controls on the number of machines. All States impose some form of controls on the number of machines at particular venues.

The trend toward centralisation of regulatory structures

The Victorian government decided to separate the ownership of gaming machines through the creation of two gaming operators from the venue operators. Provision of gaming machines by Tattersall's and TABCORP has achieved the desired objectives of

probity and the promotion of public confidence, and has allowed orderly introduction of EGMs into Victorian clubs and hotels. In addition it has facilitated central monitoring of gaming transactions and revenue flows, and has enabled rapid innovations across the system (for example the linking of jackpots). Queensland has moved in the direction of the Victorian system through the granting of eight gaming operator licences and New South Wales has granted the TAB the exclusive licence to operate a centralised monitoring system. It will take until 1 January 2001 for the NSW system to become operational.

Advantages of the gaming operator approach

Victoria's EGM operator system offers a number of advantages, including that:

- it is easier to police for probity issues because there are only two points of contact at the gaming operator level;
- it is less likely to have probity problems because the two operators are large, responsible organisations – and in Tattersall's case with a long, successful track record in the honest provision of gambling services;
- the licence renewal process keeps the two operators focussed on being successful long term players;
- having two operators enables network economies of scale which derive from the centralised monitoring of a network of gaming machines and EGM purchasing;
- it provides flexibility in tackling emerging social priorities; and
- it enables the operators to obtain better terms when dealing with suppliers, such as EGM manufacturers.

Internet gaming

Regulation of internet gaming is better than prohibition

Internet gaming is expanding rapidly. Much of it is based in jurisdictions with little regulation.

It is better to regulate and control internet gaming, rather than drive it underground by seeking to prohibit it.

Tattersall's supports the current Australian approach

Tattersall's supports the national regulatory model for interactive gaming, agreed by Australian State and Territory Gaming Ministers in May 1997.

Internet gaming may be easier to control than traditional gaming

Since players must register with the operators in order to participate in internet gaming, there will be more information available to regulators about individual players.

This means that it may be easier than with traditional gambling forms to control problem gambling, underage gambling and the potential for criminal activity.

Gambling taxation

Gambling is highly taxed

Gambling is an important source of revenue for governments. Payments to governments average 34 percent of gambling expenditure (or 4 percent of gambling turnover).

High gambling taxation has been justified historically as a trade-off for permitting activities that were previously illegal. It has also been described as "voluntary taxation" since no one is required to gamble, and therefore to pay it.

Tattersall's acknowledges governments' need for revenue, and has cooperated fully in the collection of state taxes and the payment of levies required by its licenses.

Lottery taxes are onerous

Lottery taxes are high compared to those on other forms of gambling.

Payments to governments average 33 percent of lottery turnover and 83 percent of lottery expenditure (compared to 2 to 5 percent of turnover and 20 to 37 percent of expenditure for other major forms of gambling).

Gambling taxation distorts choice and is regressive

Gambling taxation (in particular that on lotteries) distorts the odds facing participants in the various forms of gambling, and the cost of gambling relative to other goods and services.

Gambling taxation is also somewhat regressive, bearing more heavily on poorer households.

Victorian revenues benefit from Tattersall's efficiency

Lottery taxation in Victoria can also be high because lottery operating costs are low compared to those in other jurisdictions.

There could be substantial gains in economic efficiency (or in government revenues) if lotteries in other states operated with the efficiency of that in Victoria.

High lottery tax rates are hard to justify

Specific taxes on gambling could be justified on the grounds that the tax offsets the cost to society of gambling related problems. However, this does not explain why taxes are highest on lotteries which, it is generally acknowledged, create few social problems.

High rates of taxation could be justified on grounds of economic efficiency ("Ramsey taxation"), if the demand for gambling is insensitive to the rate of tax. However, *Access Economics*, in a separate study for Tattersall's, has shown that the rate of tax on lotteries is higher than can be justified on efficiency grounds.

Revenues would rise if lottery tax rates were lower

The *Access Economics* study implies that government revenue and consumer wellbeing would both be higher if the effective rate of lottery tax were lower.

The Productivity Commission should examine the principles underlying gambling taxation

The demand for gambling products may have been price inelastic in the past. However, it is likely that this is becoming less true as different forms of gambling proliferate, and become more substitutable – and as supply across jurisdictional boundaries (and through the internet) becomes a reality.

Tattersall's therefore believes that the principles underlying the design of an efficient and equitable system of gambling taxation warrant careful scrutiny by the Productivity Commission.

1 Gambling in Australia

(Refers to Inquiry Terms of Reference: (a) nature and definition of gambling; (b) the participation profile of gambling; (c) the economic impacts of gambling, and (d) the social impacts of gambling)

1.1 Preamble

This submission is about gambling in Australia and its regulation. There is a particular focus on those forms of gambling in which Tattersall's is most directly involved. Tattersall's is best known for its role in the lottery business – particularly the introduction to Australia of the Lotto numbers game. Since 1992, it has also been involved in the ownership of electronic gaming machines (EGMs) in Victoria.

It is important to realise, however, that these are just the latest phases in an ongoing, thriving business that had its origins in George Adams' Tattersall's Sweeps in Sydney in the 1880s, and is continued today by the Trustees of the Estate of the late George Adams. It is a business unique both in form, and in its long history of successful provision of gambling services to the Australian and international communities.

Definitions

First some definitions:

Gambling: "the betting or staking of something of value, with consciousness of risk and hope of gain, on the outcome of a game, a contest, or an uncertain event whose result may be determined by chance or accident or have an unexpected result by reason of the bettor's miscalculation" *(Encyclopaedia Britannica*)

Lottery: "a procedure for distributing something (usually money or prizes) among a group of people by lot or chance." Specifically, it is a form of gambling in which a usually large number of people purchase chances, called lottery tickets, and the winning tickets are drawn from a pool composed of all tickets sold or offered for sale. The value of the prizes is the amount remaining after expenses--including the profits for the promoter, the costs of promotion, and the taxes or other revenues--are deducted from the pool. In most large-scale lotteries a very large prize is offered along with many smaller ones. Lotteries have a very wide appeal as a means for raising money; they are simple to organize, easy to play, and, in general, popular but controversial." *(Encyclopaedia Britannica)*

1.2 Why do people gamble?

Recreational gambling activity is as old as civilisation itself.

Gambling has been recorded in one form or another in a wide range of early civilisations. Dice are the earliest recorded gaming implements, dating back over 2,000 years in Egypt and India. They were also used in China, by Aztec & Maya, North American Indians,

Eskimo and Africans. They have featured in Greece, Rome and all subsequent civilisations.

Fall of the dice, and other chance events were commonly used in early civilisations as signals of divine will or intentions. Drawing of lots has been used since biblical times as a way of distributing property. It was seen not only as impartial, but also as a way of allowing divine or providential influence to determine the outcome.

Gambling can be seen as a sacred or virtuous activity. In some religions, (e.g. Hinduism), engaging in gambling at appropriate times of the year is still seen as a way of ensuring future good fortune.

There was a strong primitive belief that man could, in deserving circumstances, intervene so that luck or providence would flow his way. These strong beliefs have survived the development of mathematical probability theory and formal statistical methods, from the 16th century onwards[1]. They influence the behaviour of many modern gamblers.

Gambling reflects powerful forces in human nature and society.

Human progress has depended on a willingness (indeed a desire) to take risks. A favourable return to risk-taking is a deeply rewarding experience. Failure can give rise to a determination to "try, try and try again". For the right type of personality, the action of taking a risk is itself rewarding.

Entrepreneurship involves expenditure of time and resources, and incurring risk of loss, in order to build a new human activity. Business ventures, finance and asset market speculation are all forms of entrepreneurship, on this definition. Modern economics indicates that these activities, if they are profitable, are most likely contributing to the overall well-being of society.

Similar trade-offs occur in many non-economic activities undertaken by individuals. A decision to engage seriously in a sporting, cultural or community activity usually involves a substantial initial commitment of time and resources, for rewards that are uncertain, but believed to be positive. The form of the reward differs from case to case. But the size of the reward, and the likelihood of achieving it, must be believed *ex ante* to be worth the initial commitment.

For the individual, these entrepreneurial, and equivalent non-economic, activities involve exchanging known outcomes of low value for ones that are uncertain, but potentially better. They are all of them a form of gambling (interpreting the word at its broadest).

The activity involved in the 'gamble' can be rewarding, as well as the 'gamble' itself. People draw satisfaction from acquiring knowledge and skills, exercising power over resources and other people, deploying their skills, and anticipating the outcomes of the 'gamble'.

[1] The earliest formal analysis of gambling games is in *Liber de ludo aleae* by Geralomo Cardolamo.

Given the prevalence of 'gambling' activities in economic life, it is not surprising that there is a strong demand also for recreational gambling activities.

1.3 Nature of recreational gambling activities

There is a wide variety of recreational gambling activities. They all involve four basic ingredients:

(1) a pure gamble, involving the purchase of a stake or bet, and the subsequent determination and payment of a return – based on rules laid down in advance;

(2) a social experience, associated with participation in the activity, purchase of the stake, and experiencing the outcome;

(3) an organisation that provides the gambling service, including provision, maintenance and operation of the necessary infrastructure – together with any associated activities; and

(4) a legally-sanctioned administrative structure that determines the rules of the activity, regulates it, and oversees the distribution of the revenues – particularly the payment of taxes to governments.

From the point of view of the participant, key features that distinguish one gambling activity from another include:

(1) the size of the hoped-for prize;

(2) the purchase price of each bet;

(3) the odds against winning with a single bet;

(4) the extent to which the odds can be affected by the use of skill;

(5) the time between placing the bet and the determination of the outcome;

(6) the ease of placing a second bet following the determination of the first;

(7) other experiences associated with participation (e.g. the nature of the venue);

(8) the availability and social acceptability of the activity; and

(9) the reliability of the gambling product (i.e. freedom from fraud, or malfunction).

Institutional arrangements are important

Institutional circumstances, such as those listed in (8) and (9) are important in determining the level of individual gambling activities. Legality or illegality; the number and ease of access to gambling outlets; the extent of consumer protection; all have a strong influence on the level of consumption.

The widespread acceptance and market penetration of Tattersall's products is a testimony to the importance of quality and reliability of service – within a strong regulatory framework.

Characteristics of the games themselves

Within a given institutional framework, the intrinsic characteristics of the gambling activities are also important in distinguishing one from another, and in determining their attractiveness to consumers.

Walker (1992)[2] identifies three attributes of gambling activities as being particularly important:

- the size of the hoped for prize;
- the amount of skill that can be deployed; and
- the speed with which the outcome of a bet is determined, and a new bet placed.

All gambling activity is "irrational", in the sense that the expected return to the bettor is less than one[3]. Hence gambling activities must provide participants with benefits sufficient to offset the expected financial loss.

Large prize the main attraction of lotteries

In the case of lotteries, the main benefit is the chance (however small) of gaining a very large increase in wealth, in return for a small outlay. However lotteries offer comparatively little opportunity for the deployment of skill, and are drawn at relatively infrequent intervals.

Other gambling activities, notably casino games, electronic gaming machines, and horse race betting, offer more rapid turnaround, with varying opportunities for deployment of skill. Maximum prizes are usually smaller

According to Walker, there is broad similarity, around the world, in ranking of gambling activities by size of prize, and in the odds offered to the participant.

Lotteries have the highest percentage "Edge to the house"

Figure 1.1 (reproduced from Walker) is the basis for a suggestion that the percentage edge to the house (i.e. one minus the expected return to the bettor) is proportional to the logarithm of the size of the hoped for prize.

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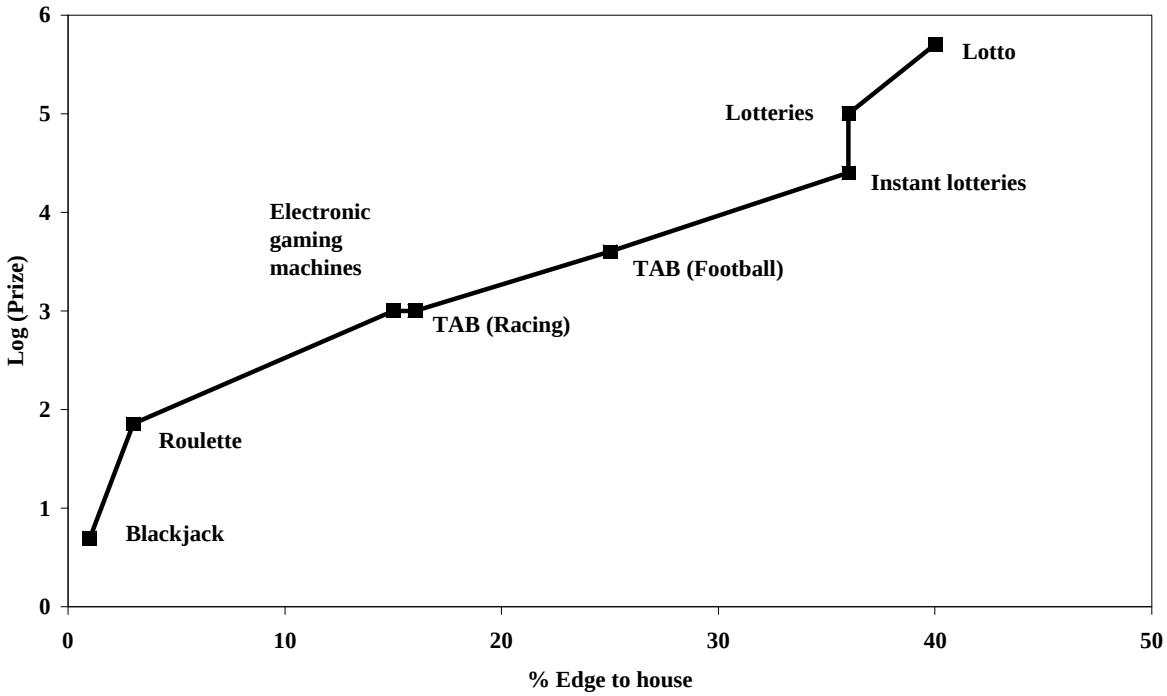
[2] M.B. Walker (1992), *The psychology of gambling*, Pergamum Press, Oxford

[3] This point is well argued in W.A. Wagenaar (1988), *Paradoxes of gambling behaviour*, Essays in cognitive psychology, Lawrence Erlbaum & associates, Hove and London.

Walker offers no clear explanation for this relationship. One possible explanation is that activities such as blackjack, roulette and EGMs involve placing a rapid sequence of bets, whose combined odds are less than those of a single bet.

An economist might also note that gambling activities have traditionally been provided under conditions of near monopoly, and that government generally plays an important role in determining the expected return to the bettor. A possible explanation, therefore, is that the relationship in Figure 1.1 reflects a combination of taxation and monopoly pricing influences that historically has yielded, or was thought to yield, an optimal outcome from the point of view of promoters and governments. Taxation issues are considered further in Chapter 5.

Figure 1.1. Size of Prize vs. Edge to the House



Some gambling activities are attractive because they have "flow" attributes

Recent psychological research[4] has shown that rapidity of feedback, and the opportunity to apply skill in circumstances where the participants feel they are in control of the situation, are important attributes of so-called "flow" activities. Such activities (which cover a very wide variety of job, intellectual, cultural, sporting and recreational activities) are those whose participants frequently report high levels of satisfaction. Gambling activities that have "flow" attributes are therefore likely to be seen as attractive by participants.

[4] M. Csikszentmihali, *Flow: the psychology of happiness*, Rider, London,1992

Consistent with this is Walker's (1992) suggestion that activities that allow the gambler to apply some skill – thereby allowing a belief that he (she) can control the odds, are likely to be especially attractive. This, together with the opportunity to repeat bets frequently, is likely to encourage heavier spending. Horse racing, electronic gaming machines and casino table games are examples of activities that offer one or both of these attributes.

Spending is heavier on activities with "flow" attributes

There is some support for this notion in the VCGA's survey of community gambling patterns in Victoria. Table 1.1 shows the average amount that gamblers say they are prepared to spend on each occasion they undertake the activity.

Activities such as lotto, scratch tickets and raffles attract much smaller average expenditure than other activities that may involve more skill. Casino activities and EGMs, which offer frequent repetition, plus in some cases the application of skill, also have a high preparedness to spend.

Table 1.1. Amount gamblers are prepared to spend

Activity	$ per occasion
Casino	42
EGMs	27
Informal cards	32
Horse racing	26
Trotting	22
Footy betting	12
Lotto	8
Scratch Tickets	4
Raffles	4

Habit formation

Preparedness to spend heavily, combined with frequent participation, implies that some gambling activities are strongly desired, and potentially habit forming. If the habit can become so strong that it leads to serious social consequences, then that is grounds for community concern about the regulation of gambling, and the measures in place to deal with its consequences.

1.4 Gambling: consumer benefit or social cost?

There is controversy over the social costs arising from the recent expansion of gambling facilities in some states, including Victoria.

The straightforward economic view is that consumers are the best judge of how to spend their income. If they choose to spend it on gambling, then that is itself evidence that gambling is meeting a consumer want, thereby increasing the consumer wellbeing of society. Similarly, removal of regulations limiting access to gambling is likely to be in the best interests of society. On this argument, the general consumer acceptance of EGM and casino gambling in Victoria is strong evidence that substantial consumer wellbeing has been created.

To argue, as some have done, that gambling is a waste of money and an unproductive use of time, is to impose the tastes and value judgements of one part of society on another. It ignores the argument advanced earlier that in a broad sense "gambling" is a basic human activity. Hence we should not be surprised that recreational gambling activities have strong appeal. As evidence of that appeal, we need only note that consumption is high even though all gambling activities are subject to high levels of taxation.

A more serious argument is that gamblers (or the act of gambling) impose costs on the rest of society that are not reflected in the costs borne by gamblers themselves. Such costs might be of several kinds:

(1) gambling may impose a macroeconomic cost, in the form of reduced national saving, in turn leading to lower economic growth;

(2) some forms of gambling may be addictive, at least for some players. Addiction brings costs to the individuals themselves (e.g. loss of earning capacity). People become addicted because they are myopic and do not realise the long-term consequences of their actions. They therefore need protecting from themselves;

(3) addiction imposes costs on society, as a result of family breakdown, gamblers' criminal behaviour, and destitution.

We consider each of these issues in turn.

(1) Possible impact on national savings

The empirical evidence in support of the proposition that gambling has reduced savings is discussed below (in Chapter 3 and Appendix A). We do not find it compelling.

However, even if it were established that heavy gamblers had lower savings, it would not necessarily imply a social cost of the kind that might justify intervention. If gamblers' saving decisions were the result of their own well-informed rational choices, and they bore the full consequences of any decisions to save less, then lower savings as a result of the expansion of gambling would still represent an optimal outcome for society.

(2) People need protecting from themselves?

It is beyond dispute that some people develop a gambling habit so strong that it dominates their other activities. In some cases the habit can be classed as an addiction, requiring illegal or antisocial behaviour to support it.

Survey evidence suggests that only a small proportion of the adult population[5] has a problem handling its gambling habit. As opportunities to participate in legal gambling activities increase, so apparently does the proportion of the overall population affected by gambling problems. This increase must be set against the much larger absolute increase in the number of people who gain benefit from their increased access to recreational gambling activities.

There is no agreement why some people develop gambling problems and others do not. Gambling problems would appear to be psychological, or behavioural, in nature. There is little evidence of the physiological responses that help explain addictions to heroin or tobacco. Gambling problems appear most likely to occur where the activity offers rapid outcomes and an immediate opportunity to repeat the activity[6]. They are more likely also, when the activity involves some skill (or the illusion of skill), allowing the gambler to feel some control over the outcome. (Walker 1992*)*. There is evidence that the habit may be encouraged by depression, but less evidence that problem gambling activity is associated with abnormal psychological states. (Walker 1992)

It would appear that problem gamblers are not myopic, in the sense that they do not know the expected long run return to gambling, nor the potential for addiction[7]. However, it does appear that they hold ill-founded beliefs about the role that good luck can play, even when the odds are clearly against them. A belief that their luck will turn can sustain gamblers through extended periods of losses, and encourage the destructive practice of chasing losses with larger subsequent bets[8].

There is a respectable school of economic thought (following the lead of Nobel Prize winner Gary Becker) that argues that addicts are rational, in the sense that their behaviour can be interpreted as maximising an unchanging utility function, in full knowledge of the potential future consequences of their current actions.

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[5] The VCGA's latest annual survey indicates that the proportion of adult Victorians with a gambling problem is around 1 percent. It also cites studies suggesting that the proportion may be as high as 3 percent in NSW, which has had a longer exposure to EGMs.

[6] VCGA (1997) *Definition and incidence of problem gambling, including the socio-economic distribution of gamblers,* study by the Australian Institute of Gambling Research, August

[7] This statement is also supported by the empirical economic studies of rational addictive behaviour, summarised in G.S. Becker (1996), *Accounting for tastes,* Harvard University Press, Cambridge, Massachusetts.

[8] W.A. Wagenaar (1988), *Paradoxes of gambling behaviour,* Essays in cognitive psychology, Lawrence Erlbaum & associates, Hove and London.

(3) Addiction imposes costs on society

While it is possible to debate whether the costs that problem gamblers impose upon themselves are truly a cost to society, there is no doubt that costs imposed on others are a genuine social cost.

These costs arise as a result of loss of business productivity, family breakdown, gamblers' antisocial and/or criminal behaviour, and destitution. They take the form of loss of wellbeing of the problem gambler's associates, and costs to welfare agencies and community groups.

While social costs undoubtedly exist, there is no agreement on their size. Arthur Andersen[9], for example, list a number of examples of the negative social impacts of excessive gambling on individuals and households. However, they are unable to find any comprehensive estimate of net social cost in the Victorian research that they survey.

Wootton comments[10], "the social costs of gambling are many and, admittedly, are difficult to determine accurately without large-scale expenditure on research." (p. 75).

Estimates, based on overseas research, have been derived for Australia, for example by Smith[11]:

> There are a wide range of estimates of gambling's 'social cost'. Different studies have differing definitions of adverse externalities from gambling, or treat 'transfers' between gamblers and other individuals differently……
>
> A pessimistic view is perhaps given by reference to US estimates of $US13,200 per problem gambler. In this case, the social costs of a 2% incidence of problem gambling in Australia would be around $3.5 billion, rising to $10.5 billion for a 6% incidence of problem gambling. Towards the more conservative end of the spectrum, using narrower definitions underlying estimates for NSW by the Australian Institute of Gambling Research, the social costs of excessive gambling are much lower. Assuming a 1% incidence of pathological and 'core' problem gamblers, social costs of excessive gambling in Australia in 1995-96 using these estimates would be around $154 million pa. *(pp74,75 footnotes omitted)*

These estimates have an unacceptably wide range. It is inappropriate to apply US-based estimates to Australian conditions. The existing Australian estimates are based on limited research and data[12]. It is important to have an accurate, unbiased estimate of the size of

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[9] Arthur Andersen, *Summary of findings: 1996-97 research program*, study for the VCGA, December 1997.

[10] Bob Wootton "Is gambling a winner in Victoria?", in M. Cathcart and K. Darian-Smith (eds), *Place your bet: gambling in Victoria*, The Australian Centre, University of Melbourne, 1996

[11] J. Smith, *Gambling taxation in Australia*, Research Study No 32, Australian Tax Research Foundation, Sydney, 1998

[12] The US estimates are taken from Chapter 3 of Robert Goodman's, *The luck business*, (Free Press Paperbacks, Simon & Schuster, New York 1995).

the social costs created by problem gambling, before discussing possible public policy approaches to the problem. **Tattersall's therefore encourages the Productivity Commission Inquiry to take a fresh look at this issue in the current inquiry.**

1.5 Lotteries not a major source of problem gambling

A lottery ticket involves the purchase of the hope of a large prize, even though the odds of winning are very small, and the expected return (in a statistical sense) negative. International experience (Wagenaar 1988) and the evidence from lotto (summarised below) is that the demand for lottery tickets responds strongly to increases in the maximum prize. Demand is also more inelastic to changes in the odds of winning, when the prize is large.

The attributes which make lottery tickets attractive are not those which are believed to cause problem gambling behaviour. The lottery (at least in its traditional forms) does not offer a rapid outcome, nor is there a strong incentive to make another immediate purchase on learning the outcome. Nor is there a significant element of skill involved in the activity.

While heavy gamblers purchase lottery tickets, this is just a facet of their wide participation in gambling. **There is no evidence that lotteries are a cause of problem gambling behaviour in Australia.**

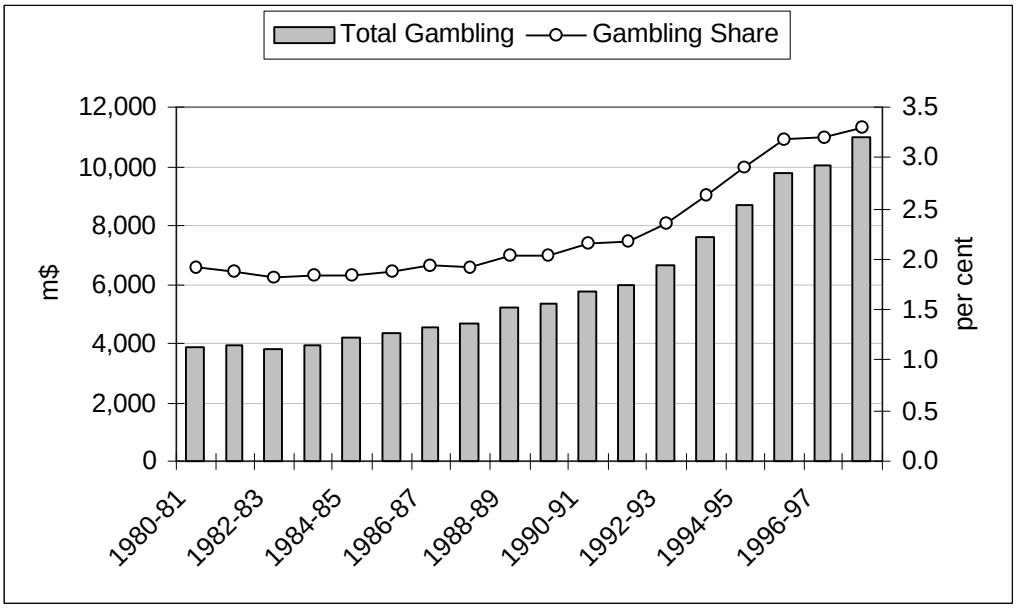
We do not here attempt an informed commentary on the US gambling market or on the way that public policy is made there. Whatever the underlying truth, one has to be alert to the way that this author appears to manipulate the presentation of the material in order to bolster his case. To give some examples (we are indebted to DL Rados, *Journal of Macromarketing*,16,1,140-2, Spring 1996, for some of these points):

- the amount wagered annually is said to be $ 482 million is said to be twice the sales of the motor vehicle industry. However, this is the amount bet, not the amount lost (or "expended" in economic terms). The amount expended is only some $40 billion per year;
- there is concern that state lotteries spend about $350 million per year on advertising. However, expressed as a ratio to sales, the figure seems more modest; just over 1 percent. Curiously, the book then refers to gambling's contribution to state revenues as a mere 1.2 percent of total revenues – never mentioning that this is probably of the order of $10 billion per year;
- there is no attempt to unravel the confusion surrounding the various degrees of problem, compulsive and pathological gambling, nor the corresponding range of estimates of the proportion of the population affected;
- presentation of the estimates of the costs per problem gambler is similarly ingenuous: "estimates of the yearly combined private and public costs of each problem gambler have ranged between $20,000 and $30,000 in 1993 dollars, with some reports as high as $52,000. The United States Gambling Study, which I directed, arrived at a much more conservative estimate of $13,200 per problem gambler per year in 1993 dollars." (p 51) By contrasting the $13,200 estimate the higher estimates of others, we are deflected from questioning the basis of the $13,200 estimate itself.

2 Gambling Participation and Spending in Australia

(Refers to Inquiry Terms of Reference: (b) the participation profile of gambling; (c) the economic impacts of gambling, (d) the social impacts of gambling; and (h) the adequacy of ABS statistics on gambling)

Figure 2.1. Total Expenditure on Gambling and Share of Total Household Expenditure, Australia 1980-81 to 1997-98 (1997-98 dollars)



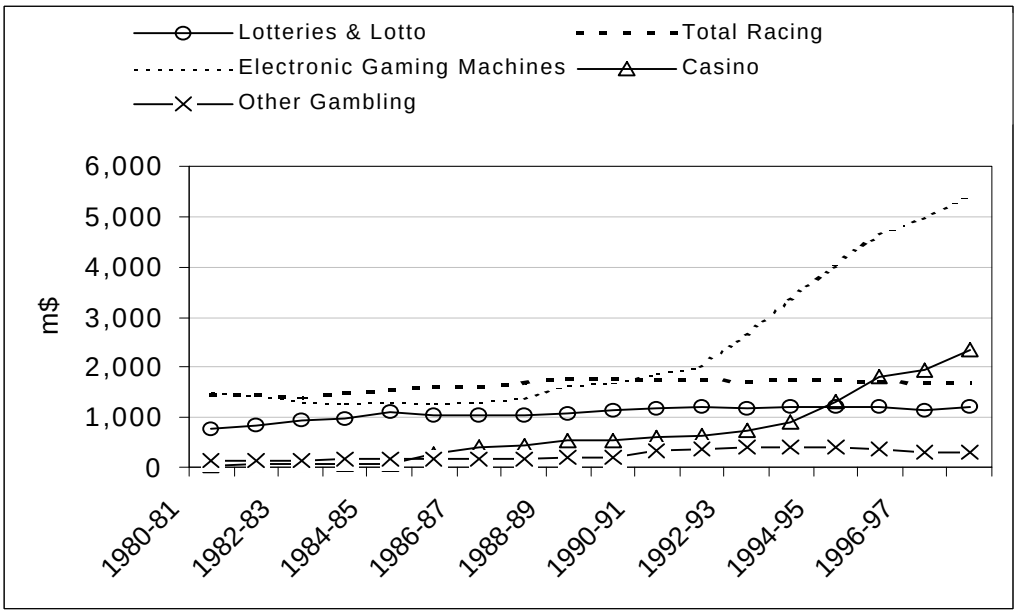
Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission and Australian National Accounts, ABS

2.1 Gambling's changing structure

The past decade has seen a rapid expansion in overall Australian expenditure on gambling. (Figure 2.1). Expressed in 1997-98 prices, expenditure has grown from over $4 billion in 1987/88 to $11 billion in 1997/98. Gambling's share of household expenditure has grown from 2 percent to 3.3 percent over the same period.

The increase has been largely due to the growth of expenditure on electronic gaming machines and casinos. (Figure 2.1). Expenditure on other forms of gambling has been flat.

Figure 2.1. Gambling Expenditure by Type of Game, Australia 1980-81 to 1997-98 (1997-98 dollars)



Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission and Australian National Accounts, ABS

Table 2.1. The Share of Total Gambling Expenditure by Type of Game in 1980-81, 1990-91 and 1997-98

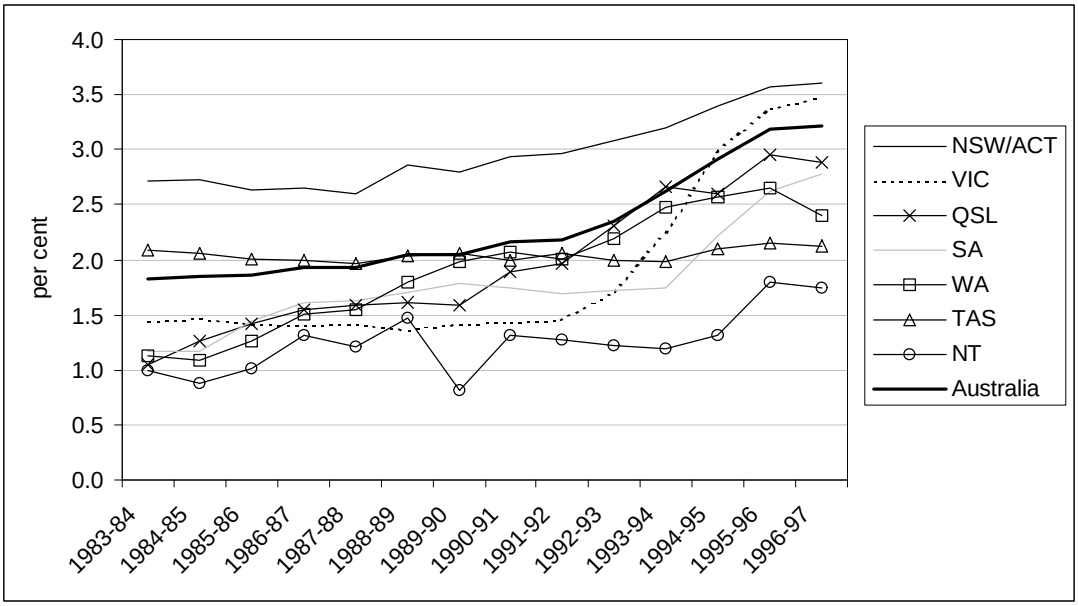
		Lotteries & Lotto	Total Racing	Electronic Gaming Machines	Casino	Other Gambling		Total
		%	%	%	%	%		%
1980-81		19.9	36.9	38.6	1.1	3.5		100.0
1990-91		20.5	30.6	32.5	10.5	5.9		100.0
1997-98		10.9	15.4	49.5	21.4	2.8		100.0

Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission and Australian National Accounts, ABS

Traditional forms of gambling, such as lotteries and racing have halved their share of the gambling market during the 1990s, in the face of the increase in EGM and casino gambling. (Table 2.1)

The increase in expenditure largely reflects strong rises in those states that have allowed the introduction of EGMs (and in some cases casinos). These include Victoria, South Australia and Queensland. (Figure 2.2)

Figure 2.2. Gambling Expenditure by State/Territory, Australia 1983-84 to 1996-97 (1997-98 dollars)



Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission and Australian National Accounts, ABS

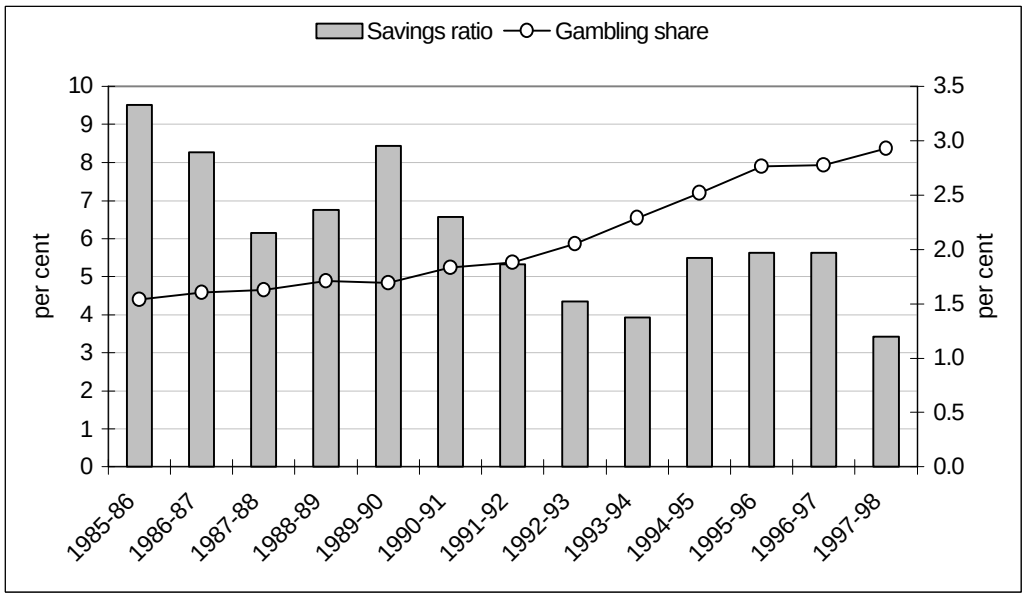
In other words, there has been a large element of catch-up, as levels of gambling expenditure in the liberalising states have begun to approach those in NSW and the ACT, where EGMs have been widespread for many years.

2.2 Gambling and household saving

There is a common view that household savings have decreased as a result of the increase in gambling expenditure during the 1990s. To make a prima facie case for this, we should establish that changes in gambling expenditure coincide with those in saving, and that there are no other substantial contributors to the change in savings patterns.

Figure 2.1 plots the savings ratio and the gambling's share of household disposable income from 1985-86 to 1997-98. Comparing the beginning and end of this period might suggest a strong negative relationship between gambling expenditure and savings. However, it is also obvious that there are other factors that influence savings. While expenditure on gambling has increased gradually over the period (in particular since 1991-92), there have been periods where the savings ratio has departed from the downward trend. In the first two years after gambling expenditure increased (1991-92 to 1993-94) the savings ratio decreased, but the subsequent year saw gambling expenditure continue to rise while the savings ratio also increased quite substantially.

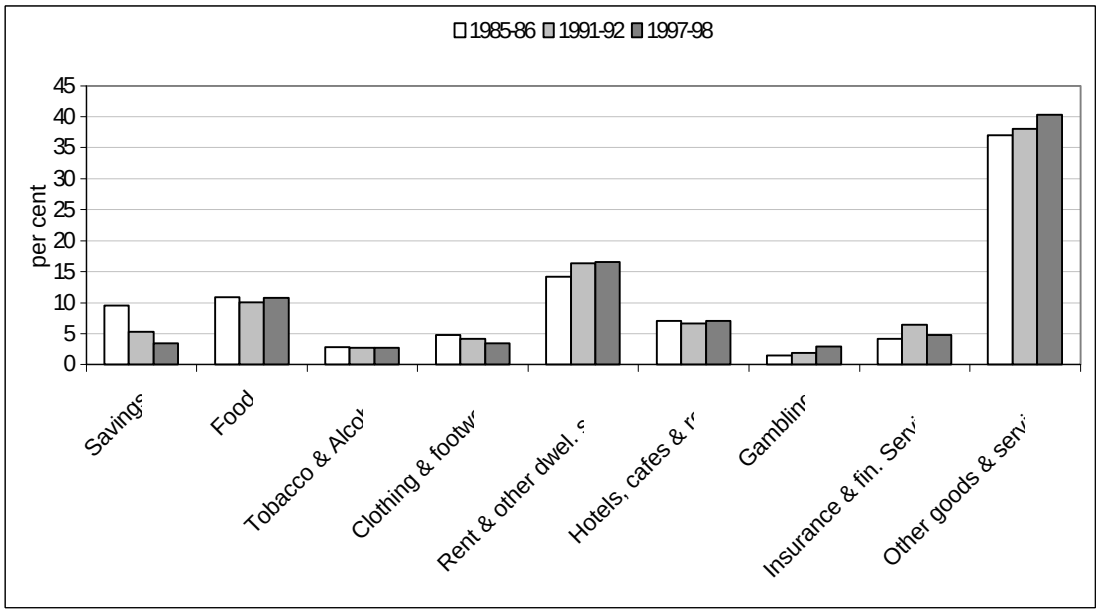
Figure 2.1. The Savings Ratio and Gambling's Share of Household Disposable Income, 1985-86 to 1997-98



Source: Australian National Accounts, ABS

We gain further insights by taking a wider look at changes in consumer expenditure over time.

Figure 2.2. Household Saving Ratio and the Share of Total Expenditure of Selected Expenditure Groups in 1985-86, 1991-92 and 1997-98



Source: Australian National Accounts, ABS

Figure 2.2 shows the saving ratio and the ratio of selected expenditures to total consumption expenditure in the three years 1985-86, 1991-92 and 1997-98:

- the 5.2 percentage point decline in the saving ratio from 1985-86 to 1991-92 was largely driven by an increase in expenditure on 'Rent & other dwelling' and 'Insurance & other financial services'. Gambling expenditure increased only marginally during this period;
- during the subsequent period from 1991-92 to 1997-98, the saving ratio declined by a further 1.9 percentage points. This time a large proportion of the decline could be attributed to an increase in the 'Other goods & services', while gambling also played a minor role.

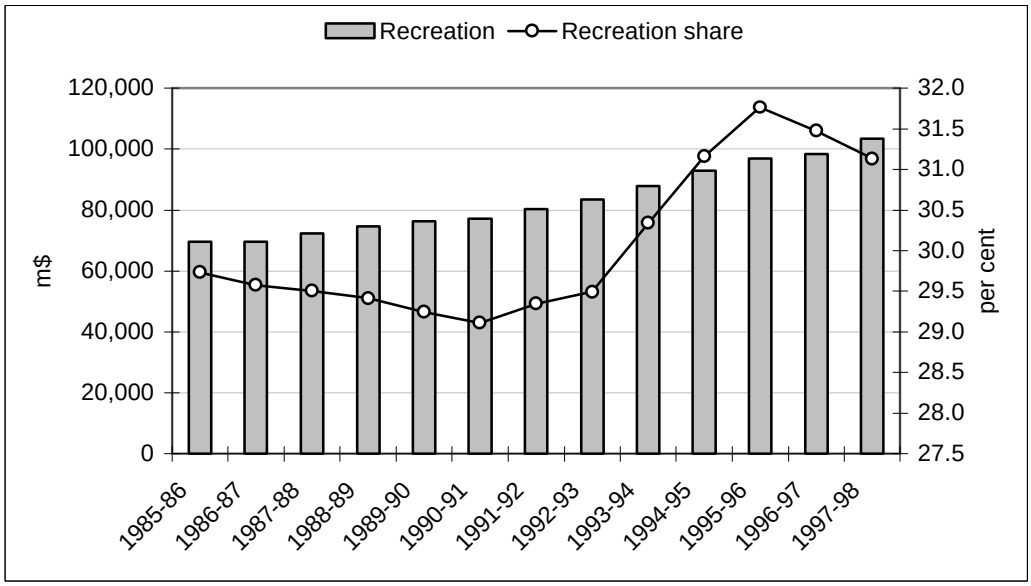
A further factor contributing to the rise in expenditure relative to income in recent years is the increased availability and reduced cost of consumer credit.

The overall conclusion from this material is that changes in gambling expenditure have been only one of a number of substantial changes in household expenditure over the last decade or so. There is no reason to single out changes in gambling as having in any way a "special" impact on saving.

2.3 Gambling and the "recreational dollar"

We obtain another perspective on the increase in gambling expenditure, if we compare it against other changes in the level and composition of the "recreational dollar".

Figure 2.1. Household Expenditure on "Recreation", 1985-86 to 1997-98 (1997-98 dollars)



Source: Australian National Accounts, ABS

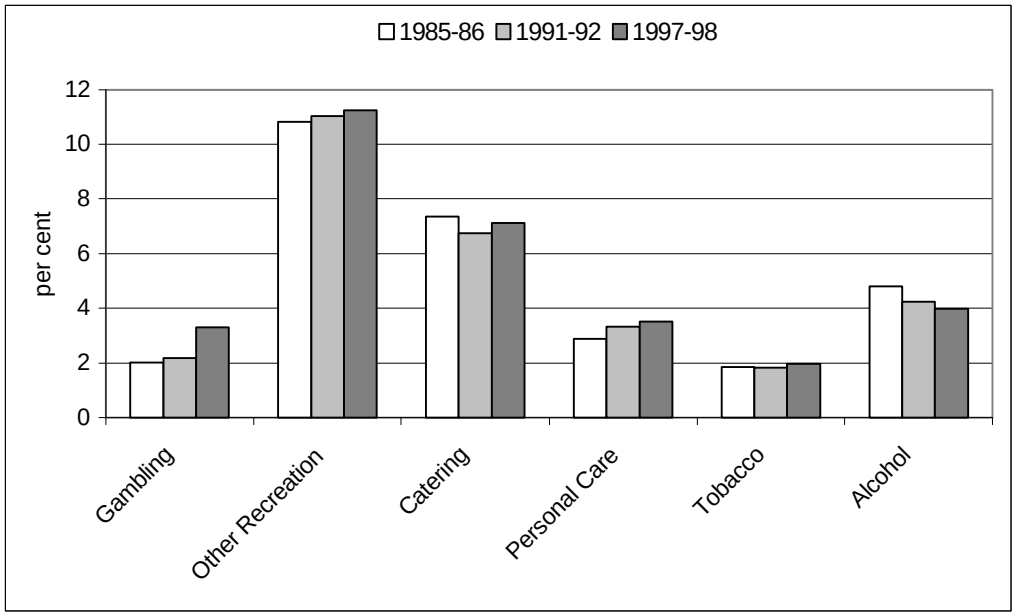
We adopt a broad definition of "recreation", combining the National Accounts consumption category *Entertainment and Recreation* with expenditure on personal care, tobacco and alcohol. Figure 2.1 shows household expenditure (in 1997-98 dollars) on "recreation' over the period from 1985-86 to 1997-98 – together with "recreation's" share of total household expenditure.

Expenditure on "recreation" rose steadily between 1985-86 and 1997-98. Its share of household expenditure declined in the late 1980s, but then rose in the first half of the 1990s – by 1.4 percentage points. This increase coincides with the growth of gambling expenditure. In the last two years, the increase in gambling expenditure has slowed and "recreation's" share of household expenditure has also fallen back.

Figure 2.2 shows the share in household expenditure of the various components of the *recreational dollar* in 1985-6, 1991-92 and 1997-98[13]. Main points:

- the decline in the share of "recreation" expenditure in the late 1980s reflected weakening spending on 'Catering' and 'Alcohol' partly offset by an increase in the share of expenditure on 'Personal care';
- the increase in "recreation" expenditure in the early nineties was mainly driven by gambling. Other groups, including 'Catering' also increased their share of total expenditure slightly the only exception being expenditure on 'Alcohol'.

Figure 2.2. "Recreation" Expenditure Components, Share of Household Expenditure; 1985-86, 1991-92 and 1997-98



Source: Australian National Accounts, ABS

[13] Of the components shown in Figure 3.6, 'Catering' includes restaurant meals, take away etc.; 'Alcohol' includes both retail and licensed premises sales. The 'Other recreation' category is the National Accounts category 'recreational goods and services', which includes sports, cultural and entertainment activities, television and video hire, and expenses related to pets.

2.4 Insights from the ABS Household Expenditure Survey

The ABS Household Expenditure Surveys are an important source of information

The most widely quoted surveys of gambling behaviour are those undertaken annually for the Victorian Casino and Gaming Authority[14]. These are informative, but are limited to one state and contain only a small amount of information on more general aspects of household behaviour. The data would also be of more use as a research tool if the VCGA were prepared to make the unit record file available to *bona fide* researchers.

The ABS Household Expenditure Survey has also been used to provide insights into the impact of gaming[15]. It has also been proposed as a source of information on problem gambling behaviour[16]. However, to this point there has been no systematic analysis of the gambling-related information contained in the latest (1993-94) survey.

Access Economics has recently constructed a Micro Model (AEMM), based on the 1993-94 Household Expenditure Survey (HES) unit record file[17]. In Appendix A, we use the model to:

- derive estimates of the proportion of the population that gamble;
- build a profile the socio-economic characteristics of lottery players and other gamblers.

We also use the model to examine the relationship of gambling expenditure to household income, demographic characteristics and other expenditures.

In this section, we summarise the main insights from that analysis.

Gambling data in the Household Expenditure Survey

The great strength of the survey is that it covers a large number (over 11,000) individuals and provides considerable detail on gambling, demographic characteristics, income and other expenditures. A great advantage of the survey is that it collects information about all

[14] For the latest survey, see Market Solutions and Mark Dickerson, *Fifth community gambling patterns survey combined with second positive and negative perceptions of gambling survey,* study for the VCGA, December 1997.

[15] See for example, National Institute of Economic and Industry research and Spiller, Gibbins Swan, *The impact of the expansion in gaming on the Victorian retail sector,* study for the VCGA, Melbourne, March 1997

[16] Australian Institute for Gambling Research, *Definition and incidence of problem gambling, including the socio-economic distribution of problem gamblers,* study for the VCGA, Melbourne, August 1997

[17] The Household Expenditure Survey (HES) is the most authoritative source of information about consumption expenditure compiled by the ABS. The HES is conducted with five year intervals and surveys a representative sample of Australian households. In the 1993-94 version of the HES 8,421 households were surveyed and contains information about 17,271 persons aged 15 and above. The response rate was 86 per cent.

persons in a household. The HES thereby provides a broad view of the relationship of gambling activities to the economic situation of families and households as whole.

The 1993-94 HES predates the latest expansion of casinos and the widespread introduction of EGMs into Queensland, South Australia and Victoria. However, this in itself is a source of strength, since it allows us to compare behaviour in those states that did have EGMs with that of comparable households in the non-EGM states. This means that we use the EGM states as a guide to current household behaviour, and can also can isolate the effect on behaviour of the introduction of EGMs.

Comparing the data in the survey with that from other sources, the reported rates of participation in the various gambling forms seem to tally quite well with information from other surveys. Total reported expenditure on lotteries and 'lotto and instant lotto' also tallies well with the total from industry data. However, as with other surveys, there is some underreporting in the survey of expenditure on 'TAB and on course racing' and EGMs.

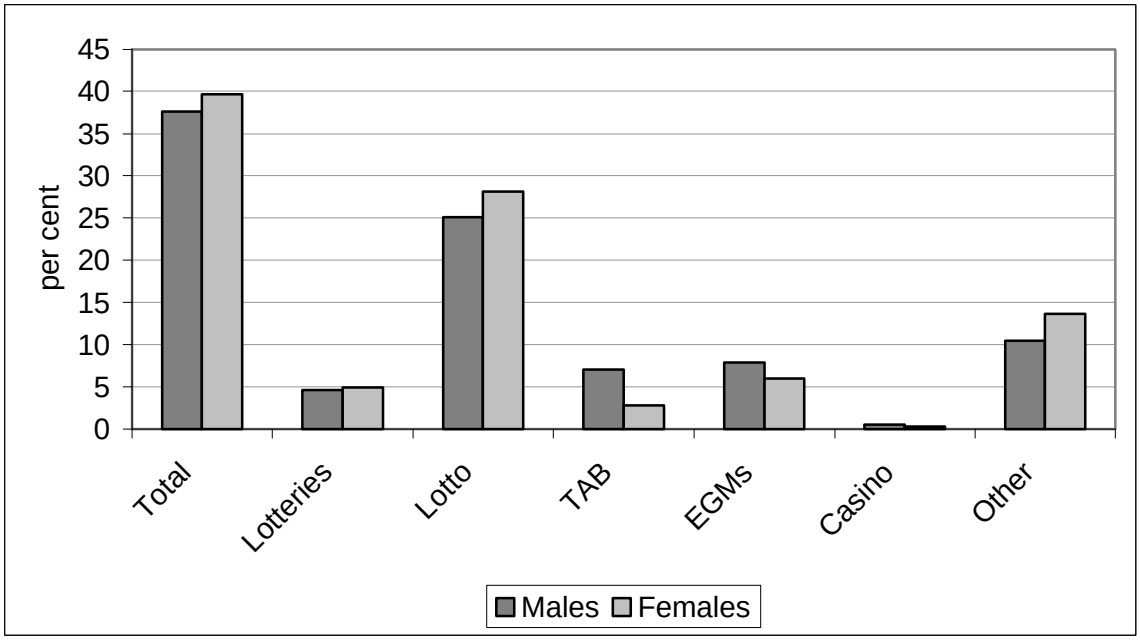
Therefore, the focus in this section is on *participation* in gambling and on *expenditure* on lotteries and 'lotto and instant lotto', where the data seem most reliable. However, the relationships derived in Appendix A between expenditure and other factors are plausible and the under-reporting observed in relation to EGMs does not appear to have diminished the robustness of the qualitative aspects of the results.

Main findings on gambling participation rates

The Access Economics Micro Model was used to analyse the participation profiles for the main forms of gambling in terms of sex, age, income, employment status and family situation. The main results are as follows:

- Measured in terms of the proportion of the population who gambled during a two-week period, the overall participation rate was 39 per cent. Females had slightly higher gambling participation (40 per cent) than males (38 per cent).
- The higher total gambling participation rate for females is a result of a higher participation in the 'soft' types of gambling such as lotteries and lotto (see Figure 2.1).
- Males are more into the types of gambling that involve an 'activity' such as 'EGMs', 'Casinos' and, in particular, 'TAB & on-course' betting (see Figure 2.1).

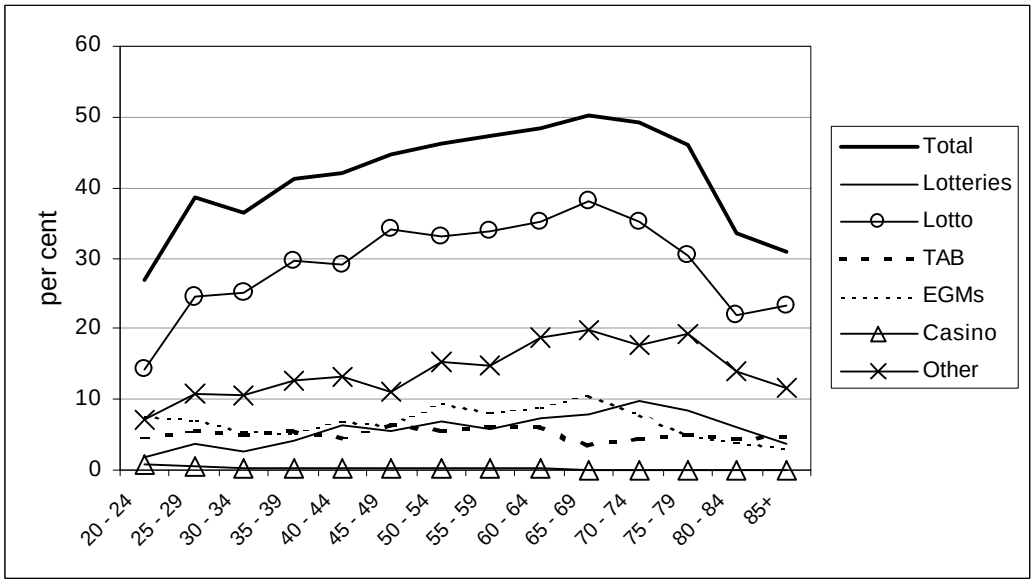
Figure 2.1. Participation in Gambling by Type of Game and Sex



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).
Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Overall, gambling participation increased gradually with age (see Figure 2.1). Measured in terms of the proportion of persons who gambled during a two-week period, the participation rate doubles from 13.5 per cent among the 15-19 year age group to 27 per cent among the 20-24 year age group. The participation rate increases until it reaches a peak around 50 per cent for the 65-69 year olds and declines for older age groups.

Figure 2.1. Participation in Gambling by Type of Activity and Age Group



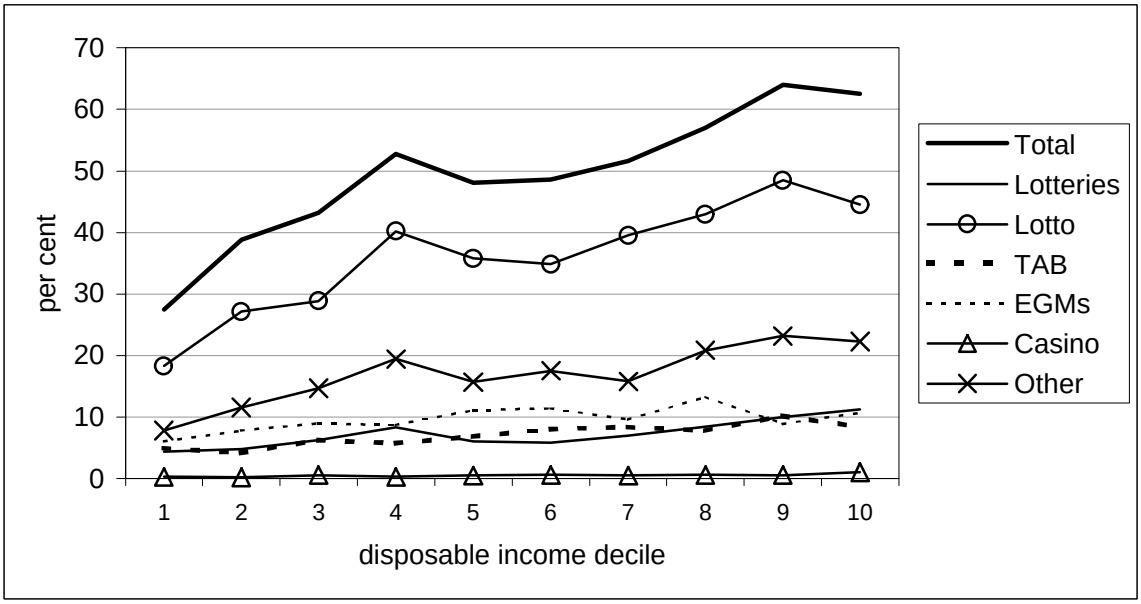
Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).
Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

'Lotto & Instant Lotto' is easily the most popular form of gambling for all age groups, reaching a peak participation rate of 38.1 per cent for the 65-69 year age group. The age participation pattern for total gambling is largely determined by the age participation for 'Lotto & Instant Lotto'.

The participation pattern for EGMs is also age dependent, but in a way that is different from the overall pattern. EGMs are relatively popular with the young and the age groups around retirement age.

- For 'EGM' gambling, male participation is high for young age groups (see Figure A.4, Appendix A). It reaches a peak for the 20-24 year olds (at 9.7 per cent) and then it decreases with age until it hits a low around the 45-49 year age group (at 5.5 per cent). Thereafter, the male participation rate increases sharply and stays at a relatively high level (around 9-11 per cent) until it starts declining for the age groups age 70 and above.
- Females show a similar pattern with a peak for the 20-24 year olds, albeit at a lower level (around 6.2 per cent) than for young males. The female participation rate declines to a low of 3.3 per cent for the 35-39 year age group before it gradually picks up to attain an all time high for the 65-69 year olds (at around 10.4 per cent). It then declines for the older age groups to zero participation for the over 84 year olds. Females aged 75-84 are actually more likely to use EGMs than their male counterparts.

Figure 2.2. Participation in Gambling of Income Units by Gambling Type and Decile of Disposable Income



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).

Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Gambling activity increases with income. For income units ranked by decile of disposable income, participation increases with income (see Figure 2.2). Apart from a local peak

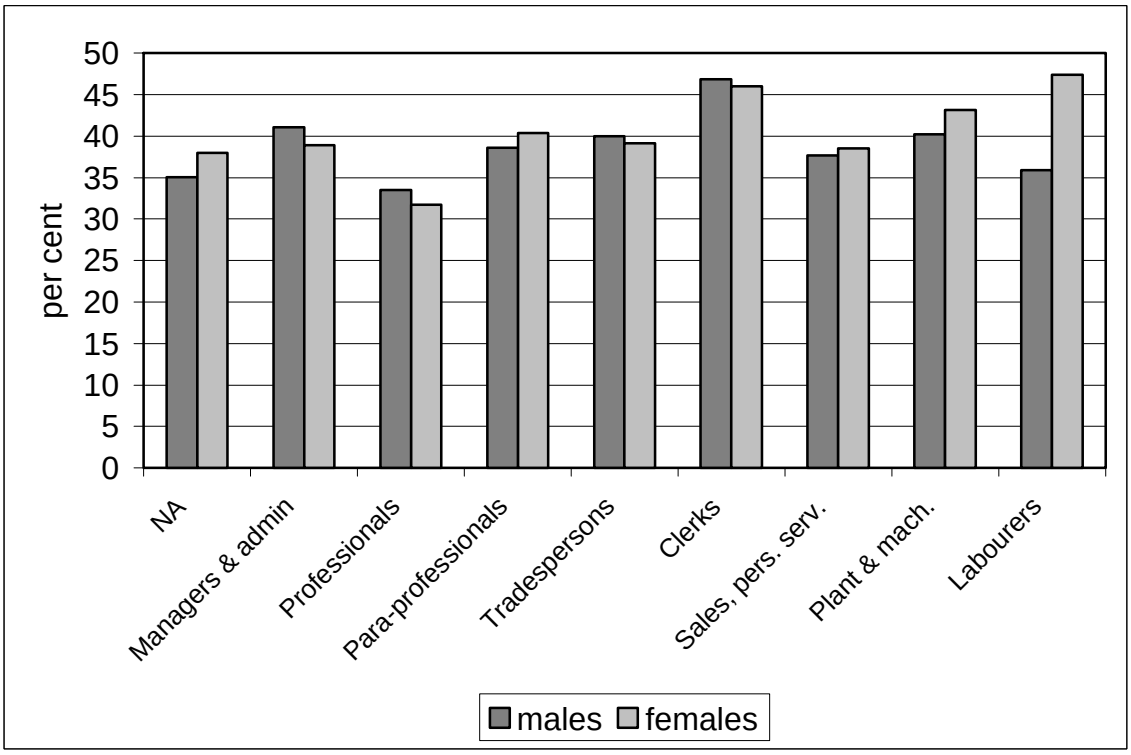
around the fourth decile (due to the many pensioners participating in lotto/lotteries), the increase is quite even from the bottom to the top of the income distribution. While 27 per cent of income units in the bottom decile reported (non-negative) gambling expenditure during a two week period, gambling participation increased to around 64 per cent for the top two deciles:

- Participation in 'Lotteries' and 'Lotto & Instant Lotto' broadly follows the overall relation with income.
- The use of EGMs is also reportedly related to income with participation almost doubling from around 7.8 per cent for the first decile to around 13.3 per cent for the sixth decile. The use of EGMs is relatively constant over the upper half of the income distribution.

Employment status has a major impact on gambling participation rates (see Appendix A)**:**

- Unemployed persons (both males and females) have significantly lower gambling participation than do employed persons.
- Persons who are not in the labour force have marginally lower participation than employed persons.
- Part-time employed males gamble much less than full-time employed males, while the gambling participation rate of part-time females is similar to that of full-time females.

Figure 2.3. Participation in Gambling by Sex and Occupation



Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Occupation has a relatively minor influence on gambling participation (see Figure 2.3). 'Clerks' generally have higher participation, while professionals have lower participation than the average.

Family characteristics have a significant impact on gambling participation.

- Persons who live in two-adult income units are more likely to gamble than persons in single-adult income units.
- For both males and females, the presence of children generally makes participation more unlikely across all types of gambling, particularly for the games that involve an activity (e.g. 'TAB & on-course', 'EGMs' and 'Casino').

Appendix A also contains a multivariate analysis of participation in "Lotto & Instant Lotto" and EGMs. This analysis provides more precise estimates that broadly confirm the findings set out above. Additional findings include:

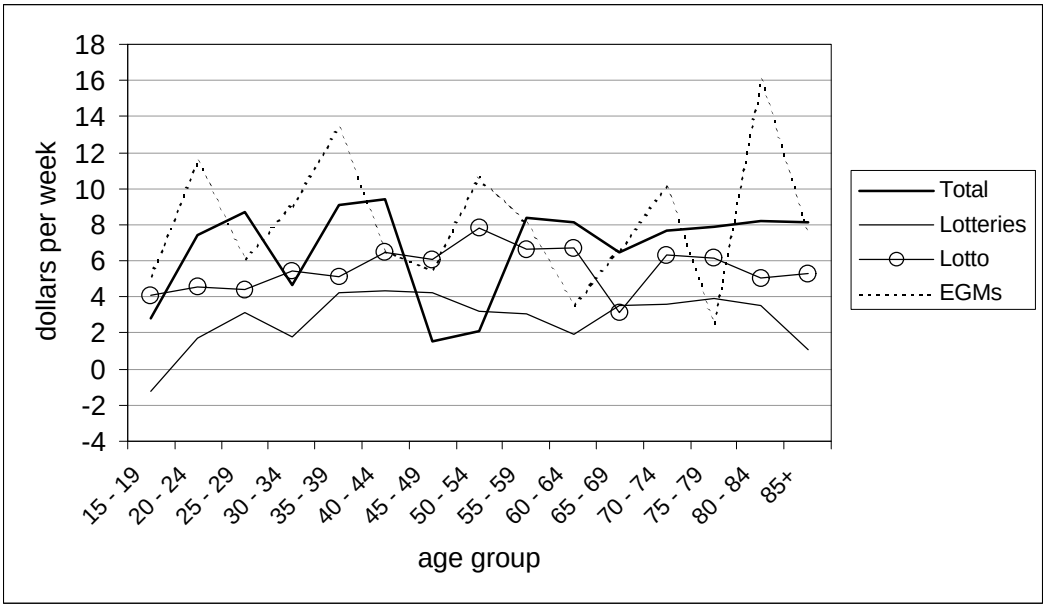
- country of birth is a very powerful predictor for both 'Lotto & Instant Lotto' and 'EGM' usage. For both games, the Australian born have the highest participation;
- for 'Lotto & Instant Lotto' individuals born in 'Northeast Asia' have the lowest participation (16 percentage points below the Australian level), followed by persons born in 'North America', the 'Middle East and North Africa'. Groups with participation rates closer to the Australian born are persons from 'Other Oceania and Antarctica' (mainly New Zealanders), 'Europe and the former USSR', 'Southeast Asia' and 'Southern Asia';
- for 'EGMs' persons born in 'Other Oceania and Antarctica', 'Middle East and North Africa' and 'Northern America' have participation rates close to the level of the Australian born. Persons born in 'Europe and the former USSR' are slightly less likely to play 'EGMs' than the Australian born (1.5 percentage points lower), while persons born in Asian countries generally have somewhat lower participation.

Main findings on gambling expenditure patterns

The main features of gambling spending patterns derived from the 1993-94 Household Expenditure Survey are as follows:

- Males and females spend roughly the same on gambling. However, males on average spend more on most of the activities in which they participate.
- Age does not appear to be an important factor in relation to the amount spent on gambling (see Figure 2.1).
- While factors such as employment status and family status are important determinants of gambling participation, there is no obvious pattern in relation to the amount spent.

Figure 2.1. Gambling Expenditure by Age and Type of Game ($/week)

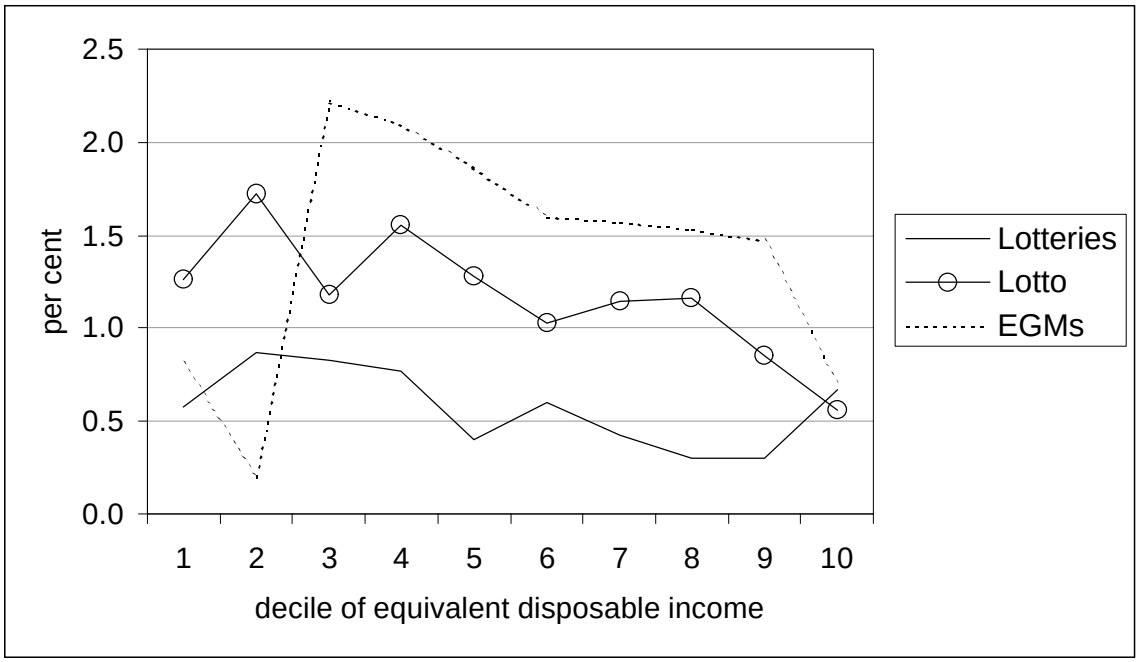


Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

The amount gambled is reportedly somewhat related to income.

- Households with mid-range income report spending slightly more on EGMs than income units at both the low and the high ends of the income distribution.
- Expenditure on 'Lotto & Instant Lotto' shows a remarkably even level across income deciles, with a tendency to higher outlays by households with mid-incomes.

Figure 2.2. Share of Total Expenditure on 'Lotteries', 'Lotto & Instant Lotto' and 'EGMs' for Households with Non-zero Gambling Expenditure



***Source*: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.**

- While the amount that households spend on gambling is positively related to income, the share of total expenditure spent on gambling declines with level of equivalent income, at least above a certain level of income (see Figure 2.2).
- The share of total expenditure spent on 'Lotto & Instant Lotto' decreases gradually, from around 1.5 per cent for the bottom deciles to just above 0.5 per cent for the top decile. Expenditure on 'Lotteries' follows a similar pattern at a lower level.

By far the majority of the households who gamble do so within reasonable limits of the overall household budget:

- around 94 per cent of 'Lotto & Instant Lotto' players have expenditure of less than 5 per cent of their total expenditure.

3 Tattersall's and the Australian lottery industry

(Refers to Inquiry Terms of Reference: (a) nature and definition of gambling; (b) the participation profile of gambling; (c) the economic impacts of gambling, (d) the social impacts of gambling; (e) the effects of regulatory structures; and (f) the implications of new technologies)

In this chapter we turn more directly to Tattersall's contribution to the Australian gambling industry. Historically Tattersall's main business has been in lotteries. In the current decade it has also become involved in the provision of electronic gaming machines in Victoria. In this chapter, the focus is on Tattersall's unique contribution to the Australian lottery industry. The following chapter discusses electronic gaming machines.

3.1 Characteristics of lotteries

State-wide lotteries are at one end of the spectrum of recreational gambling activities, in that they involve:

(1) the largest potential prizes from a single bet, paid for by the sale of

(2) a large number of comparatively low-priced tickets, to a wide public;

(3) a low expected return to each ticket, which is acceptable to the purchaser, because of the large size of the hoped-for prize;

(4) no objective role for individual skill in affecting the outcome, though purchasers may believe they have an ability to predict or influence it;

(5) a comparatively long delay between sale of tickets and determination of the outcome. This is inevitable, given the need to sell a large number of tickets, in order to fund the prize;

(6) ease of purchasing tickets in subsequent drawings of the same lottery, through availability of account facilities ,and the provision of "stake money" to a proportion of participants through the distribution of a number of low-valued prizes;

(7) a psychic reward from participation, through "dreaming" about the possible outcome; sharing hopes and disappointments with friends and family; and from watching the draw on television;

(8) a high degree of social acceptability, stemming from the low financial outlay, and the high level of participation in the community including those who do not participate in other recreational gambling activities.

3.2 Evidence from the VCGA Community Surveys

Participation in Lotto and similar activities

According to the VCGA's 1997 Survey[18], 60 percent of Victorian adults gamble at least once a month[19]. Almost half play Lotto at least once a month; 15 percent buy Scratch Tickets at least that often. Nearly a quarter of Victorians buy raffle tickets that regularly. The people who undertake these gambling activities are a typical cross-section of the general population; according to the VCGA survey, there was a comparatively high proportion of "occasional" and "disinterested" gamblers among them.

In any event, the proportion of Victorians reporting that they participated at least once a month in these activities fell during the three years to 1997 (with the exception of raffles where there was a slight increase).

More intense forms of gambling

Activities such as electronic gaming machines (EGMs), horseracing and the casino are often seen as more intense forms of gambling. However, in 1997 only 10 percent of Victorian adults reported using EGMs at least once a month. The corresponding proportions were even less for horseracing (6 percent) and the casino (4 percent).

These low proportions tally with other information in the survey. Eleven percent of Victorian adults reportedly fell into the "heavy gambling" categories – undertaking an average of two to three gambling activities each week, and spending more than 15 percent of their income on gambling. Another twelve percent were classed as "social gamblers" – undertaking at least one gambling activity each week, spending about an hour at it, and around ten percent of their income.

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[18] Victorian Casino and Gaming Authority (1997), *Fifth community gambling patterns survey combined with second positive and negative perceptions survey*, report by Market Solutions and Mark Dickerson for the VCGA, Melbourne, December

[19] The gambling activities identified in the VCGA surveys include:

Bingo
Casino table games
Electronic gaming machines (EGMs)
Footy betting
Horse racing
Informal cards
Lotto
Raffles
Scratch Tickets
Trotting

3.3 Historical and social context of lotteries

Lotteries involving purchase of tickets, in return for the chance of winning prizes of cash or valuable assets, have a long history. From the earliest recorded European lotteries (in 15th century Flanders and Burgundy), they have been used to raise money for public purposes, or else licensed by the government for private profit. There was a general lottery in Elizabethan England, to raise money for repairing harbours and other public purposes. In the next century, the Virginia Company made conducted several lotteries to help finance the settlement of Jamestown in North America. Between 1769 and 1826 there were 128 state lotteries in England, raising a total of 35 million pounds for the government. Lotteries were also used extensively in North America, before and after independence – for public purposes, such as the building of universities – and for private purposes, such as the disposal of goods and properties by merchants.

The Virginia Company's lotteries were seen as the "first and most certaine" way to obtain funds. Public lotteries in England and North America were seen as a means of "voluntary taxation" to obtain funds for popular causes. Nevertheless, supervision was inadequate; and fraud and abuse – particularly by private organisers – became common. As a result, lotteries fell increasingly into disrepute.

The first Industrial Revolution in the 18 th and early 19 th centuries saw the emergence of factory production, bringing with it the need for a larger (and necessarily more disciplined) factory labour force, the loss of traditional lifestyles and relationships – and the concentration of the population into industrial towns, where conditions were ghastly by modern standards. This led to a shift in social attitudes on the part of factory owners and other property owners – shared also by the growing middle class of artisans, merchants and professionals, who sought to distinguish themselves from the factory worker. The new attitudes sought to eliminate drunken, idle behaviour, and to encourage instead habits of hard work, and self advancement by thrift and self improvement – partly by legislation, and partly through education and religious observance.

In Britain, and in many US states, liquor trading was curtailed, and in some cases prohibited. Gambling was made illegal. Lotteries were banned in England after 1826, and in many individual American states and in Europe in the years that followed. However, limited betting on horse racing remained legal in England – given aristocratic involvement, and on the grounds that wagering involved the application of skill, rather than mere chance. This gave rise to sweepstakes, limited to club members; these were lotteries whose tickets had the chance of winning the rights to individual horses in a major race – with winning horses taking a predetermined share of the total value of ticket sales.

3.4 Development of lotteries in Australia

Gambling has been strongly entrenched in Australian society from the earliest days. The upper echelons of society nurtured horseracing, of which wagering was an integral part. They also disapproved of 'idle' gaming by convicts and labourers. As in other countries, by the mid 19th century, the emerging middle class had embraced 'respectability' as a means of distinguishing itself from the working class. Here too, there was increased regulation of social behaviour, including prohibition of games of chance. Lotteries were, for example, banned in NSW in 1844.

However, as in England, wagering on horse races survived outright prohibition on the grounds that it involved skill. Unlike the predominant view in protestant England, negative attitudes to gambling were less strongly held amongst the substantial Irish catholic minority. There was also a diversity of views amongst the widely scattered colonies.

In NSW, sweepstakes on horse races were common and popular in the years following the ban on lotteries. The Tattersall's Sporting Club was established in Sydney in 1858, and was one of many conducting sweepstakes. In 1878, the license was acquired by George Adams (the founder of the organisation presently headquartered in Melbourne). As the official history of Tattersall's[20] states,

> His careful attention to detail and the scrupulous honesty with which he ran the Sweeps were noted and they became increasingly popular with members. So popular, in fact, that ordinary patrons of the Tin Bar were asking to be allowed to buy tickets. It did not take George very long to widen the sales in order to permit non-Club members to participate.
>
> The reputation of Tattersall's pub and its landlord combined to ensure the success of the new venture. It was on the running of the Sydney Cup in 1881 that the Tattersall's first public Sweep took place. Participation in the Sydney Cup Sweep was not for the poor, but the entire two thousand tickets, at one pound each, were sold. First prize was nine hundred pounds, second prize six hundred pounds and third prize three hundred pounds. The sweep was drawn in the main parlour of the old hotel. The portents were favourable. The winning horse was Progress. George was on his way.

The depression of the 1890s led to a tightening of legislative control of social behaviour. Following the banning of sweepstakes in NSW in 1891, Adams moved the Tattersall's Sweeps to Brisbane. Facing prohibition there also in 1895, he was invited to Tasmania to conduct a lottery to dispose of the property holdings of the failed Bank of Van Dieman's Land. Thereafter, despite strong opposition, the Tasmanian Parliament passed a law allowing the government to make regulations licensing lotteries.

From 1896 till 1954, Tattersall's conducted its Sweeps from a Tasmanian base. After George Adams' death, operations continued (as they do today) under a trust set up in his will.

For Tasmania, Tattersall's brought economic and financial advantages. The Sweeps generated substantial and increasing revenue for the state Treasury, together with local employment. In the 1950s, for example, only 12 percent of Tattersall's sales were in Tasmania. The remainder were to the rest of Australia, with some international business as well.

The other states all reacted by passing legislation prohibiting lotteries and the sale of Tattersall's tickets. However, the business was not seriously affected until the new Commonwealth government introduced postal regulations prohibiting the delivery of mail

[20] p.31 T. Wilson and E. Dean *The luck of the draw: the history of the estate of the late George Adams and Tattersall's*, 2nd edition, Tattersall Sweep Consultation, Melbourne, 1996

to Tattersall's and its associates. These bans, which persisted till 1930, led to the development of ingenious ways of avoiding them, the inevitably brought with them increased possibilities of fraud on the part of those handling money destined for Tattersall's. However, such fraud seems to have been on a very small scale.

The postal bans were policed with varying severity, and were accompanied by other Commonwealth actions that invited the accusation of hypocrisy. For example:

- a refusal to apply a similar ban to support a NSW prohibition on local sales of Queensland lottery tickets in 1921;
- the appointment of Tattersall's as an agent of the Federal Taxation Department in 1921, to collect a 14% tax on prizes; and
- the introduction of a new 5 shillings and 6 penny postal note in 1924, to cater for the heavy interstate demand for Tatts tickets.

Establishment of foreign lotteries

Actions to curtail lotteries and sweeps in Australia reflected similar trends elsewhere. However, the bans were not universal and there was a gradual spread of state-run or licensed lotteries. Establishment of lotteries was frequently justified on the basis that a large proportion of the proceeds would be used to support worthy public causes.

The Italian National Lottery was established in 1863, after Italy's unification, to raise funds for the state. In the US, the Louisiana State Lottery operated from 1869 till the 1890s. It was killed off when the US Congress banned the interstate transportation of lottery tickets.

In the twentieth century, where anti-gambling sentiment permitted it, and the state's funding needs compelled it, lotteries again began to operate. Australian states were among the forerunners – with the Queensland Golden Casket in 1920 and the NSW State Lottery in 1931. Foreign examples include the French Loterie Nationale in 1933, and the Irish Hospitals' Sweepstakes in 1930; the majority of this lottery's revenues came from the US, where no legal lotteries operated until 1963.

The comparatively early establishment of state lotteries in Australia reflects the demonstrated success and wide social acceptability of the Tattersall's Sweeps, together with states' urgent need for revenue.

Tattersall's own move to Victoria came in 1954, following negotiations to avert the establishment of a state lottery in Tattersall's largest market. Though successful at first, the Sweeps came under increased competition from state owned betting shops, including the Totalisator Agency Board (TAB). Turnover stagnated during the 1960s. In 1972, Tattersall's sought the agreement of the Victorian government to the introduction of a new lottery game, Lotto. This game had its modern origins in Germany, where it was used to fund the reconstruction of sporting facilities following the 1939-1945 war. It has since spread to more than 40 countries.

3.5 Development of Lotto in Australia

Compared to other lottery types, Lotto's main attractions are personal participation (players can choose their own numbers and watch the draw on television), and the large first prize pools.

The first Tattslotto drawing was made on 22 June 1972. Initially, Tattslotto was a 6 from 40 numbers game (currently 6 from 45) with some smaller prizes. Players were guaranteed 60% of the overall revenue. If there was no winner, the prize was awarded to players that correctly selected 5 numbers, plus a supplementary. If this still failed to produce a winner, then the prize went to players that selected four correct numbers, plus supplementaries. This proved to be unpopular because it produced few large prizes, and turnover had fallen to $26,000 by the twelfth Tattslotto draw on 7 September 1972. The decision to rollover the jackpot if there was no winner immediately produced a jump in turnover. In subsequent years it has been unusual for there to be no winner of the First Division prize and typically the first prize is shared between six or seven entrants.

Lotto's success in Victoria led to the introduction of similar games in other states and territories. In 1981, The Australian Lotto Bloc was formed, combining the prize pools of Lotto games in Victoria, Queensland, South Australia, Western Australia ,Tasmania, the ACT and the Northern Territory.

Over the period since the introduction of lotto in 1972, there has been a substantial increase in the range of lotto games available and the frequency of games, as Tattersall's has adapted its product to meet the changing demands of the marketplace and competitive pressures from the spread of other forms of gambling in the State.

Tattslotto originally was a 6 from 40 numbers game, which shortly after its introduction into Victoria was adapted to provide for a jackpot (or rollover of the first prize) in the event of there being no winning ticket. Over the years there have been many changes in the form of the televised presentation of the draw, with the current draw meeting a far more rigorous time schedule than in earlier years. Originally the draw was on Thursday nights, but this was changed to Saturday nights.

Currently Channel Seven broadcasts the OzLotto draw on Tuesday, the Powerball draw on Thursday and the Tattslotto draw on Saturday. Each night the Channel Nine Network telecasts Keno, a Tattersall's game that began in 1988. Channel Seven also broadcasts the results of the daily Tatts 2 draws.

The number and variety of games offered by Tattersall's has increased over the years. Since 1982, Tattersall's has introduced the following games into the marketplace:

Midweek*	October 1983
Tatts 2	June 1984
Keno	May 1988
Lotto Extra	November 1991
Oz Lotto	February 1994
Powerball*	May 1996

* Powerball replaced Midweek.

Not all Tattersall's market innovations have been successful. For example, in June 1977 Tattersall's introduced Gold Lotteries, with a first prize of $1 million - in cash or gold bullion. Gold Lotteries involved 100,000 tickets at $25 per ticket, which was over-priced relative to Tattslotto. There were eight Gold Lotteries draws at $25 per ticket but ticket prices were reduced to $10 for the ninth and final draw in March 1981. Nonetheless, Gold Lotteries raised a total of $6.96 million revenue for the Government.

'Instant Scratch-It' tickets ('scratchies') were introduced in 1981. Initially, tickets were $1, with prizes varying between $2 and $10,000. As participation in scratchies increased, higher priced tickets were introduced (up to $10) with prizes ranging up to $1 million.

While there have been ups and downs over the years, Tattersall's expertise and entrepreneurship are highly regarded in the marketplace.

For example, when the Queensland Government decided to establish lotto in that State in 1981, they contracted with Tattersall's. Tattersall's established the Queensland game, Gold Lotto, and operated the game for the first two years. Under the terms of Tattersall's contract, responsibility for the operation of Gold Lotto transferred to the Golden Casket Office in 1983.

Tattersall's operates all lottery games in Tasmania, the ACT, the Northern Territory and in a number of overseas jurisdictions – Western Samoa, Fiji, Nauru, Commonwealth of the Northern Marianus Islands, Vanuatu and the Cook Islands. The Saturday night Tattslotto draw is operated by Tattersall's on behalf of the Australian Lotto Bloc which includes not only the jurisdictions in which Tattersall's is directly licensed, but also the States of South Australia, Western Australia and Queensland.

3.6 Regulation of Tattersall's Victorian lottery operations

Regulation of lotteries

As in most jurisdictions, the Victorian government restricts the operation of lotteries to a single provider. No State in Australia allows more than one promoter of lotteries to operate. NSW, Queensland, South Australia and Western Australia have each chosen to establish a State owned and controlled lottery promoter. The Northern Territory licenses Tattersall's as its single promoter. The ACT is the only jurisdiction that allows two promoters to operate lotteries in competition with each other.

As will be shown below, there are strong economic and fiscal reasons why states have restricted competition in the lottery market.

In Victoria, the Tattersall Consultations Act restricts the licence to conduct lotteries in Victoria to the promoter (that is a single promoter) and defines the promoter as the Estate of the late George Adams (the owner of the Tattersall's business and brand names). The Estate's licence was originally issued for a period of ten years and has been renewed since, including at competitive tender, for periods not exceeding ten years. The current license expires in 2004.

Under the terms of its original licence, Tattersall's returned 60 percent of gross revenues in the form of prizes, and was allowed to retain 9 per cent to cover its expenses and make a return. The state government took the remainder.

The agreement was regularly reviewed, leading to an increase in the proportion of gross revenue flowing to the government. In late 1982, following a change in government, the license was put to public tender, which Tattersall's won. As a result of this tender, the share of turnover allocated to Tattersall's for operating costs and profit was reduced from 7 ½ percent to around 4 ½ percent.

In December 1997, Tattersall's lottery licence was extended to 30 June, 2004, with essentially unchanged financial conditions.[21] The extension conditions required Tattersall's to "(a) actively promote and conduct Consultations so as to maximise revenue to the Victorian Government and (b) to maintain a high quality and integrity of service to subscribers to Consultations". Tattersall's was also obliged to "actively pursue" the establishment in Victoria of a high technology plant for the development of lotteries and lottery products.

[21] Specifically, Tattersall's pays the government 35% of turnover up to $200 million; 35.5% on the next $400 million of turnover, and 36% of turnover over $600 million. In addition, Tattersall's pays 25% of net profit to the Consolidated Fund and 10% to the Lotteries Development Fund. Revenue is transferred by standing appropriation from the Consolidated Fund to the Hospitals and Charities Fund and the Mental Hospitals Fund.. The Lotteries Development Fund is accessed by Tattersall's for approved development projects. There is also a 10 cent tax, introduced in 1992, on all lottery games other than Instant, Super 66 and Tatts 2.

Incentives facing Tattersall's

Tattersall's faces powerful incentives to reduce costs and expand its lottery business. Given the requirement to return 60 percent of gross revenue as prizes, Tattersall's gross margin is effectively capped at 4 percent on gross revenues over $600 million. The organisation's net profit is therefore highly susceptible to any blow-out in costs.

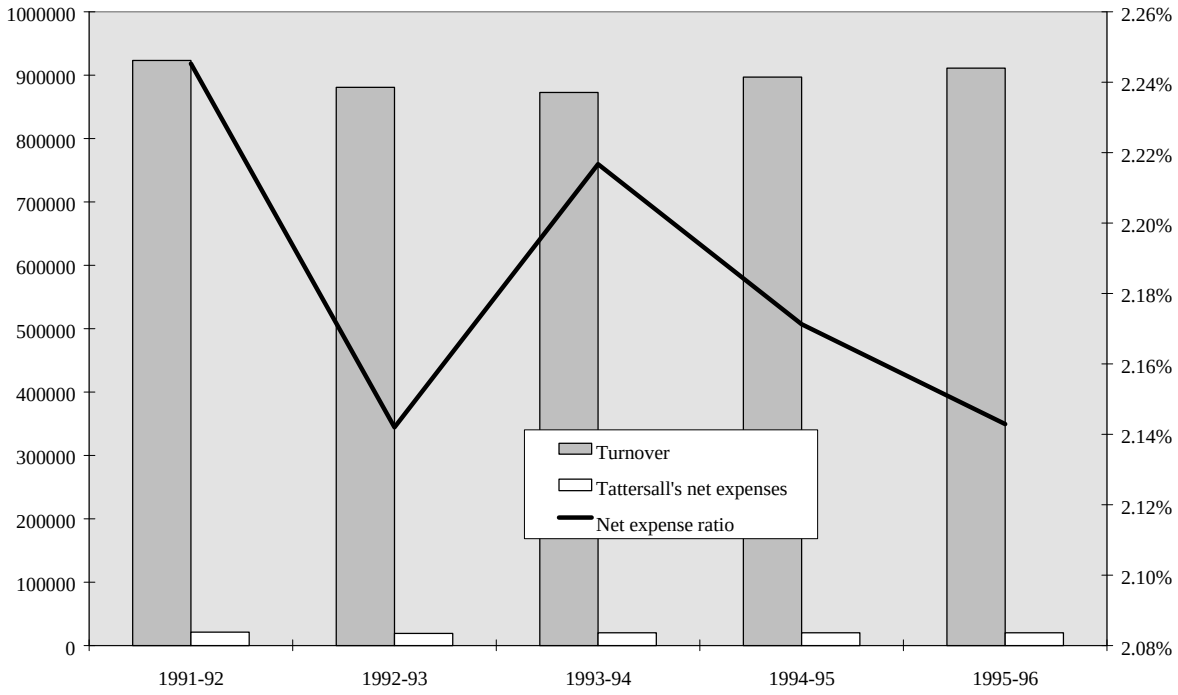
Subject to regulatory requirements, and to the terms of the will, the Trustees of the George Adams Estate have full discretion to manage the business for the benefit of the beneficiaries of the estate and to engage in philanthropic activities. Under the terms of the will, ten percent of profits are shared by staff. The trustees, acting on behalf of the beneficiaries, and the staff, therefore have a strong incentive to expand profits – which can only be achieved by reducing costs, expanding turnover, or diversifying into profitable new markets or activities. Given the economies of scale that are evident in the lottery business, expansion of the business is itself likely to be an effective way of reducing unit costs.

At the same time, the long-term security of the profit flow depends on Tattersall's retaining its Victorian business. The strategic threat to this business is genuine – as evidenced by the requirement to face a competitive tender in 1982.

Tattersall's can only be assured of winning any future tender if it can demonstrably offer best value to the Victorian government, implying in turn that its costs must be lower and business growth higher than is likely to be achieved by potential replacements.

Tattersall's is efficient

Figure 3.1. Lottery Turnover Relative to Tattersall's Net Expenses



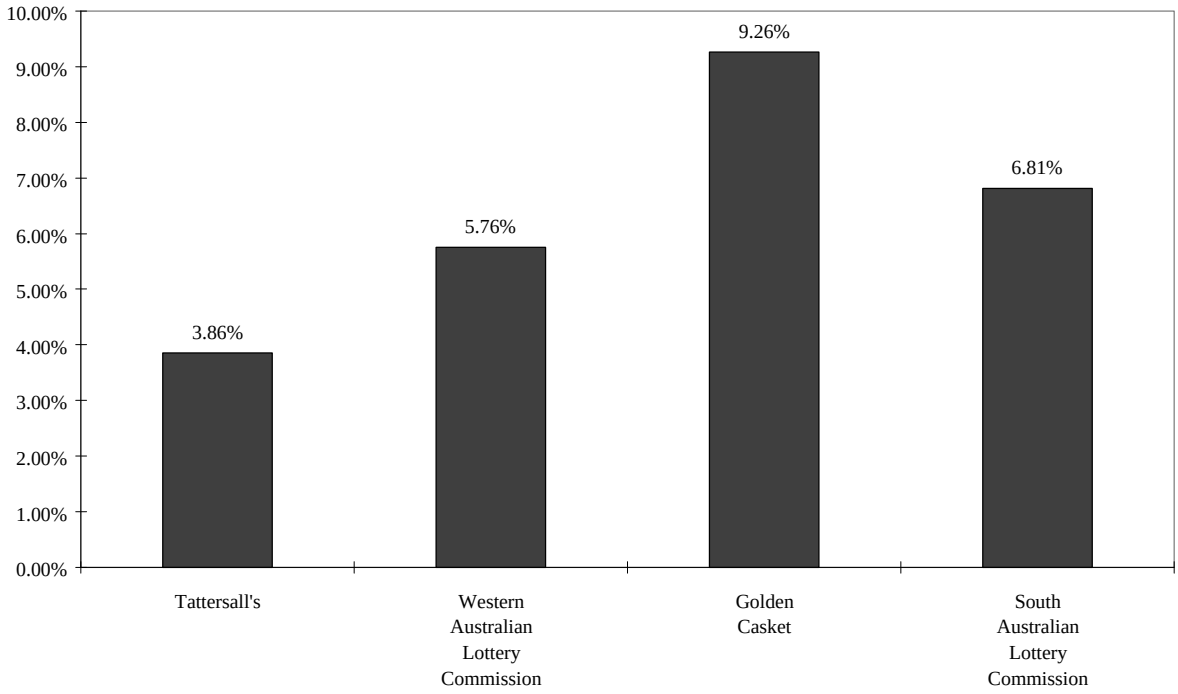
In 1981-82 net operating expenses amounted to $12.8 million, equal to 2.95% of turnover. Expenses had fallen to 2.14% of turnover in 1995-96. In real terms Tattersall's expenses fell by 33.5% over this period.

The recent performance of net expenses is shown in Figure 3.1. Tattersall's net expenses have fallen in nominal terms by 5.9% over the four years to 1995-96. In real terms[22] this represents a decline of 12.4%.

Tattersall's expenses are low in relation to those of other jurisdictions in Australia. There are difficulties in comparing net expense ratios among lotteries in different jurisdictions because of the different treatment of interest income and unclaimed prizes. Comparability is improved if it is confined to gross expense ratios.

As shown in Figure 3.2, Tattersall's has the lowest ratio of expenses to turnover of any lottery operator in Australia.

Figure 3.2. Comparison of Operational Efficiency of Lotteries in Various Jurisdictions in Australia



Such information as is available on expenses of lottery operators in other countries suggests that Tattersall's expense ratio is comparable with international best practice. Table 3.1 shows that Tattersall's has lower operating costs than any of the State lotteries in the United States.

[22] Based on the implicit price deflator for private consumption.

Table 3.1. US Lottery Sales and Operating Expenses

	1989 Sales	Operating Costs
	$US million	%
California	2595	11
New York	2034	7
Florida	1982	12
Pennsylvania	1653	8
Massachusetts	1551	10
Ohio	1540	12
Illinois	1521	7
New Jersey	1250	9
Michigan	1171	10
Maryland	765	8
Connecticut	494	6
Virginia	375	15
Arizona	295	13
Wisconsin	262	11
Washington	255	13
Missouri	223	16
Kentucky	217	16
Iowa	170	18
Oregon	164	15
District of Columbia	144	16
Indiana	143	
Maine	105	17
Colorado	105	25
New Hampshire	86	11
Kansas	76	19
Delaware	64	10
West Virginia	62	25
Rhode Island	61	14
Vermont	39	16
Idaho	33	
South Dakota	20	24
Montana	13	30
Total	19468	

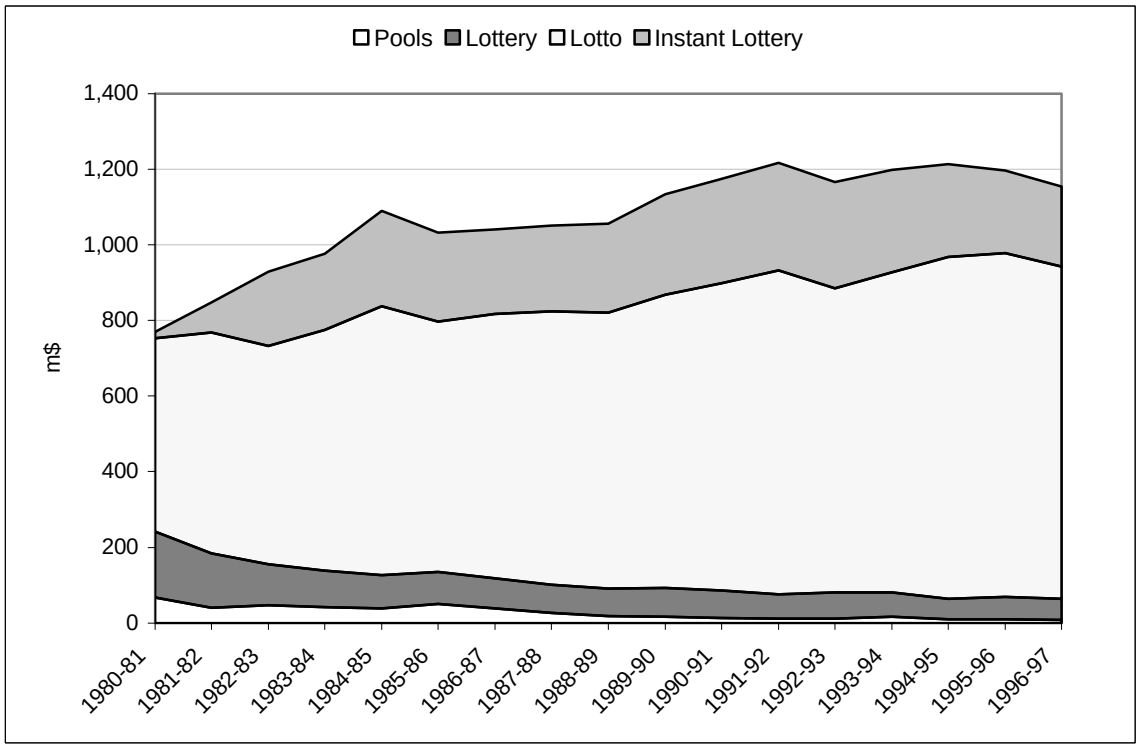
Source: Clotfelter and Cook (1990), Table 1.

One reason Tattersall's has remained competitive over the period of its present licence is that lotteries increasingly are becoming subject to competition from forms of gambling made available by new technologies. Electronic gaming machines, introduced in 1992 and the opening of the temporary and then permanent Crown Casinos are obvious examples of increased competition from other forms of gambling. The spread of Internet gaming, however, is also a growing competitive force; all Australian State and Territory Governments are currently considering a cooperative legislative scheme in which Internet gambling may spread significantly.

Tattersall's costs have also fallen as a result of its willingness to embrace the latest electronic technologies in servicing the lottery market. The most significant development in this respect was the adoption of Tattersall's "on-line" lottery system by which players' entries are recorded by Tattersall's central system via communication from the lottery terminal installed in the retailer's outlet. Going "on-line" (which occurred in 1983) resulted in significant efficiencies. Since then, Tattersall's has continued to improve the system by constantly updating hardware and software, and developing its own software.

Tattersall's overall impact

Figure 3.1. Composition of Lottery expenditure in Australia, 1980-81 to 1996-97, (1997-98 dollars)



Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission

Tattersall's overall impact on the Australian lottery industry can be seen in Figure 3.1. This shows the market penetration of the two forms of lottery (Lotto and instant lotteries) pioneered in Australia by Tattersall's. Throughout the 1980s, expenditure on these two

products more than offset the decline in expenditure on the traditional lotteries and pools. It is only in the last couple of years that expenditure on Lotto and instant lotteries has itself peaked, in the face of strong competition from other gambling forms.

Table 3.1 provides further evidence of Tattersall's leading role in the lottery market. Apart from Western Australia, where there are no EGMs, average per capita expenditure on lotteries + lotto is highest in Victoria and the Northern Territory – where Tattersall's has the license.

Table 3.1. Average per capita expenditure on lottery products, 1994-95 to 1997-98

	Lotteries	Lotto	Instant lottery	Pools	Total lottery products
New South Wales	9.16	47.29	12.92	0.77	70.13
Victoria	1.38	75.11	8.05	0.43	84.96
Queensland	1.26	58.87	31.92	0.81	92.87
South Australia	0.00	52.95	7.79	0.29	61.03
Western Australia	0.00	89.40	22.05	0.77	112.22
Tasmania	1.10	53.08	10.42	0.39	64.99
A.C.T.	4.25	49.48	11.44	0.32	65.49
Northern Territory	10.23	81.97	10.41	0.23	102.84

3.7 Economics of lotteries

Lotteries are subject to significant economies of scale. These relate both to operating costs and on the demand side, to the size of the prize pool.

Operating costs

There is evidence on economies of scale in operating costs in a US study by Clotfelter and Cook[23]. They state (p.108) that "scale economies in provision are exhausted at about $300 million per annum in annual sales" (in 1989 US dollars). However, this finding is based only on casual examination of the operating costs of the lotteries in 37 of the 39 American states with lotteries. It does not formally isolate scale economies from other influences on costs.

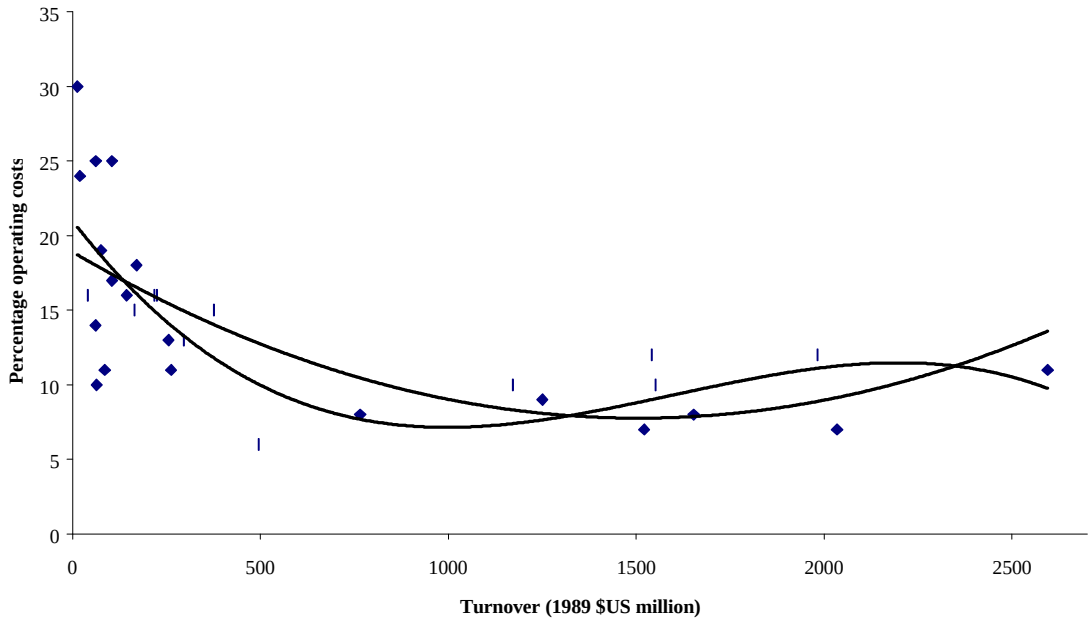
The data strongly suggests that the proportion of administration costs in turnover does decrease with the size of the lottery. Despite Clotfelter and Cook's observation, the lowest percentages of operating costs seem to be associated with the largest annual turnovers.

[23] C. Clotfelter and P. Cook, "On the Economics of State Lotteries", *Journal of Economic Perspectives*, 4(4), Fall 1990, 105-19.

Clotfelter and Cook's data on operating costs and annual turnover are plotted in Figure 3.1, together with simple second- and third-order polynomial approximations to the relationship between the series.

Figure 3.1. Operating cost versus turnover

Source: Clotfelter and Cook (1990) Table 1



While obviously not a definitive explanation, the curves suggest that scale economies are exhausted at annual sales between $1 and $1.5 billion in 1989 US dollars[24]. Translating the implied limits on economies of scale from this simple analysis into current Australian dollars will clearly imply a scale well in excess of Tattersall's present $911 million annual turnover.

Economies of scale on the demand side

It is a peculiar characteristic of lotto that the expected value of a $1 bet depends not only on the fraction going to the prize pool, but also on the total amount bet by other players. The rules of the game create an externality[25]; when player A bets a dollar, she simultaneously increases the jackpot available to player B (a positive externality) and simultaneously increases the chance that, if B does win the jackpot, he will have to split it with somebody else (a negative externality). Since the first has a larger effect on the

[24] Note that the third-order approximation suggests another region of economies of scale above $2.2 billion.

[25] See P. Cook and C. Clotfelter, "The Peculiar Scale Economies of Lotto", American Economic Review, 83, June 1993, 634-64

expected jackpot than the second, adding another player to the pool increases the expected value of a bet.

The analysis can be extended to take account of lower order prizes and rollovers of the first prize from one week to the next[26]. Scott and Gully have also shown that weekly sales in the US lottery market respond efficiently to fluctuations in the size of the prize pool, resulting from jackpots.

They show that consumers will always prefer the larger prize pool resulting from higher sales, whenever there is no rollover. When there is a rollover, the expected value of an entry will still increase with the size of the pool, but only over a range in which the pool is "sufficiently" small. The larger the rollover, the smaller this range becomes.

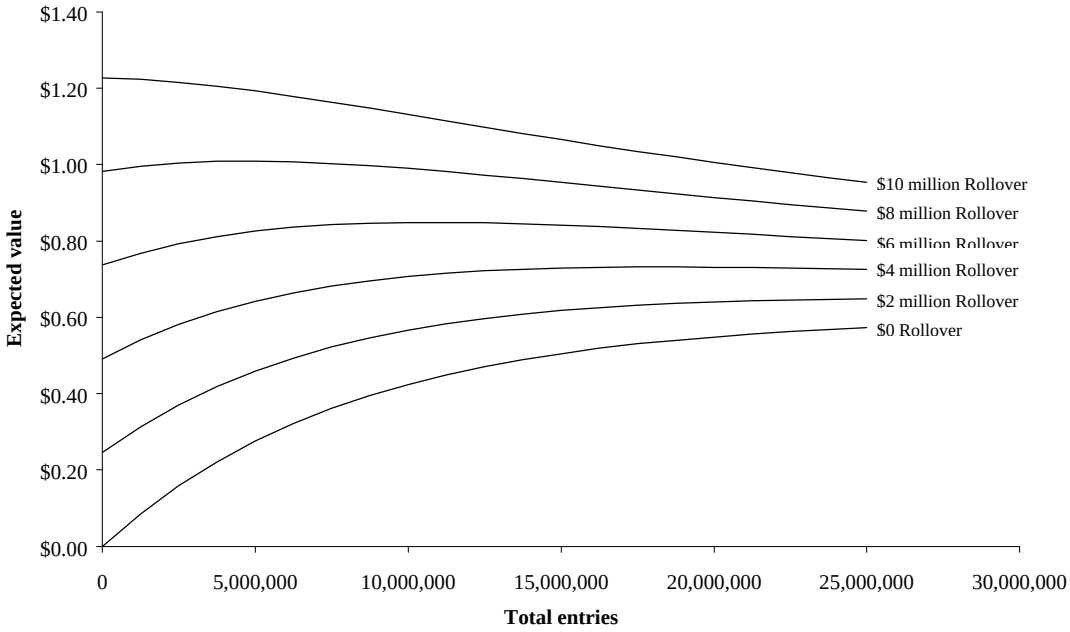
Figure 3.1 shows the relationship between the expected value of a single $1 entry in a winners-take-all 6 from 45 lotto with various levels of rollover, assuming 60 cents of the entry price goes to the prize pool. In this example a rollover of $6 million or more would cause the expected value of an entry to decrease as the number of other entries increases beyond about 9 million.

The expected value decreases over the whole range of entry numbers when the rollover is $10 million or more. A rollover of $2 million or less allows the expected value to increase uniformly with the number of entries over the range shown, but only the zero rollover case is guaranteed to continue increasing.

Allocating some part of the prize pool to lower division prizes will cause the expected value of participation to converge more quickly to the entry price net of takeout (60 cents in this example), but does not change the relationship between expected value and player numbers.

[26] See, for example, F. Scott and O. D. Gulley, "Testing for Efficiency in Lotto Markets", *Economic Inquiry*, 33, April 1995, 175-88.

Figure 3.1. Expected value of 6 from 45 lotto as the numbers of entries increase



In practice, the size of Saturday Tattslotto ensures that the game is almost always won and rollovers are rare. This draw accounts for more than half of total turnover. Assuming no rollovers, the expected return on a Tattslotto entry (and, in turn, demand for participation) always increases with the number of entries.

Although Tattslotto rollovers are rare, around every nine weeks Tattersalls does offer "Superdraw" games in which the Division 1 pool is guaranteed to be a particular minimum size. The effect of these draws stimulates entries from around 300,000 additional players, an increase of more than 30%, and increases the average spend per player by around $2.50.

4 Regulatory Arrangements For EGMs

As of 31 March 1998 there were about 158,000 gaming machines (GMs) operating in Australia excluding those located in casinos. Each State has its own regulatory arrangements and these arrangements vary. Differences include the total number of machines permitted, the number of machines permitted in individual venues, the number and type of venues in which machines are permitted, taxation rates and the arrangements for the permitted ownership of machines. The clubs industry traditionally has been less important in Victoria and South Australia compared with New South Wales and Queensland and this is reflected in the regulations.

Whereas lotteries have been conducted for many years in all parts of Australia, EGMs have a shorter history of operation in most states. The challenge for the regulatory authorities in those states where EGMs have been legalised relatively recently has been to design appropriate regulatory arrangements ab initio. Different states have arrived at different solutions. In the case of New South Wales, which has over four decades of experience in supervising the operation of EGMs, the challenge has been to adapt regulations to reflect modern practices and take advantage of modern technologies.

The Commission's Inquiry presents the opportunity for the industry, regulators and the community to review existing regulatory arrangements, to draw out the lessons from Australia's experience in regulating EGMs to date and to consider their implications for the future direction of regulatory policies and practices. This section is intended as a contribution to that process.

4.1 Restrictions on the Number of EGMs

All states have some form of restriction on the number of GMs, but practices vary considerably across Australia reflecting different historical developments and, in particular, variations in the importance of the clubs industry among the states.

New South Wales traditionally has had few restrictions on the number of EGMs, and the largest number of EGMs per capita of any of the states. In part this reflects the approach of linking EGMs and the development of the clubs industry in New South Wales. When GMs were introduced into New South Wales in 1956 their operation was restricted to clubs. The clubs' monopoly over the operation of GMs lasted for 28 years. This policy reflected the desire of successive governments of New South Wales to promote the role of non-profit, community-based organisations that, in turn, promote sporting and cultural activities and support a range of charitable projects.

New South Wales has never imposed a limit on the number of GMs that a club may operate, providing it does not operate more approved amusement devices (AADs) than poker machines[27]. The outcome, therefore, has been to produce a total number of GMs

[27] Any game, such as spinning reel games, may be carried on PMs, except for the video draw poker game. Under the Liquor Act 1982 an AAD is defined as a gaming machine on which the game of draw poker only may be played.

that is demand determined, subject to the restrictions relating to the operation of GMs in other venues. Until 1984 the operation of GMs in other venues was banned. In 1984 hotels were permitted to operate GMs on a restricted basis. The November 1996 amendments to the NSW Liquor Act 1982 increased the maximum number of GMs that a hotel may operate from 10 to 30, providing it does not operate more PMs than AADs. As at 30 June 1996, 1,807 hotels operated a total of 11,584 GMs.

When the Sydney casino opened in 1995 in its temporary premises it was permitted to operate 500 GMs. The permanent casino was allowed to operate 1,500 GMs.

Even following the relaxation of the clubs' monopoly over the operation of EGMs, clubs still dominate the EGM market in New South Wales. As at 30 June 1996, 1,441 clubs operated a total of 64,157 GMs in NSW. The largest club operated 772 GMs.

Other states that have introduced EGMs over the past decade have imposed restrictions of one form or another on the total number of EGMs. At the other end of the spectrum from New South Wales, Victoria has imposed a cap of 27,500 on the number of EGMs permitted for gaming at licensed venues other than at the Melbourne Casino until the year 2000. This cap was imposed on the basis of research commissioned by the Victorian Casino and Gaming Authority into the social and economic effects of gaming.

The two Victorian gaming operators (see below) own all gaming machines in Victoria, and can move machines among venues in accordance with market conditions, providing:

- the number of gaming machines placed in approved venues is equally distributed between hotels and licensed clubs;
- the maximum permissible number of gaming machines available for gaming in any licensed venue is 105 machines, with a limit of 100 machines within the restricted (i.e. designated) gaming area of the venue; and
- the proportion of gaming machines located outside the Melbourne metropolitan area is not less than 20 per cent.

South Australia and Queensland do not have a global limit on the number of EGMs but do impose a limit on the number of EGMs at particular venues. In South Australia this limit is a maximum of 40 EGMs at any venue. As at 30 June 1998 there were 10,898 GMs in South Australia at 513 venues.

The initial impetus for the Queensland Government to consider the legalisation of gaming machine operations was to address the deteriorating financial position of licensed clubs across the state. The Government studied the machine gaming environment in other jurisdictions, particularly in New South Wales, and considered reports on concerns with regard to the introduction of GMs by the Criminal Justice Commission and the Parliamentary Criminal Justice Committee.

Machine gaming commenced in clubs and hotels/taverns in Queensland in 1992, pursuant to the Gaming Machine Act 1991, with the regulations imposing a tighter restriction on the number of EGMs in hotels compared with clubs. As at 30 June 1998, there was a total of 23,435 gaming machines in 1,158 sites, comprising 16,624 machines in 637 clubs and 6,811 machines in 521 hotels/taverns.

Significant amendments to the Gaming Machine Act occurred in 1992 and 1993 with major amendments arising out of the outcomes of the Review of Queensland Gaming Machine Regulatory Arrangements (the "White Paper") occurring in 1997 and 1998. One outcome is that licensed clubs will be permitted to increase to a maximum of 300 machines and hotels to a maximum of 45 machines in yearly increases of 10 and 5, respectively, over the period to 2001, as follows:

	Clubs	**Hotels**
From 1 July 1998	270	30
From 1 July 1999	280	35
From 1 July 2000	290	40
From 1 July 2001	300	45

4.2 Regulations for Fairness and Honesty in EGM Operation

Because of the very large turnover generated by EGMs, there is a strong incentive to tamper with the machines themselves and/or with the reporting systems upon which revenue collections rely. All states have detailed systems of regulation intended to combat fraudulent practices by EGM manufacturers, maintenance contractors, gaming machine operators and venue operators. EGMs must conform with the minimum payout ratio to players (generally 85%) in order to ensure fairness in operation. Of the amount retained by the venue operator, the appropriate amount of taxation must be calculated, reported and collected.

The Victorian regulatory arrangements are the most centralised and arguably the most efficient. The degree of centralisation in Victoria, in part, reflects the late introduction of EGMs into hotels and clubs in Victoria in 1992-93 and the establishment of a casino in Melbourne in June 1994.

The Victorian Casino and Gaming Authority (VCGA) was established as an independent statutory authority under the Gaming and Betting Act 1994 and charged with responsibility for monitoring and controlling gaming, including EGMs, wagering and other forms of gambling in Victoria. The VCGA's Business Plan for 1996-97 described the rationale for regulation of the State's gambling industry as necessary to:

- prevent any criminal or unsuitable people from becoming involved in the industry;
- ensure public confidence in the industry;
- ensure government receives all revenue due to it from approved gambling activities; and
- protect patrons of approved gambling activities from unfair or unreasonable treatment.

The Victorian regulatory arrangements were the first to include the issue of gaming operator licences. The gaming operators purchase from the manufacturers and own all

gaming machines in Victoria. There are two gaming operators in Victoria - TABCORP Holdings Limited and Tattersall's (both licences expire in 2012) - with each permitted to operate 50% of the maximum permissible number of gaming machines available for gaming in the State. As noted earlier, the maximum number of EGMs permitted for gaming in licensed venues in Victoria, other than at the Melbourne Casino, has been set at 27,500 and is next subject to review in the year 2000.

The effect of the introduction of gaming operators into the regulatory structure was to achieve vertical separation of the Victorian gaming machine industry. Manufacturers may sell machines only to gaming operators, but the two gaming operators are not permitted to hold venue operator licences to operate as gaming venues. These are issued only to approved hotels and licensed clubs.

In addition to the gaming operator controlled EGMs, Crown Limited is permitted under the terms of its licence, which was issued in November 1993 for an initial period of 40 years, to operate 2,500 EGMs within the casino. There is no equivalent to the gaming operators for the Melbourne Casino. Consequently, the casino deals with a large number of suppliers. In relation to controlled contracts between the casino and other parties, the Casino Control Act 1991 requires the VCGA to consider the "operation of the contract and the suitability of each person who is a party to the contract".

This provision exists to ensure criminal exploitation is prevented from entering the casino through the provision of goods and services. In a presentation to the August 1997 Gaming Regulators Conference in New South Wales, the Chairman of the New Jersey Casino Control Commission indicated that tight controls over the supply of goods and services to casinos were very essential and that "... strict regulatory controls have prevented organised crime from ownership or operation of casinos in New Jersey".

Despite his overall favourable report on the VCGA, the Auditor General recently reported[28] on unsatisfactory aspects of the casino's practices in relation to assessing certain controlled contracts in that:

- probity checks were carried out only on key persons nominated by the prospective contractor;
- only key employees, rather than directors and shareholders of the companies involved, were investigated for suitability; and
- in a case involving an overseas parent company and its local subsidiary seeking to supply gaming equipment, only the directors of the local subsidiary were probity checked.

No such finding was made by the Auditor General in relation to the VCGA's gaming responsibilities where the gaming operators provide centralised sources of supply to venue operators. The gaming operator arrangements also minimise the need for ongoing monitoring by the VCGA of parties to controlled contracts, for example, due to changes in ownership, directorship or key management after a contract has been formalised.

[28] *Victoria's Gambling Industry – An insight into the role of the regulator,* Special Report No. 54, March 1998.

The Gaming Machine Control Act 1991 also includes provision for the allocation, in designated proportions, of the total net daily cash balances (i.e. the total amount wagered on gaming machines less the sum of all prizes paid) to government revenue, gaming operators, venue operators and a special trust fund, the Community Support Fund (used for special research into gambling and for specified community purposes). In the case of clubs, one-third of net revenue goes to each of government revenue, gaming operators and venue operators. In the case of hotels, the return to the venue is 25 per cent of the total net daily cash balances and 8 1/3 per cent is payable into the Community Support Fund. The lower tax rate for clubs is to assist clubs in improving the facilities they offer to their members and local communities. The gaming operators operate the monitoring systems that ensure compliance with these provisions of the Act.

The Victorian gaming operator based regulatory structure increasingly has been adopted as the standard by the other States. At the time of the introduction of EGMs into Queensland, the Government decided to purchase the gaming machines and rent them to the venues on a cost-recovery basis. As well as addressing probity issues, this approach also assisted the licensed clubs which were in generally poor financial condition.

During 1996, however, the Queensland Government held public consultation widely in the industry and the community in its Review of Queensland Gaming Machine Regulatory Arrangements, the report of which was published as "the White Paper" in November 1996. The resulting amendment to the Gaming Machine Act in 1997 introduced two fundamental changes to the gaming machine regulatory environment.

First, the ownership of gaming machines was no longer restricted to the Queensland Government. Sites were given freedom of choice to purchase and/or lease or sublease machines from licensed operators or approved financiers. This resulted in all but 1,722 of Queensland's 23,435 operational gaming machines being purchased directly by venues or approved third parties by 1 July 1998. The remainder are expected to be purchased in the next few months.

Second, the Queensland Office of Gaming Regulation transferred the task of electronic monitoring of gaming machines to Licensed Monitoring Operators (LMOs). LMOs may also enter into commercial arrangements to provide ancillary services to gaming machine venues, including leasing of machines, management advice, training, marketing and linked jackpots. Eight LMOs have been licensed and have begun business operations with the gaming machine venues. The changeover of monitoring operations from the Queensland Office of Gaming Regulation to LMOs commenced on 1 July 1998. From August 1997, new procedures were put in place for all gaming machine purchases, leasing, conversions, disposals and so forth by sites to be undertaken through LMOs.

The effect of these changes has been to remove the Queensland Government from operational aspects of the gaming machine industry, while maintaining its regulatory role to protect the probity and integrity of the industry. This is similar to the Victorian arrangements.

In New South Wales licensed venues may purchase machines directly from the manufacturers. While there is no machine ownership role for gaming operators, New South Wales has instituted a centralised system for monitoring GMs, which is expected to be fully operational by 2001. The system, to be operated by the NSW TAB, provides for

the computerised monitoring of all GMs in NSW under a 15 year exclusive licence. All venues are required to connect to the centralised monitoring system by 1 January 2001, which will collate and process data in relation to each machine connected to the system. TAB will be responsible for the collection and processing of the data, including the assessment and billing of duty and records of designated events relating to the integrity of the machines. The centralised monitoring system is expected to result in a reduction in monitoring costs and improved scrutiny of GMs that will enhance the overall integrity of the operation of GMs in NSW.

Venues are required to pay TAB a monitoring fee set initially at $26.10 per machine per month. TAB will be able to provide electronic authorisation of any changes to gaming machine configurations and to sell to venues information and analysis in relation to their gaming machine usage, utilisation, etc.

The NSW TAB also operates the inter-club/hotel linked gaming machine jackpot system. This system, which the TAB also operates under an exclusive 15 year licence, enables venues the opportunity to pool a portion of their gaming machine turnover to create larger wide area gaming machines jackpot prizes, similar to systems operating in other jurisdictions. TAB will conduct separate jackpot pools for registered clubs and hotels. Venues will pay the TAB for participation in the linked jackpot system, which is unlikely to exceed 15% of revenue from linked GMs.

4.3 Responsible Gaming

Victorian Gaming Machine Industry Codes of Practice

In late 1996, the Victorian Gaming Machine Industry developed a self-regulatory Accord and a number of Codes of Practice. The aim is to ensure that the industry adopts a responsible approach to its social obligations, in line with community expectations.

The Accord and Codes came into operation in February 1997, and were reviewed after six months' operation.

In implementing the Accord and Codes, the industry has:

- maintained dialogue and worked with interested community groups and problem gambling support services;
- established a workable, credible Independent Complaints Resolution Process;
- introduced "Responsible Service of Gaming" training for venue staff;
- acknowledged that a small percentage of patrons may experience problems associated with gambling and has made a commitment to assisting these patrons; and
- established a self-exclusion process from gaming venues that has patron acceptance.

The Victorian industry's Codes of Practice are currently being evaluated by other states and New Zealand.

The six-month review concluded that more needed to be done – especially in communication – but that in key areas, industry self-regulation had successfully negotiated the implementation phase. .As a result of the review, the industry working group determined to:

- implement a comprehensive awareness programme in relation to the Codes of Practice and the Secretariat's activities;
- consult continuously with community interest groups in relation to problem gambling issues;
- commission a research study to define, for the purposes of the Accord, what constitutes "Responsible Gaming" within an appropriate legal context; and
- explain in detail the advertising standards set out in the Accord, for the benefit of the industry, its patrons and the public.

Tattersall's activities

Tattersall's has strongly supported the development of the Accord and Codes of Practice, together with their implementation at its venues.

Tattersall's has also moved out in front of the rest of the industry by conducting a Responsible Gaming Communication Trial (See Box 4.1). The aim of this trial, conducted at 10 gaming venues from November to December 1998, was to encourage responsible play at the venues. The trial involved the use of various kinds of display material, based on the theme *Have fun, but play it safe.*

Tattersall's is now considering launching a campaign based on the theme at all its venues in Victoria.

Box 4.1: Responsible Gaming Communication Trial

It is the responsibility of each individual to determine his/her gaming behaviour. While the vast majority of patrons play responsibly, there is a small minority whose behaviour exposes them to the risk of developing gambling problems.

Tattersall's recognises that it has a role in promoting socially responsible behaviour by patrons at its gaming venues. It has therefore undertaken a Responsible Gaming Communication Trial at selected venues, based on the theme *Have fun, but play it safe.*

Early results from the trial are promising. Tattersall's is now considering launching a campaign based on the theme at all its venues in Victoria.

5 Gambling and Taxation

(Refers to Inquiry Terms of Reference: (b) the participation profile of gambling; (c) the economic impacts of gambling, (d) the social impacts of gambling; (e) the effects of regulatory structures; and (g) the impact of gambling on government budgets)

5.1 Taxation levels

Tattersall's acknowledges governments' need for revenue, and has cooperated fully in the collection of state taxes and the payment of levies required as a condition of its licenses.

Gambling is an important source of revenue for governments. High gambling taxation has been justified historically as a trade-off for permitting activities that were previously illegal. It has also been described as "voluntary taxation" since no one is required to gamble, and therefore to pay it.

However, as shown in Table 5.1, gambling taxation distorts the odds facing participants in the various forms of gambling, and the cost of gambling relative to other goods and services.

Table 5.1. Government revenue, percent of Turnover, by State in 1996-97

	Lotteries & Lotto	Total Racing	Gaming machines	Casino	Total Gambling
	%	%	%	%	%
New South Wales	29.7	7.3	2.1	3.7	3.6
Victoria	38.2	4.2	4.0	2.0	4.4
Queensland	31.2	4.9	2.9	2.6	5.1
South Australia	40.1	3.6	4.4	7.1	5.9
Western Australia	29.8	3.7	-	3.2	6.5
Tasmania	30.5	4.2	4.3	2.7	4.3
ACT	30.8	2.8	2.3	4.1	3.3
Northern Territory	31.9	1.6	4.1	0.6	2.8
Australia	**32.8**	**5.4**	**2.9**	**2.6**	**4.3**

Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission.

Note: Where a particular form of gambling was not available in 1996-97 the cell has been left blank.

Relative to turnover, the average tax on lotteries is 32.8 percent – ranging from 29.7 percent in NSW to 40.1 percent in South Australia. Average taxes on other forms of gambling range from an estimated 2.6 percent on casino turnover to 5.4 percent on racing. It would seem that there is massive discrimination against lotteries relative to other forms of gambling.

Table 5.2. Government revenue, share of Expenditure, by State in 1996-97

	Lotteries & Lotto	Total Racing	Gaming machines	Casino	Total Gambling
	%	%	%	%	%
New South Wales	76.8	50.4	21.3	21.7	31.2
Victoria	95.3	28.6	43.0	22.1	42.0
Queensland	78.0	28.6	19.8	17.6	28.5
South Australia	101.9	25.0	35.6	26.5	39.1
Western Australia	72.3	24.5	-	15.0	29.3
Tasmania	92.8	42.8	20.6	34.4	38.9
ACT	71.8	20.6	22.4	20.0	27.0
Northern Territory	79.8	15.5	48.4	5.1	24.7
Australia	**82.8**	**36.7**	**28.6**	**19.9**	**34.1**

Source: Australian Gambling Statistics 1972-73 to 1996-97, Tasmanian Gaming Commission.

Note: Where a particular form of gambling was not available in 1996-97 the cell has been left blank.

Table 5.2 shows how government's share of expenditure varies across gambling forms and by state. Bearing in mind that expenditure equals the sum of operating costs, government revenues and profit retained by the operator, this ratio actually provides information about (a) the level of operating costs, and (b) the long-term sustainability of current tax rates in the different jurisdictions.

In the case of lotteries, the table confirms the low level of operating costs and operator's profit in Victoria (just 4.7 percent of expenditure). This contrasts with the much higher level of these items in NSW (23.2 percent), Queensland (22 percent) and Western Australia (27.3 percent).

We estimate that, if in 1996/97 providers in all jurisdictions had achieved the same level of costs as Tattersall's Victorian operations, total costs Australia-wide would have been some $150 million less than actually observed. Had there been effective competition between service providers across state boundaries, this saving would have been available to governments as higher revenues, or to bettors as a higher maximum prize or expected return.

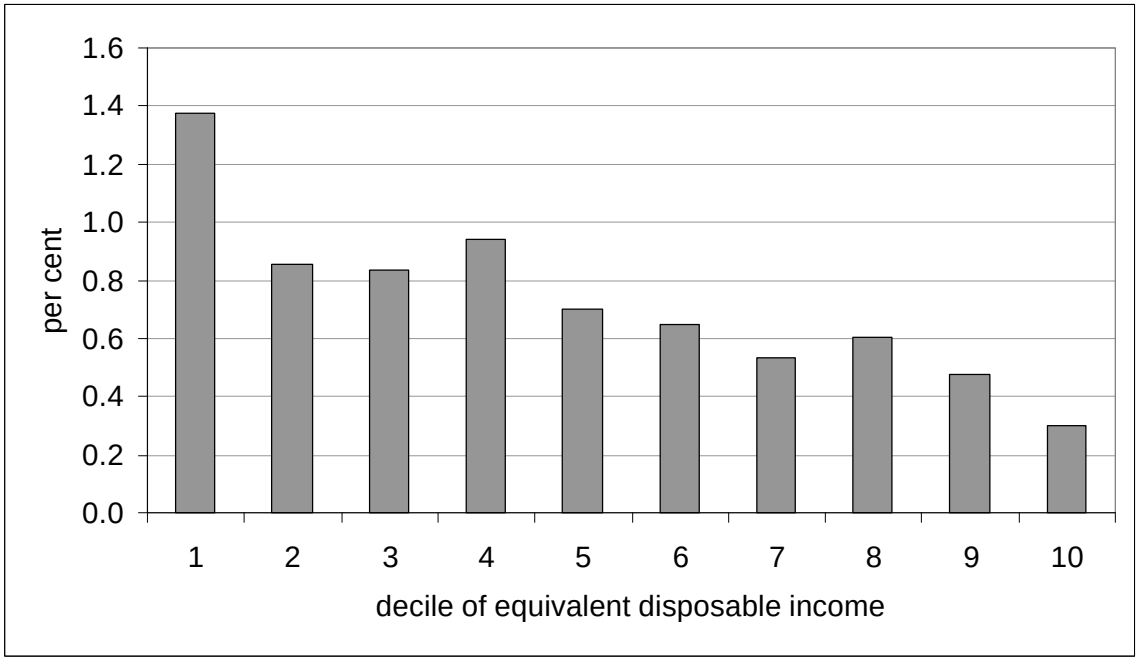
5.2 The Incidence of Gambling Taxation

Gambling taxation is regressive, bearing more heavily on poorer households.

Using the data from the Household Expenditure Survey compiled in Appendix A, it is possible to estimate the amount of expenditure on gambling by various socio-economic characteristics that is collected by government through the taxation of gambling. These estimates suggest that:

- Gambling taxes are generally regressive though some are more regressive than others. An estimated 1.4 per cent of disposable income of those in the lowest income decile is paid as gambling tax. The gambling tax share of disposable income drops to 0.9 per cent for the second income decile and thereafter declines to 0.3 percent for the top income decile.

Figure 5.1. Estimated Government Revenue from Gambling, Share of Disposable Income by Decile of Disposable Income for Households

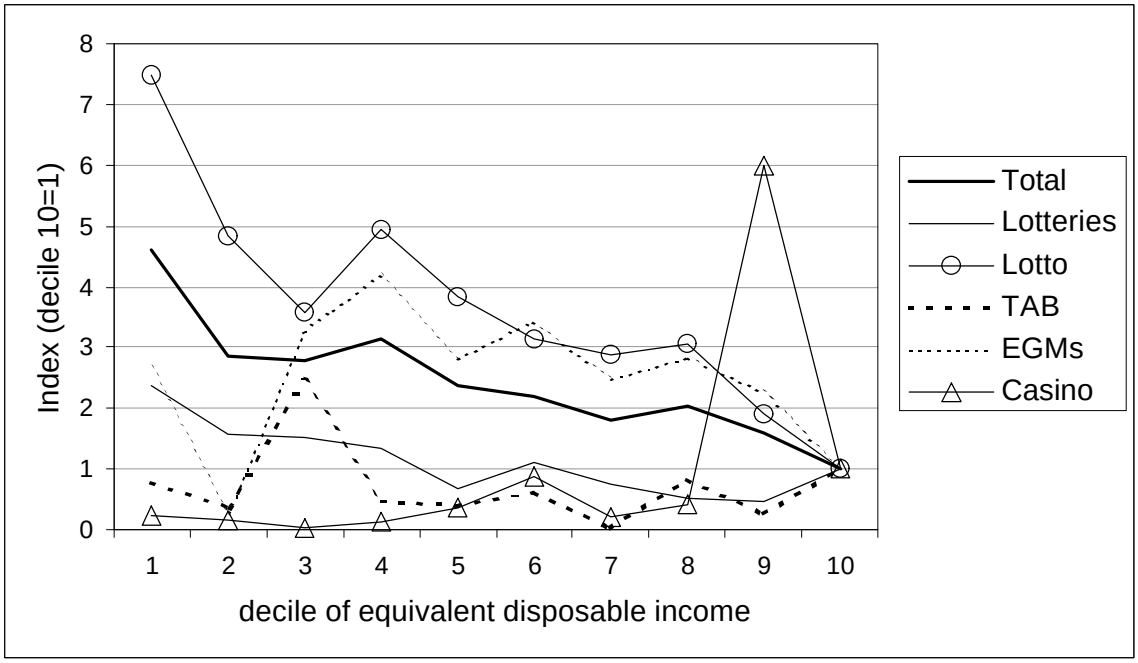


Source: Access Economics Micro Model; the 1993-94 Household Expenditure Survey, ABS; and Australian Gambling Statistics 1972-73 to 1996-97, The Tasmanian Gaming Commission.

The taxes imposed on lotteries and lotto games are the most regressive of the taxes on the various forms of gambling, while casino taxes appear to somewhat progressive. For example, the proportion of disposable income paid in lotto and instant lotto taxes by those

in the first income decile is 7.5 times greater than the proportion paid by those in the highest income decile. By contrast, for consumers of casino services the proportion of disposable income paid in taxes by those in the first income decile is only 0.2 of the proportion paid by those in the highest income decile.

Figure 5.2. Gambling Revenue, Share of Disposable Income by Decile of Disposable Income for Households, (Index: decile 10=1)



Source: Access Economics Micro Model; the 1993-94 Household Expenditure Survey, ABS; and Australian Gambling Statistics 1972-73 to 1996-97, The Tasmanian Gaming Commission.

The share of disposable income paid as tax on EGMs increases from 0.05% for the lowest income decile to 0.07% for the 4th income decile, declining to around 0.02% for the sixth to the 10th deciles. Accordingly, middle income earners pay the highest share of disposable income in taxes on EGMs.

Those at the bottom end of the income distribution pay a smaller share of disposable income in taxation than those in the middle income range, but more than those at the top end of the income distribution. The very low EGM tax incidence of the 2nd decile is the result of a high number of large households who generally have a low EGM usage.

BOX 5.1 THE EFFICIENT TAXATION OF LOTTERIES

Does the current rate of tax on lotteries raise the maximum amount of revenue? If not, should the tax rate on lotteries be increased or decreased? Would the revenue maximising tax rate be the best from the viewpoint of the community as a whole? To our knowledge, these questions have not been studied before.

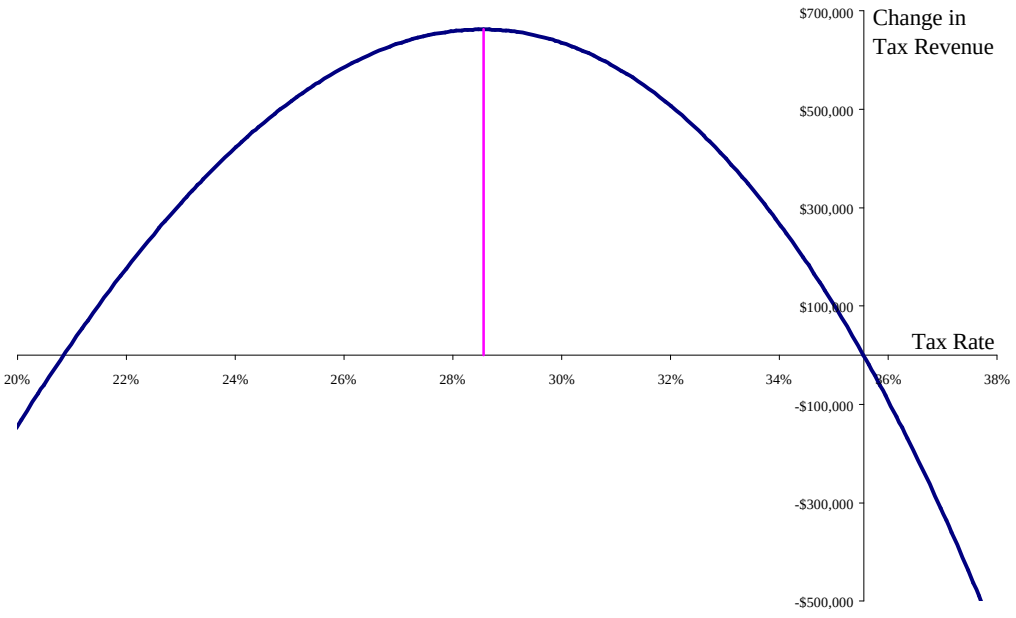
An increase in the rate of tax applying to a lottery increases the price of playing in a lottery. Tax revenue will increase for increases in the tax rate providing the proportionate reduction in demand is less than the proportionate increase in price occasioned by the increase in the tax rate. This is an empirical question and depends on the responsiveness of demand to an increase in price – the elasticity of demand.

Access Economics has estimated the demand for the three main lotteries using weekly data on turnover based on the modified quadratic demand curve. The elasticity of demand implied for each of the games is:

	Tattslotto	**Powerball**	**OzLotto**
Low turnover	2.19	0.03	0.20
High turnover	0.24	0.20	0.80

The high elasticity of Tattslotto for low turnover games (non-Superdraw weeks) indicates that demand is very sensitive to price at these levels. Thus, a reduction in the price (achieved through raising the payout ratio) would lead to a substantial increase in turnover. For the other two lotteries demand is less price sensitive (with a lower elasticity of demand).

Changes in Weekly Tax Revenue from Tattslotto for Different Tax Rates



Using the estimated demand curve, the chart above shows the estimated change in tax revenue from Tattslotto for a single draw (not a Superdraw) at different tax rates. It shows that the

current tax rate of 35.55% exceeds the revenue maximising rate. That is, lowering the tax rate would collect more tax revenue (due to the increase in the turnover stimulated by a lower tax rate).

The revenue maximising tax rate is 28.5%. At that rate, tax revenue would rise by $660,000 per week or almost $35 million over a full year. It would be possible to lower the tax rate to 20.8% while leaving tax revenue unchanged. This would allow for significant increases in payout ratios, division one prizes and turnover.

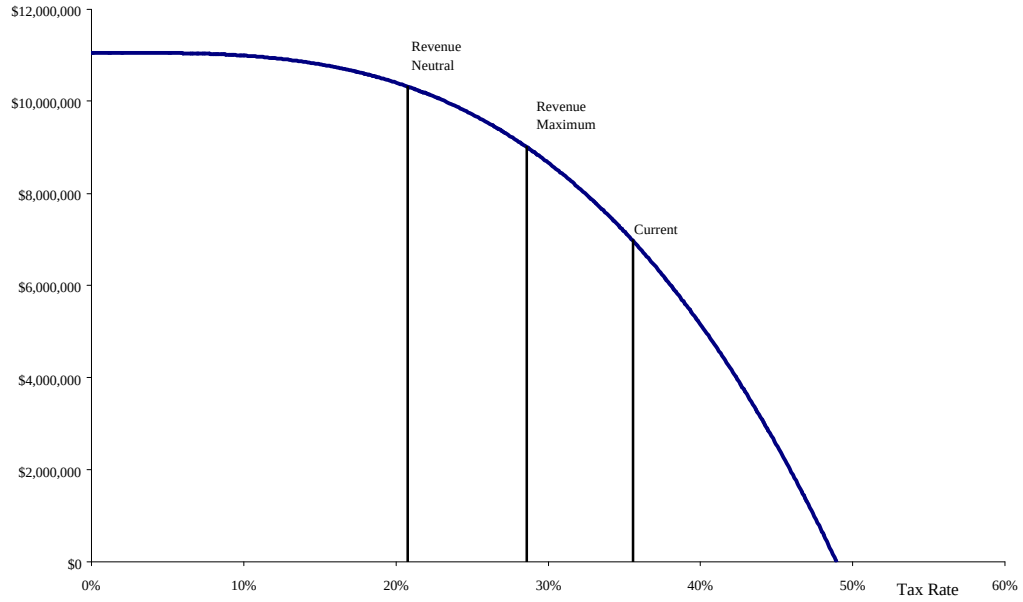
Is the revenue maximising tax rate the rate that maximises the benefits to the community as a whole?

Community benefits are composed of the tax revenue plus the consumer benefits less the social costs of lotteries. For given social costs, the best rate of taxation is that which maximises the sum of tax revenue and consumer benefits.

Taxes raise the price of a good above cost, forcing consumers first, to pay too much for what they consume and second, to consume less. This reduces consumer welfare. An important measure of the impact of a tax on consumers is the deadweight loss. This measures, in dollar terms, how much a tax reduces the welfare of consumers above and beyond the tax revenue raised. One obvious objective in designing the taxation system is to minimise the deadweight loss as this minimises the cost to consumers of raising any given level of government revenues.

Given the estimate of the demand curve for Tattslotto, it is possible to calculate the deadweight losses associated with different tax rates. The following chart shows the relationship between the tax rate and community benefit (tax revenue plus consumer welfare).

Community Benefit Versus the Tax Rate for Tattslotto



At the current tax rate on Tattslotto the community benefit is only around $362 million a year. This benefit increases to around $536 million a year if the tax rate were reduced to 20.8%, even though taxation revenue is estimated to be the same as at present. Moving to the revenue maximising tax rate would increase government revenue and the welfare of consumers. Such a change would increase community benefit from Tattslotto by $2 million a week or $106 million a year. Of this, almost $35 million would take the form of increased tax revenue.

5.3 Optimal taxation of gambling

The evidence surveyed above suggests that taxation on lotteries is very high, and that taxation of gambling, as a whole, is highly regressive. There is a need to justify the current state of affairs, or to determine how it might be improved.

High taxation of gambling could be justified on the grounds that the tax offsets the cost to society of gambling related problems. However, this does not explain why taxes are highest on lotteries that, it is generally acknowledged, create few social problems.

High rates of taxation could also be justified on grounds of economic efficiency ("Ramsey[29]) taxation"), if the demand for gambling is insensitive to the rate of tax. However, Access Economics, in a separate study for Tattersall's (See Box 5.1), has shown that the rate of tax on lotteries is higher than can be justified on efficiency grounds. That is, both revenue and consumer wellbeing would be higher if the effective rate of tax were lower.

The demand for gambling products may have been price inelastic in the past However, it is likely that this is becoming less true as different forms of gambling proliferate, and become more substitutable – and as supply across jurisdictional boundaries (and through the internet) becomes a reality.

Tattersall's therefore believes that the principles underlying the design of an efficient and equitable system of gambling taxation warrant careful scrutiny by the Productivity Commission.

[29] Ramsey pricing requires that the tax be chosen, so that the compensated demand for each activity is reduced in the same proportion. On making the simplifying assumption that there are no cross-price effects between the taxed goods, the Ramsey rule simplifies to the *inverse elasticities rule* – namely that the optimal tax rate is inversely proportional to the price elasticity of demand in each case. See, for example, G.D. Myles (1995), *Public economics,* Cambridge University Press.

6 The future of gambling regulation

(Refers to Inquiry Terms of Reference: (e) the effects of regulatory structures; and (g) the impact of gambling on government budgets)

6.1 Lessons from Tattersall's history

Tattersall's history illustrates the changing nature of government/industry interactions in the lottery and gaming sectors. Lessons to be drawn from that history include:

- the strength of underlying demand for gambling products, whatever the official attitude towards their desirability or legality;
- the impossibility of controlling interstate (and for that matter international) trade in gambling services unless there is effective cooperation between all jurisdictions;
- that, given gambling's effectiveness as a revenue raising device, governments have not long been able to maintain a policy of prohibition and non-involvement. The potential for revenue loss to other jurisdictions has also been a strong factor encouraging the spread of gambling services within jurisdictions;
- regulation of gambling which lacks popular legitimacy is likely to be ineffective and tends to discredit those supposed to enforce it. It may also invite accusations of hypocrisy against government;
- the importance of efficiency, honesty and fair dealing in determining which providers of gambling services will succeed in the long term. These attributes reflect both the provider of the gambling service and the regulatory framework within which it operates; and
- the importance of full, objective examination of options and consequences before major changes are made to gambling legislation. Change should balance the response to market dynamics against the need to preserve revenue and to monitor and control the impact on society.

6.2 Future regulation of lotteries

We now draw on the various strands of analysis presented in previous sections, to provide a comment on the future regulation of lotteries.

At present, each state licenses a single provider of lotteries in its jurisdiction. This allows the state to impose conditions that it considers should maximise revenue. In addition, taking each state in isolation, a monopoly is also the best way to achieve the economies of scale on the demand side that are inherent in pari-mutuel lottery games.

However, as we have shown:

- taxation of lotteries may well be higher than the rate that maximises either tax revenues, or net social welfare;
- there are economies of scale in the provision of lottery services that are not fully exploited in the market offered by an individual state. Led by Tattersall's, the

pooling of prizes across state boundaries has allowed the achievement of some economies of scale;

- however, the lack of competition between service providers means that costs are high in some jurisdictions under current arrangements.

We estimate that, if in 1996/97 providers in all jurisdictions had achieved the same level of costs as Tattersall's Victorian operations, total costs Australia-wide would have been some $150 million less than actually observed. Had there been effective competition between service providers across state boundaries, this saving would have been available to governments as higher revenues, or to bettors as a higher maximum prize or expected return.

Provided that governments can preserve their tax base through agreement with lottery providers, there are good grounds for treating Australia as a single lottery market, in which providers can compete freely across state boundaries.

There is also an international dimension that is likely to become increasingly pressing. In a globalising world, Australian consumers are likely to obtain increasing access to large scale lotteries operated by foreign organisations such as Camelot (UK) and G-Tech (USA). These will be able to draw on economies of scale beyond those available in the Australian market. In time they are likely to compete strongly with established Australian operations.

It is essential, therefore, that governments allow Australian lottery providers to anticipate that competition by removing the regulatory barriers that currently prevent lottery providers competing across state/territory borders. This would allow the emergence of strong national organisations, capable of meeting future international competition.

6.3 Future regulation of electronic gaming

The introduction of EGMs into a number of states in recent years has created the opportunity for innovative regulatory structures and a re-think of old structures. While the states are working toward the adoption of national technical standards for gaming machines, there are likely to be continuing differences in the regulation of EGMs among the states, partly reflecting different attitudes towards the clubs industry among the states.

The discussion of the regulatory arrangements earlier suggested that there had been a trend toward greater centralisation of regulatory structures, with the Victorian gaming operator arrangements being the most centralised at present. These arrangements offer a number of advantages, including that:

- it is easier to police the system for probity issues because there are only two points of contact at the gaming operator level;
- it is less likely to have probity problems because the two operators are large, responsible organisations – and in Tattersall's case with a long, successful track record in the honest provision of gambling services;
- the licence renewal process keeps the two operators focussed on being successful

long term players;

- having two operators enables network economies of scale which derive from the centralised monitoring of a network of gaming machines;
- it provides flexibility in tackling emerging social priorities; and
- it enables the operators to obtain better terms when dealing with suppliers, such as EGM manufacturers.

6.4 Regulation of internet gaming

The internet will provide strong competition for existing forms of gaming

The internet provides a new way of marketing all forms of gambling. For lotteries, it may increase competition from international providers, outside the framework of Australian regulation. However, the strongest impact is likely to be on more interactive forms of gambling, such as EGMs.

According to a recent report compiled by Deutsche Bank, there are an estimated 200 Internet gaming sites already operating on the World Wide Web. Deutsche Bank estimates that revenues generated by these site in 1997 reached the US$500 million mark and that this figure will exceed US$7 billion by 2001.

Whilst most existing Internet gaming operators are located in jurisdictions such as the Caribbean, where regulation of such activities tends to be less rigorous than would be the case in more developed nations, a recent survey conducted by the US based Interactive Gaming Council found that "almost 15% of the world's governments already recognise and permit some form of interactive wagering".

"Regulate and control" a better approach than prohibition

In May 1997, Australia joined the ranks of those governments which have decided that a "regulate and control approach" to interactive gaming is more desirable than a "prohibition approach". At that time, Australian State and Territory Gaming Ministers agreed on a national regulatory model for interactive gaming.

Meanwhile, the Kyl Bill in the US is a clear attempt by authorities in that country to adopt a prohibitive approach to interactive gaming. It has been widely argued by Internet experts, and even the US Department of Justice, that such an approach is technically and practically impossible to enforce. It has therefore been suggested that attempting to ban interactive gaming will only serve to drive the industry underground and thus into the hands of unregulated, and possibly undesirable, gaming operators.

Commonsense would suggest that an unenforceable law is a bad law and therefore attempting to prohibit interactive gaming, as opposed to regulating and controlling it, will be an exercise in futility.

Internet gaming has unique features that may make it easier to regulate

Interactive gaming differs from more traditional forms of gaming in ways that Tattersall's believes will make it easier to regulate.

The concerns most frequently expressed concerning interactive gaming are those of problem gambling, underage gambling and the potential for criminal activity (money laundering, etc).

With interactive gaming, the operator must know the identity of the player to receive payment and pay prizes. Players must register with the operator – a requirement that has been formally enshrined in legislation, such as that enacted under the Australian model.

As a result, interactive gaming players cannot hide behind anonymity. This means that facilities such as self-imposed spending limits and self-banning provisions, and requirements such as proof of age and proof of identity, can be make interactive gaming far easier to monitor and control than traditional (anonymous) gaming activities.

In summary, interactive gaming is already here and is here to stay – legally or otherwise. Legislators can seek to ban it, but risk losing control over it if they do. Interactive gaming is a new form of gaming that will naturally raise questions in the community. However, Tattersall's believes that interactive gaming (if properly regulated) has the potential to create less problems than more traditional forms of gaming.

Access Economics
March 1999

PRODUCTIVITY COMMISSION INQUIRY INTO THE AUSTRALIAN GAMBLING INDUSTRY

SUBMISSION ON BEHALF OF TATTERSALL'S APPENDIX A: GAMBLING PARTICIPATION AND HOUSEHOLD EXPENDITURE

prepared for

Tattersall Sweep Consultation

by

Access Economics

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Appendix A: Gambling Participation And Household Expenditure: insights from the ABS 1993-94 Household Expenditure Survey

This appendix uses the Access Economics Micro Model (AEMM) to:

- derive estimates of the proportion of the population that gamble;
- build a profile the socio-economic characteristics of lottery players and other gamblers;
- derive estimates of expenditure by income decile and household demographic characteristics; and
- Investigate the relationship between gambling behaviour and expenditure/savings patterns of households.

The AEMM draws on the 1993-94 Household Expenditure Survey unit record file. Before using this data source, we first need to evaluate the survey as a source of information about gambling behaviour.

A.1 Household Expenditure Survey Estimates of Gambling Expenditure

Description of the HES

The Household Expenditure Survey (HES) is the most authoritative source of information about consumption expenditure compiled by the ABS. The HES is conducted with five year intervals and surveys a representative sample of Australian households. In the 1993-94 version of the HES, 8,421 households were surveyed, providing information about 17,271 persons aged 15 and above. The response rate was 86 per cent. The survey aims to measure levels and patterns of expenditure on commodities and services and to identify factors which influence these levels and patterns. The information collected by the HES thus includes a broad range of characteristics of persons and households, including details on income and demographic composition.

The 1993-94 HES was conducted over the 12 month period from July 1993 to June 1994. Each household remained in the survey for the two weeks it took to complete the personal diaries that recorded the expenditure information. Most expenditure items, including gambling, were measured over a two week period (though not all[1]); zero expenditure is recorded if no expenditure was incurred during this period.

Income and income units

The HES definition of income aims to measure "current usual gross household income which is composed of recurring and usual regular cash flow". Employee income refers to the usual pay around the time of the interview, while business and property income refers to the average last financial year. Transfer income such as pensions and allowances refers to the last payment.

[1] Some infrequent expenditure items were measured retrospectively with a reference period of up to two years. Expenditure on items like health services, telephone costs and consumer durable referred to the last 3 months while for example education and vehicle expenses referred to the last 12 months. Other items like insurance, loans payments, rent and electricity referred to the last payment.

There are some problems in comparing income and expenditure using HES data. First, income is largely a measure of *current* income, which does not reflect the economic capabilities over a longer period of time (like a year) for all families. This is particularly the case for families with a current income that deviates from the normal situation. Second, the survey does not collect information on all receipts that may form the basis of consumption. Excluded are most infrequent receipts, such as windfall gains, capital gains and lump sum payments, or withdrawal from savings.

An important feature of the HES is that it allows persons to be grouped in income units, families and households. The results presented here uses the definitions of an *income unit* and a *household*. The Australian Bureau of Statistics defines an *income unit* as:

> One person or a group of related persons, within a household, whose command over income is shared. The relationships allowed for in the definition of an income unit are restricted to those of marriage (registered or de facto) and those between parents and dependent children who usually reside in the same household. Operationally, this means that an income unit can be defined as:
>
> - a couple with dependent children;
> - a couple without dependent children;
> - a sole parent with dependent children;
> - a single person
>
> A dependent child is any person under 15 years of age or any full-time student aged 15-24 years who has a parent or guardian in the household and is neither the spouse nor parent of anyone in the household.

Similarly, a *household* is defined as:

> A group of two or more related or unrelated persons who usually reside in the same dwelling, who regard themselves as a household and make common provision for food or other essentials for living; or a person living in a dwelling who makes provision for his or her own food and other essentials for living. Households include non-family or group households of unrelated persons, same-sex couple households, single-parent households as well as one-person households.

The choice of unit in the analysis of the distribution of economic resources is important. A household may comprise of more than one income unit. It is therefore a broader definition than that of an income unit. In distributional analysis, the appropriate unit should ideally reflect the sharing arrangement in place and this is not always achieved by specific definitions such as the above.

Representation of gambling

Gambling is an item of consumption that is included in the HES. The ABS separately identifies six forms of gambling:

1. lottery tickets (includes state lottery, Casket, Lottery and Sweep Tickets);
2. lotto (includes lotto, Tattslotto, instant lotto, scratch tickets, Footy Tab and Pools);
3. TAB and on-course betting;
4. gaming machines;
5. Casinos; and
6. other gambling (includes, for example, bingo, raffles, cards and crosswords).

Some qualifications

Compared with other surveys of gambling behaviour the 1993-94 HES has its strengths and its weaknesses. It is important to keep these strengths and weaknesses in mind and to acknowledge where the HES based analysis is superior and where it is merely supplementary.

Gambling expenditure in the 1993-94 HES is defined as the amount wagered by a consumer, less the amount of winnings during the two week diary period of the survey. Net gambling expenditure, therefore, can be negative (if winnings exceed outlays) and positive (if the consumer outlays more than is received back in winnings). As one consumer's winnings are another consumer's expenditure, gambling expenditure for the community as a whole would be zero (leaving aside gambling by foreigners in Australia) if gambling were costless to operate and it were not subject to imposts by government. Gambling expenditure, in effect, represents the amount of tax collected by government from consumers and also covers the profits and cost of operating the gambling industry.

An ideal measure of gambling's impact on household budget would allow gambling expenditure of families to be measured over an extended period of time (say a year) to be compared with the family disposable income. The HES mainly measures income and expenditure over a shorter period. Measurement of expenditure over a two week period (or even longer) and income 'current weekly' may result in a misleading distribution of *expenditure shares* – especially for typically infrequent activities.

There are obvious reasons why some surveyed persons/families might show up with extremely high gambling expenditure shares. It might be that a person has a high expenditure on a particular activity during a two-week period (for example, a visit to the casino), but it is hardly problematic if it only happens once a year. Likewise, the current income of some persons may not adequately reflect their economic situation either because their income is temporarily low (due to, for example, unemployment or unpaid leave) or they simply live of their savings (like some retirees). These cautions should be borne in mind in assessing our findings.

For many purposes, net expenditure on gambling is the relevant measure. However, there are a few problems in relation to net expenditure as a measure of gambling activity:

1. it is not possible to identify gamblers with zero net expenditure on a particular type of gambling. As a result, some persons are identified as non-gamblers because they reported a zero net result although they in fact did gamble;
2. there is a random component in the net result. Net expenditure is positively correlated with the amount wagered in the sense that the more a person gambles, the higher the expected net expenditure. The relatively short diary period of the 1993-94 HES makes extreme outcomes (like net winnings) more likely. Indeed, the estimates from the 1993-94 HES (see Table A.1) suggest that out of the 5,262,000 persons who reported non-zero gambling expenses there were 424,000 net winners;
3. it is difficult to determine who pays gambling taxes using net expenditure. It is not possible to correctly apportion total taxes to individual winners and losers on the basis of net expenditure. Accordingly, the analysis of the distribution of the gambling tax burden has been performed by comparing the result for groups of the population.

Table A.1 Total Number of Gamblers by Type of Game in the 1993-94 HES

	1993-94 HES			Share of adult population
	Winners	Losers	All	
	000	000	000	%
Lottery tickets	53	594	647	4.4
Lotto and instant lotto	222	3,403	3,625	25.1
TAB, on course	133	527	660	3.9
EGM[1]	109	670	779	4.9
Casinos	7	42	49	0.3
Other gambling	62	1,620	1,681	11.9
Total gambling	424	4,839	5,262	35.6

Source: The 1993-94 Household Expenditure Survey, ABS.
[1] Note: In 1993-94, there were no EGMs in South Australia, Western Australia and Tasmania.

Under-reporting is a concern

Under-reporting is a common problem in surveys of gambling behaviour. Other surveys have come up with different estimates of the extent of under reporting based on a comparison with aggregate industry statistics. The experience from the HES suggests that the problem varies greatly across the different types of gambling. Table A.2 shows estimates of the aggregate gambling expenditure from the 1993-94 HES together with aggregate industry statistics. The table shows the HES aggregates for individuals who are net winners and losers separately.

The survey's estimates of gambling expenditure are, in general, lower than the industry benchmark. The overall coverage of the 1993-94 HES is 25.6 per cent. However, the average figure hides a wide variation across the different types of gambling. 'Lotteries' and 'Lotto & instant lotto' have HES aggregates that are in fact higher than the industry benchmarks (188.7

per cent and 105.2 per cent), while the estimates for the remaining gambling activities are all below the benchmarks. The 'Other gambling' category represents 71.7 per cent of the benchmark. The coverage for 'TAB & on course' and 'EGMs' is at a much lower level (7.5 per cent and 10.6 per cent). The negative total for 'Casinos' is a result of the reported net wins exceeding the net losses by close to a factor of three.

Table A.2 Total Gambling Expenditure by Type of Game, 1993-94 HES Aggregates and Industry Benchmarks for 1993-94

	1993-94 HES				
	Winners	Losers	All	Benchmark	HES Coverage
	m$	m$	m$	m$	%
Lottery tickets	19	131	112	59	188.7
Lotto and instant lotto	206	1,274	1,078	1,024	105.2
TAB, on course	389	508	120	1,602	7.5
EGM	159	486	327	3,072	10.6
Casinos	209	76	132	823	-16.1
Other gambling	107	388	281	392	71.7
Total gambling	1,089	2,874	1,785	6,972	25.6

Source: The 1993-94 Household Expenditure Survey, ABS, and Australian Gambling Statistics 1972-73 to 1996-97, The Tasmanian Gaming Commission.

Possible under-coverage

The are several potential sources of *under-coverage*. *Under-reporting* is only one of the problems.

It may be the case that there is attrition bias if gamblers, especially heavy gamblers, have a lower response rate than others do. This source of under-coverage is the problem of *sample bias*. The relatively high response of the HES compared with the topical gambling surveys, suggest that this is a minor problem. From an attrition point of view, The 1993-94 HES is arguably the best available survey on gambling expenditure.

The HES is subject to another source of under-coverage, which we could call *observation bias*. The source of this bias is the diary form of the expenditure recording. Interviewees are asked to record their expenditure on a daily basis over a two-week period. It is likely that the act of recording may influence the actual expenditure itself. Some respondents may abstain from incurring certain types of 'controversial' types expenditure when they know the expense is supposed to be recorded in a dairy. This *observation bias* is not present in retrospective questionnaires where the interviewees are asked about past expenditure.

The final source of under-coverage is *under-reporting*. The recorded gambling expenditure is what the respondents *report* they spend, and this is not necessarily the same as they actually spend. Gambling expenditure can be positive (for *losers*) as well as negative (for *winners*).

Under reporting could be a result of losers understating their loss or winners overstating their win – or, indeed, both. One particular case of under reporting is persons who report zero expenditure when the person has in fact incurred a loss.

In the analysis of gambling participation and gambling spending we essentially deal with two aspects of under-coverage. The question is to what extent the under-coverage for 'TAB & on course' 'EGMs' and 'Casinos' in Table A.2 is the result of too few gamblers or too low expenditure for the individuals who reported non-zero expenditure. **A comparison with other surveys of gambling behaviour gives us reasons to believe that the HES is more accurate in measuring participation rates for the 'problematic' games than it is in measuring the amount spent on these types of gambling.**

It is tempting to interpret the under-coverage resulting from either observation bias or under-reporting as some sort of discomfort relating to the gambling activity or the expenditure associated with it – to the extent that it is not caused by a lack of memory. Some gamblers may not wish to admit the true level of their gambling expenditure to other members of the household or to the interviewer or, indeed, to themselves.

On that basis, the coverage figures in Table A.2 make it possible to rank the six categories of gambling according to how rate in terms of the gambler's own discomfort. From that point of view, the 'Casino' gamblers who on average report a net win score the highest 'discomfort' points. The 'TAB & on course' players come second admitting just 7.5 per cent of the actual expenditure. With 10.6 per cent coverage, 'EGM' usage is the third most 'controversial' gambling form. These low levels of recognition suggest that many of these gamblers are somehow uncomfortable with their gambling activity. It is worth pointing out, however, that only one in seven (see Table A.1) 'Casino' players reported a net win. Roughly the same proportion of the 'EGM' players report net winnings while one in five 'TAB & on course' player claim to have won.

On the same basis, players of 'Lotteries', 'Lotto and instant lotto' and 'Other gambling' rate as more comfortable with their gambling expenditure. The coverage of each type of game still differs somewhat from the benchmarks. However, the total coverage of these three categories is very good (99.7 per cent), and there are probably some classification problems that can explain the differences. The high level of coverage could be interpreted as suggesting that these games are not associated with the same level of 'discomfort' as 'Casino', 'TAB & on course' and 'EGM' gambling.

To summarise, the quality of the information in the 1993-94 HES on 'TAB & on course', 'EGM' and 'Casino' is not very high. But we can have more confidence in the estimated participation rates than the amount spent. The results presented in the following should be interpreted accordingly. In contrast, the quality of the information in the 1993-94 HES on 'Lotteries', 'Lotto and instant lotto' and 'Other gambling' can be regarded as very high.

While recognising its problems, **the 1993-94 HES has some obvious advantages over other surveys on gambling behaviour**. The great strength of the 1993-94 HES in relation to gambling is that it, more that any other survey, incorporates gambling within a very broad context of economic circumstances and behaviour at the level of persons and household. The detail of the information on income, expenditure (other than gambling) and household

characteristics (and composition) gives the 1993-94 HES an edge over other surveys as a basis for social and economic analysis and modelling.

A.2 Australians' participation in gambling

In any particular period of time a consumer either gambles (participates in gambling) or does not. The percentage of the population that participates in gambling over a particular time period is called the gambling participation rate. The longer the period of time over which survey estimates of gambling are conducted, the more likely it is that a consumer that has not previously gambled will purchase some gambling services. For example, many Australians who do not normally gamble do have a flutter once a year on the Melbourne Cup.

As the HES collects gambling expenditure over a two-week period, the estimates of the gambling participation rate derived from the HES data should be regarded as a low estimate of the actual participation rate. Alternatively, as the rate of frequent users is higher for a short than a long reference period, the estimates may be regarded as representing those who regularly participate in gambling.

The Access Economics Micro Model was used to estimate the gambling participation rate over the two week reference period over the 12 months from July 1993 to 1994 during which the HES was conducted. There has been a strong increase in expenditure on gambling since the HES was conducted and an obvious question to ask is how well the survey represents the gambling patterns of today.

The increase in gambling expenditure since the early nineties has largely been caused by a surge in 'EGM' and 'Casino' gambling, while expenditure on traditional games like 'Lotteries', 'Lotto & Instant Lotto' and 'TAB & on-course' has remained relatively stable. So, while the results for the participation in these traditional forms of gambling probably give a good picture of the present situation, we need to adjust the participation rates for 'EGM' and 'Casino' gambling to take account of recent developments.

In the case of 'EGM' gambling, the main development has been a change in government regulation that has increased the availability of 'EGMs', in particular, their introduction to states where this form of gambling was not available in 1993-94 (South Australia and Tasmania). In order to make the participation rates for 'EGM' gambling more comparable to the current situation, they have been calculated on the basis of states where this form of gambling was permitted in 1993-94 (that is, excluding also Western Australia). Although the adjusted 'EGM' participation rates should still be regarded as on the low side, the participation profiles are likely to provide a reasonable picture of relative participation in the various forms of gambling[2].

The Access Economics Micro Model was used to analyse the participation profiles for the main forms of gambling in terms of sex, age, income, employment status and family situation. The main results are as follows.

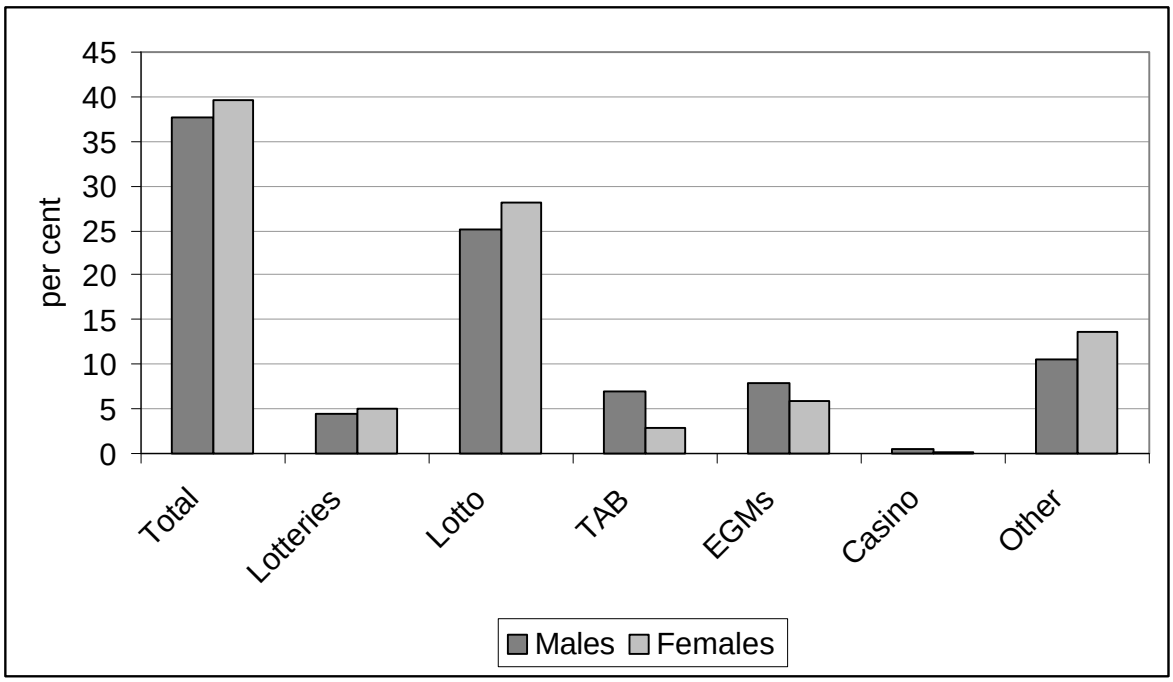
[2] It is recognised also that participation rates for 'Casino' gambling are not very accurate, though they have been included for completeness.

- Measured in terms of the proportion of the population who gambled during a two-week period, the overall participation rate was 39%. Females had slightly higher gambling participation (40%) than males (38%).

- The higher total gambling participation rate for females is a result of a higher participation in the 'soft' types of gambling such as lotteries and lotto (see Figure A.1).

- Males are more into the types of gambling that involve an 'activity' such as 'EGMs', 'Casinos' and, in particular, 'TAB & on-course' betting (see Figure A.1).

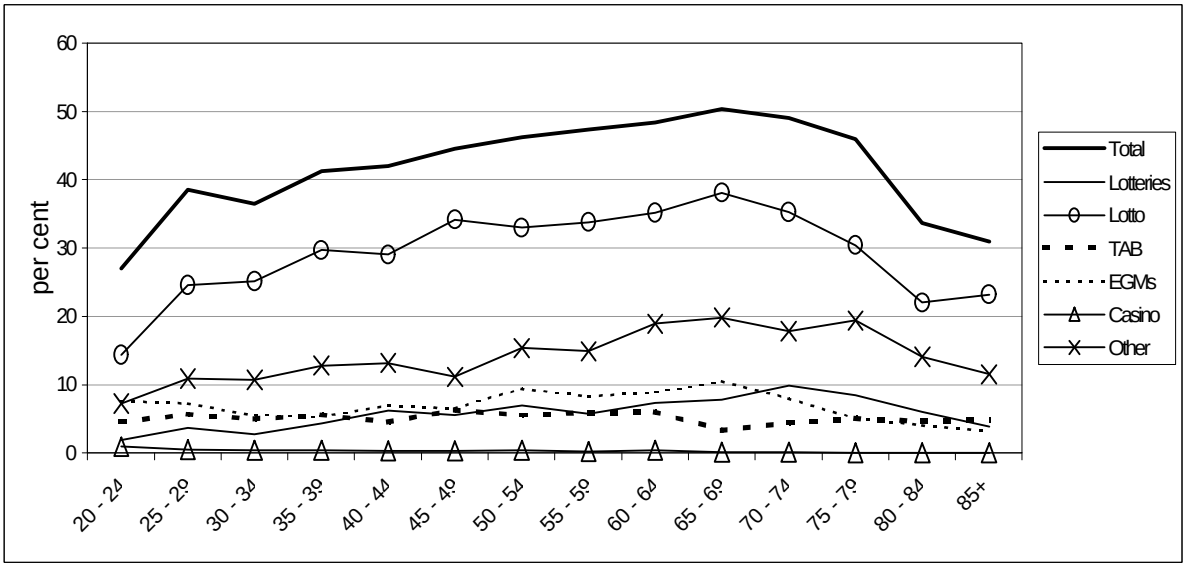
Figure A.1 Participation in Gambling by Type of Game and Sex



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94). *Source*: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

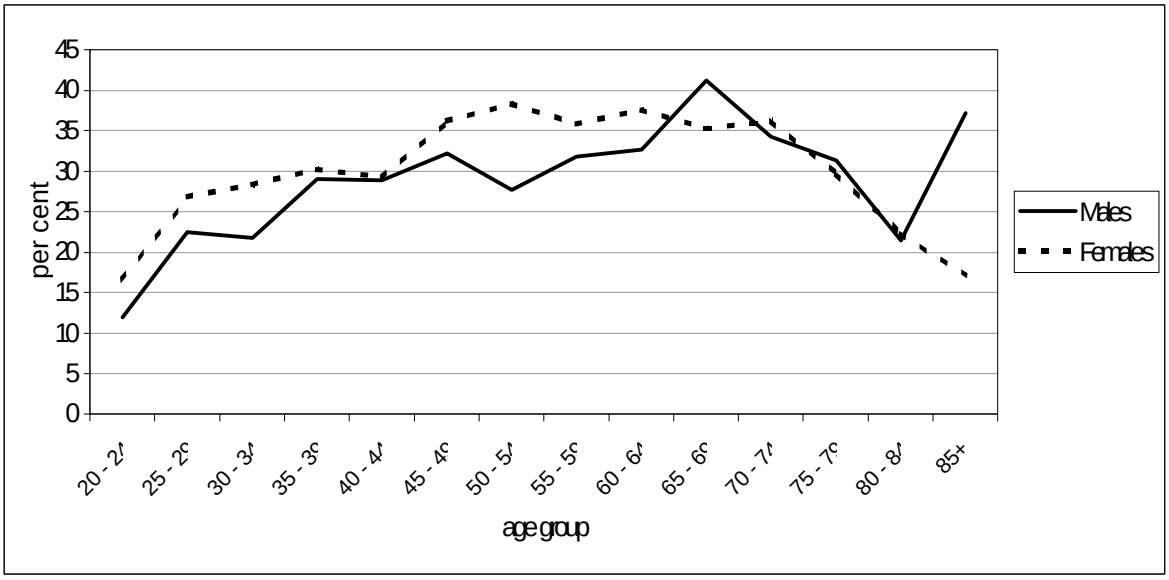
Overall, gambling participation increased gradually with age (see Figure A.2). Measured in terms of the proportion of persons who gambled during a two-week period, the participation rate doubles from 13.5 per cent among the 15-19 year age group to 27 per cent among the 20-24 year age group. The participation rate increases until it reaches a peak around 50 per cent for the 65-69 year olds and declines for older age groups.

Figure A.2 The Participation in Gambling by Type of Activity and Age Group



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94). *Source*: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Figure A.3 Participation in 'Lotto & Instant Lotto' by Sex and Age

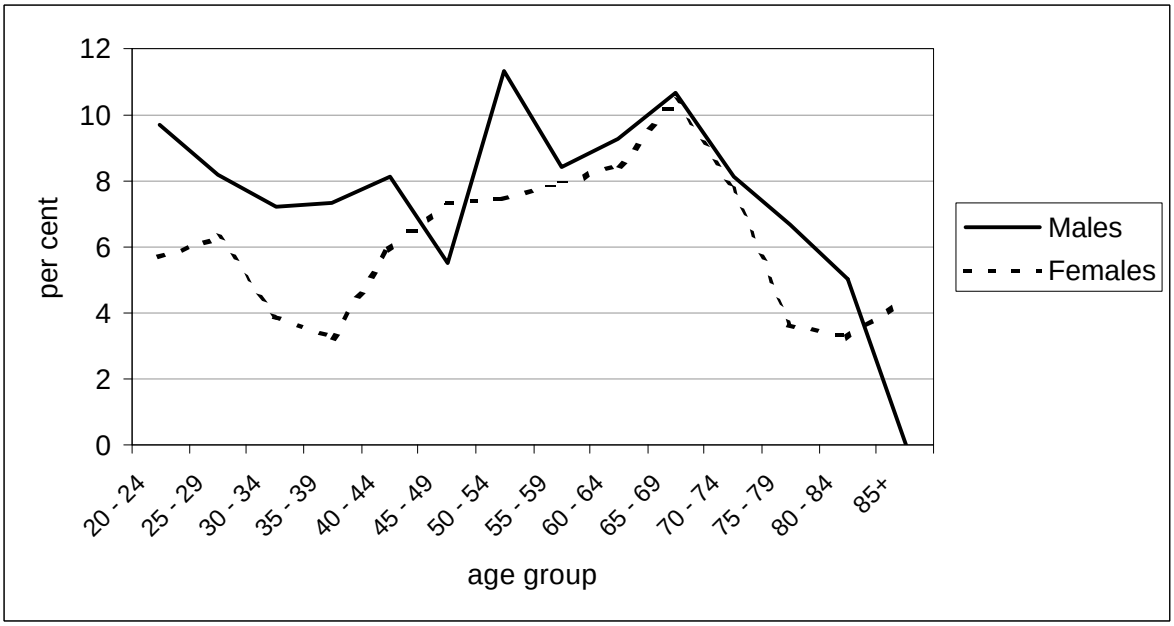


Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

'Lotto & Instant Lotto' is easily the most popular form of gambling for all age groups, reaching a peak participation rate of 38.1 per cent for the 65-69 year age group. The age participation pattern for total gambling is largely determined by the age participation for 'Lotto & Instant Lotto'.

- The higher female participation in these activities occurs across all age groups below 65, while male s seem to catch up at old age (see Figure A.3).

Figure A.4 Participation in EGMs by Sex and Age Group



Note: The figure excludes South Australia, Western Australia and Tasmania (with no EGMs in 1993-94).
Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

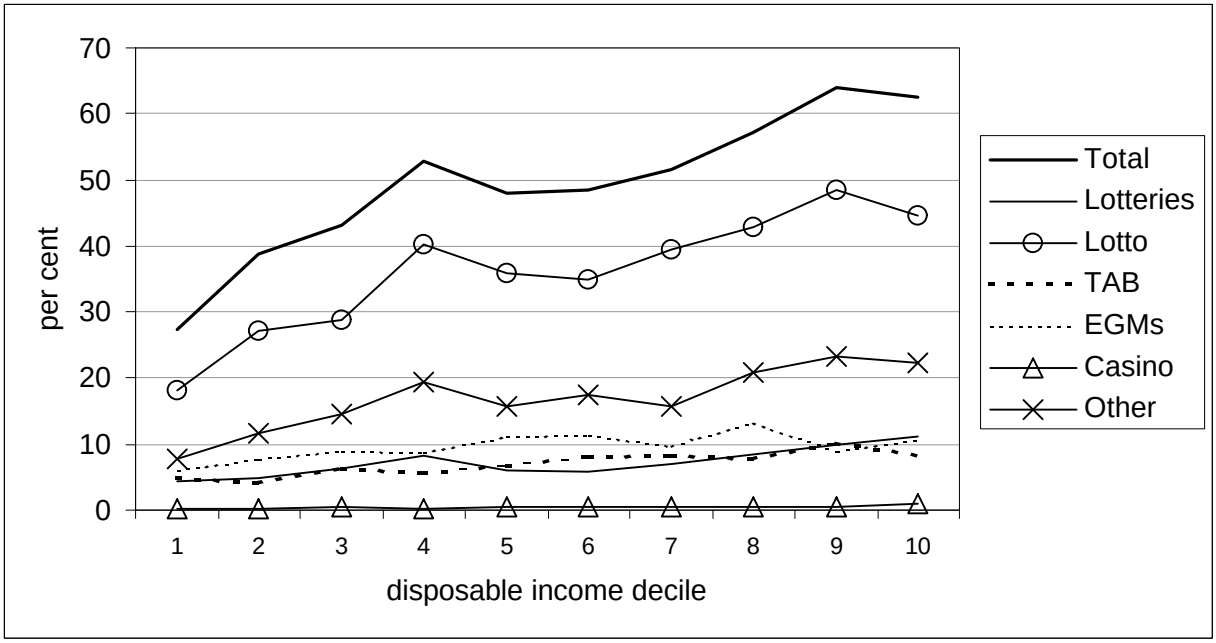
The participation pattern for 'EGMs' is also age dependent, but in a way that is different from the overall pattern (see Figure A.4). 'EGMs' are relatively popular with the young and the age groups around retirement age.

- For 'EGM' gambling, male participation is high for young age groups. It reaches a peak for the 20-24 year olds (at 8 per cent) and then it decreases with age until it hits a low around the 45-49 year age group (at 4.8 per cent). Thereafter, the male participation rate increases sharply and stays at a relatively high level (around 8 per cent) until it start declining for the age groups age 70 and above.

- Females show a similar pattern with a peak for the 20-29 year olds, albeit at a lower level (around 6 per cent) than for young males. The female participation rate declines to a low of 2.6 per cent for the 35-39 year age group before it gradually picks up to attain an all time high for the 65-69 year olds (at around 9 per cent). It then declines for the older age groups to zero participation for the over 84 year olds. Females aged 75-84 are actually more likely to use EGMs than their male counterparts.

Casino gambling shows a pattern opposite to that of the overall gambling age profile. According to the HES, the young (20-24 years) are the most frequent visitors to the casinos. Almost 1% of this age group has gambled at a casino during a two-week period. The reported participation rate drops to 0.4% for the 25-39 year olds and further to around 0.3% for 40-55 year olds, declining thereafter to zero for the over 74 year olds.

Figure A.5 Participation in Gambling of Income Units by Type of Decile of Disposable Income



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94). *Source*: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Gambling activity increases with income. For income units ranked by decile of disposable income, participation increases with income (see Figure A.5). Apart from a local peak around the fourth decile (due to the many pensioners participating in lotto/lotteries), the increase is quite even from the bottom to the top of the income distribution. While 27 per cent of income units in the bottom decile reported (non-negative) gambling expenditure during a two week period, gambling participation increased to around 64 per cent for the top two deciles:

- Participation in 'Lotteries' and 'Lotto & Instant Lotto' broadly follow the overall relation with income.

- The use of EGMs is also reportedly related to income with participation doubling from around 6 per cent for the first decile to around 11 per cent for the fifth decile. The use of EGMs remains relatively constant over the upper half of the income distribution.

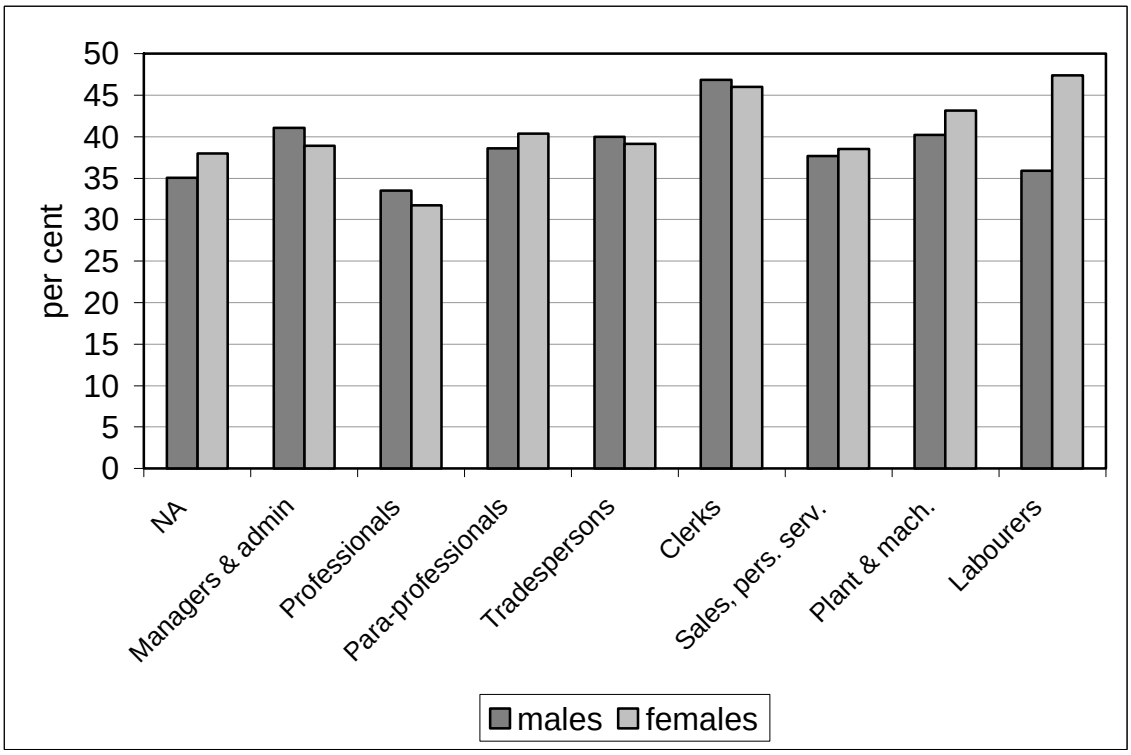
- Gambling at a casino is most common for those in the top income decile. Around 1% of the top income decile gambled at a casino, whereas for the third through to the ninth income deciles had a participation rate around 0.5 per cent. The bottom two deciles had very low level of casino gambling of around 0.2 per cent.

Employment status has a major impact on gambling participation rates**:**

- Unemployed persons (both males and females) have significantly lower gambling participation than do employed persons.

- Persons who are not in the labour force have marginally lower participation than employed persons.

Figure A.6 Participation in Gambling by Sex and Occupation



Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

- Part-time employed males gamble much less than full-time employed males, while the gambling participation rate of part-time females is similar to that of full-time females.

Occupation has a relatively minor influence on gambling participation.. 'Clerks' generally have higher participation, while professionals have lower participation than the average.

Family characteristics have a significant impact on gambling participation.

- Persons who live in two-adult income units are more likely to gamble than persons in single-adult income units.

- For both males and females, the presence of children generally makes participation more unlikely across all types of gambling, particularly for the games that involve an activity (e.g. 'TAB & on-course', 'EGMs' and 'Casino').

Table A.3 Frequency of Gambling (non-zero outlays) of Persons by Sex, Income Unit Type and Type of Game

	Total Gambling	Lottery tickets	Lotto	TAB, on-course	EGMs	Casinos	Other gambling
	%	%	%	%	%	%	%
Males:							
Single person	36.3	3.9	22.5	8.1	9.7	0.7	7.8
Sole parent, 1 child	29.9	7.6	23.6	8.0	4.7	0.1	12.6
Sole parent, 2+ children	8.8	0.0	8.8	0.0	0.0	0.0	0.1
Couple	44.3	6.0	30.2	7.2	9.6	0.3	14.3
Couple, 1 child	34.6	4.7	24.4	6.1	6.3	0.3	9.3
Couple, 2+ children	31.6	3.1	21.4	5.9	4.0	0.4	8.9
ALL	37.6	4.6	25.1	7.0	7.9	0.5	10.5
Females:							
Single person	37.2	4.9	25.1	3.3	7.2	0.3	13.4
Sole parent, 1 child	31.5	3.6	21.6	2.8	5.6	0.3	10.2
Sole parent, 2+ children	30.8	1.2	21.0	2.3	5.6	0.0	10.7
Couple	46.8	6.9	35.1	3.0	7.3	0.3	14.9
Couple, 1 child	37.8	4.3	26.4	2.1	6.3	0.1	11.0
Couple, 2+ children	35.4	3.0	24.2	2.2	2.4	0.2	14.3
ALL	39.7	4.9	28.1	2.8	6.0	0.3	13.6

Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94). *Source*: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

Multi-variate analysis of gambling participation

The gambling participation patterns presented in the tables and figures above provide a useful overview of the gambling activity for different groups in the community. However, the different participation rates for different groups do not necessarily reflect the actual *effect* of the factors in the classification tables. Gambling participation is the result of a complex interaction of many factors and multi-variate analysis is required to examine the effect of individual factors.

One way of taking a large number of factors into account simultaneously is to estimate a probabilistic model for the relationship between these *explanatory* factors and the participation in individual types of gambling. The logistic regression model is a probabilistic model that

relates the logarithm of the odds-ratio of a positive outcome (in this case the outcome that a person has non-zero gambling expenditure) to a linear function of the explanatory variables[3]:

$$\text{Log}(p_i/(1-p_i)) = X_i\beta$$

This is equivalent to the probability of a positive outcome being expressed as the *logit* of linear function of the explanatory variables:

(A.1) $p_i = 1/(1+\exp(X_i\beta))$

The logistic model has been estimated for 'Lotto & Instant Lotto' and 'EGM' usage. The estimated parameter values are shown in the column to the right in Tables A.4 and A.5 with the corresponding standard deviations of the parameters estimates shown in the mid-column. The estimated model is non-linear in the explanatory variable and the parameter estimates cannot be interpreted directly as elasticities. The elasticity of a variable depends on the values of all the other variables. However, on the basis of the estimated parameters and the overall level of participation it is possible to calculate *standard sensitivity* estimates. Such sensitivity estimates are shown in the left column of Tables A.4 and A.5. The standard sensitivity of a regression variable indicates the effect on the participation probability of one unit difference in the value of the variable. For example, the age effects suggests that being a female increases the probability of being a 'Lotto & Instant Lotto' player by 3.1 percentage points (with an overall average participation rate of 26.6 per cent) while it reduces the probability of being an 'EGM' player with 4.0 percentage points (with an overall average of 6.9 per cent). For 'Lotto & Instant Lotto' this estimate is similar to the overall difference in participation rates for males and females (25.1 per cent and 28.1 per cent). For 'EGMs', however, the overall difference between the participation rates of males and females is just 1.9 percentage points. The isolated positive effect on 'EGM' usage of being a male is thus understated by more than 50 per cent.

The effect of family situation is represented by a set of indicator variables that distinguish the type of a person's income unit in the six groups shown in Table A.3 above. In order, differentiate between the different impact of family situation on males and females, a set of additional variables have been included to represent the 'additional' impact on females. The zero-level (the omitted variable: IUType1) is represented by single persons so, all parameter values indicate the effect on usage relative to this group. Having children clearly has a negative effect on both types of gambling and the effect is to some extent different for single and couples and for males and females.

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[3] To be more precise, the model we estimate assumes that the utility derived from 'being a gambler' is a linear function of the explanatory variables plus an error term representing unobserved heterogeneity with respect to the *net* utility derived from gambling (that is, net of the utility forgone by not having gambled money available for other expenditure or savings):

$$U_i = X_i\beta + e_i \qquad i=1,\ldots,N$$

Even if the utility is not directly measurable, we can use the fact that a persons is a gambler if $U > 0$. In other words we can define an observable variable *g* by:

$g = 1$ for $U>0$

$g = 0$ otherwise

The logistic model assumes that the error term, e_i, has the logistic distribution: $F(x) = 1 / (1 + \exp(x))$.

Looking first at 'Lotto & Instant Lotto', sole parents with one child are 2.5 percentage points less likely to be players than single persons are. Sole parents with two or more children are 5.2 percentage points less likely to play. Partnered males with zero or one child are at the same level as sole parents with one child (2.5 percentage points less than single persons) and partnered males with two or more children are 6.1 percentage points under the single person level. For partnered females the sensitivity calculations are slightly more complicated because the parameters are not additive. Partnered females are more likely to play 'Lotto & Instant Lotto' than partnered males although there is a strong negative effect of having children. Partnered females without children have 3.0 percentage point higher usage than single persons, while those with one child are at the same level as single persons. Having two or more children further reduces the effect by 1.5 percentage points.

The effect of family situation on 'EGM' usage is somewhat similar to the effect on 'Lotto & Instant Lotto' usage. Notice again, that the overall level is of 'EGM' usage (6.9 per cent) is much lower that the overall level of 'Lotto & Instant Lotto' usage (26.6 per cent). The effect of being a sole parent is a reduction below the single person level by 2.5 percentage points. Being a partnered persons without children has the effect on usage as single persons while there is a strong effect of having children for both males and females who are partnered. The negative effect of having just one child is not as strong for females (1.3 percentage points) as for males (2.6 percentage points) relative to the single person level. However, the negative effect of having two or more children is slightly stronger for females (4.9 percentage points) than for males (4.3 percentage points).

There are clear differences between the states and territories in the level of usage of both 'Lotto & Instant Lotto' and 'EGMs'. While New South Wales has among the lowest level of 'Lotto & Instant Lotto' usage, the opposite is the case with respect to 'EGM' usage. The usage of 'Lotto & Instant Lotto' is highest in Queensland, Western Australia and Northern Territory (9.8 percentage points above New South Wales) followed by Victoria, South Australia and Tasmania (5.6 percentage points above New South Wales). The ACT is the only state/territory with a lower level of usage than NSW (3.9 percentage points) although this estimate is hardly significant.

The high level of availability of 'EGMs' in New South Wales is presumably the explanation for the highest level of usage in this state (notice that Western Australia, South Australia and Tasmania had no 'EGMs' in 1993-94 and hence they have been excluded from the estimations). The runners up is the ACT with (an insignificant) 0.8 lower usage than New South Wales. Next is Queensland with 2.1 percentage points, then Victoria with 2.7 percentage points and finally Northern Territory 4.5 percentage points lower than New South Wales.

The effect of ethnicity on gambling participation is represented by a variable for *country of birth*. Unfortunately the 1993-94 does not have further detail on ethnicity such as, for example, birthplace of parents. Second generation immigrants have thus been included with other Australian born persons. The estimation results in Tables A.4 and A.5 suggest that country of birth is a very powerful predictor for both 'Lotto & Instant Lotto' and 'EGM' usage. For both games, the Australian born individuals are among those with the highest propensity of usage.

Participation in 'Lotto & Instant Lotto' is lowest for individuals born in 'Northeast Asia' with a level of usage 16.4 percentage points below the Australian born population. Persons born in

'North America' also have participation rates that are substantially lower than Australian born (12.6 percentage points below), closely followed by persons born in the 'Middle East and North Africa'. The group that has 'Lotto & Instant Lotto' participation rates closest to the Australian born are persons from 'Other Oceania and Antarctica' (mainly New Zealanders), 'Europe and the former USSR', 'Southeast Asia' and 'Southern Asia' (4.2 percentage points lower).

The attraction of 'EGMs' appear to be highest for persons born in 'Other Oceania and Antarctica' (mainly New Zealanders), 'Middle East and North Africa' and 'Northern America'. These groups have participation rates around the same level as Australian born population. Persons born in 'Europe and the former USSR' are slightly less likely to play 'EGMs' than the Australian born (1.5 percentage points lower), while persons born in Asian countries generally have very low participation. Although the estimated difference in the participation rates for different regions of Asia is hardly significant, there is a tendency towards persons born in 'Southern Asia' being the least likely users (5.5 percentage points below the level of Australian born), followed by persons born in 'Northeast Asia' (4.4 percentage points below level) and persons born in 'Southern Asia' (3.9 percentage points below level).

A person's employment situation appears to have some impact on the participation in both 'Lotto & Instant Lotto' and 'EGM'. Being employed part-time or unemployed reduces 'Lotto & Instant Lotto' participation by 3.1 percentage points relative to persons with full-time employment. Males who are out of the labour force have a slightly higher usage (2.2 percentage points above the level of the full-time employed), while being out of the labour force has a negative impact on female participation (4.7 percentage points down).

Being a female either employed part-time or out of the labour force increases the likelihood of playing 'EGMs' relative to a full-time employed female (by 3.4 and 1.0 percentage points respectively). However, unemployed females have slightly lower participation (1.9 percentage points under the level of the full-time employed). Interestingly, males appear to display the reverse pattern, with the part-time employed and those out of the labour force being less likely to play 'EGMs' than the full-time employed (with 1.9 and 1.3 percentage points respectively).

The effect of variables such as age and income, that have been incorporated with a squared term (and a cubic term in the case of the income effect on 'Lotto & Instant Lotto' participation), is less straightforward to interpret. For both types of game participation is increasing with age (at a decreasing rate) up until a certain point whereafter it decreases. The maximum is attained around the age of 60 for 'Lotto & Instant Lotto' and around 50 for 'EGM' participation.

Contrary to what could be expected from the positive relationship between income and 'EGM' participation (see Figure A.2 above), income does not appear to have an independent effect on the usage. The positive relationship between income and 'EGM' participation should thus be attributed to factors such as age (males generally have both higher income and participation) and labour force status. This is not the case for 'Lotto & Instant Lotto' participation where income does play an independent role. The participation rate increases with the disposable income of the income unit until it attains a maximum around $670 pw (~ $35,000 pa) with 4.3 percentage points above the level for $0 pw or for $1,380 pw (~$72,000 pa) – for income levels beyond this point the participation rate has dropped below the zero income level.

Participation in 'Lotto & Instant Lotto' is somewhat related to the wealth of the income unit. Wealth has been represented by variables for housing tenure (outright owner, purchaser or renter), non-housing loans and financial assets of the income unit. The results show that (as expected) wealth has a negative effect on the participation rate. Outright owners are 2.3 percentage points less likely to play 'Lotto & Instant Lotto' than are renters, while purchasers are slightly more likely (with 1.8 percentage points above renters' participation rate). Non-housing loans increase the participation rate, although it takes relatively high levels of debt to amount to a noteworthy increase. A debt level of $100,000, for example, increases the participation rate by 3.3 percentage points. Similarly the level of financial assets reduces the participation rate, with an estimated 0.9 percentage points for the first $100,000 and 8.1 percentage points for the first $1,000,000.

Table A.4 Estimation Results for the Logistics Regression for 'Lotto & Instant Lotto'

Variable:	Description:	Estimate	Standard deviation	Standard sensitivity %
	Number of observations	17,271		
	Weighted share of gamblers	26.6		
Constant		-2.7315	0.1024	
Sex	1, if male	-0.1654	0.0726	-3.1
Age	Age (1: 15-19; 2: 20-24;..;15: 85+)	0.4650	0.0232	10.0
Age^2	Age squared	-0.0247	0.0016	-0.5
	Income Unit Type (1: single pers.):			
IUType2	Sole parent, 1 dependent	-0.1323	0.1267	-2.5
IUType3	Sole parent, 2+ dependent	-0.2878	0.1483	-5.2
IUType45	Couple 0-1 dependents	-0.1345	0.0659	-2.5
IUType6	Couple, 2+ dependent	-0.3426	0.0819	-6.1
IUTypeF4	Couple only / female	0.2846	0.0859	5.9
IUTypeF5	Couple, 1 dependent / female	0.1351	0.1114	2.7
IUTypeF6	Couple, 2+ dependent / female	0.2661	0.1088	5.5
	State of residence (1: NSW):			
State246	Vict., South Aust. or Tasmania	0.2710	0.0435	5.6
State357	Queensland, WA or NT	0.4566	0.0456	9.8
State8	ACT	-0.2088	0.1564	-3.9
	Country of Birth (1: Aust.)[1]:			
COB2357	See footnote[2]	-0.2253	0.0431	-4.2
COB4	Middle East and North Africa	-0.5971	0.1888	-10.0
COB6	Northeast Asia	-1.1531	0.1943	-16.4
COB8	Northern America	-0.7950	0.3264	-12.6
	Labour Force Status (1: Full-time):			
LFStat23	Part-time or Unemployed	-0.1661	0.0538	-3.1
LFStat4	Not in the Labour Force	0.1101	0.0733	2.2
LFStatF4	NILF / female	-0.3648	0.0798	-6.5
	Housing Tenure (1: Renter & oth.):			
Tenure1	Owners	-0.1203	0.0482	-2.3
Tenure2	Purchasers	0.0906	0.0505	1.8
	Financial variables:			
Loans	Non-housing loans ($0,000)	0.0161	0.0156	0.3
Assets	Financial assets ($0,000)	-0.0047	0.0017	-0.1
Income	Inc. unit's wkly disp. inc. ($000)	0.6491	0.1635	14.4
$Income^2$	IU_INC squared	-0.5313	0.1141	-9.1
$Income^3$	IU_INC cubic	0.0446	0.0110	0.9

[1] Also omitted: 9: 'South America, Central America and the Caribean' and 'Africa (excluding North Africa)' that both have very few observations.

[2] 2: 'Other Oceania and Antarctica'; 3: 'Europe and the former USSR'; 5: 'Southeast Asia'; and 7: 'Southern Asia'.

Table A.5 Estimation Result for the Logistics Regression for 'EGMs' for the 'EGM States' (New South Wales, Victoria, Queensland and Northern Territory)

Variable:	Description:	Estimate	Standard deviation	Standard sensitivity %
	Number of observations	12,955		
	Weighted share of gamblers	6.9		
Constant		-2.7205	0.1578	
Sex	1, if male	0.5047	0.1184	4.0
Age	age (1: 15-19; 2: 20-24;..; 15: 85+)	0.1449	0.0417	1.0
Age^2	age squared	-0.0102	0.0031	-0.1
	Income Unit Type (1: single pers.):			
IUType23	Sole parent	-0.4669	0.1950	-2.5
IUType5	Couple, 1 dependent	-0.4925	0.1632	-2.6
IUType6	Couple, 2+ dependent	-1.0151	0.1515	-4.3
IUTypeF5	Couple, 1 dependent / female	0.2611	0.2326	1.9
IUTypeF6	Couple, 2+ dependent / female	-0.2948	0.2432	-1.7
	State of residence (1: NSW):			
State2	Victoria	-0.5278	0.0852	-2.7
State3	Queensland	-0.3885	0.0918	-2.1
State7	Northern Territory	-1.1142	0.4935	-4.5
State8	ACT	-0.1267	0.2369	-0.8
	Country of Birth (1: Aust.):			
COB3	Europe and the former USSR	-0.2612	0.1021	-1.5
COB5	Southeast Asia	-0.8564	0.3294	-3.9
COB6	Northeast Asia	-1.0667	0.3744	-4.4
COB7	Southern Asia	-1.6399	0.8671	-5.5
	Labour Force Status (1: Full-time):			
LFStat2	part-time	-0.3516	0.1899	-1.9
LFStat4	Not in the Labour Force	-0.2145	0.1339	-1.3
LFStatF2	part-time / female	0.7843	0.2384	7.1
LFStatF3	Unemployed / female	-0.3510	0.3170	-1.9
LFStatF4	NILF / female	0.3575	0.1718	2.7

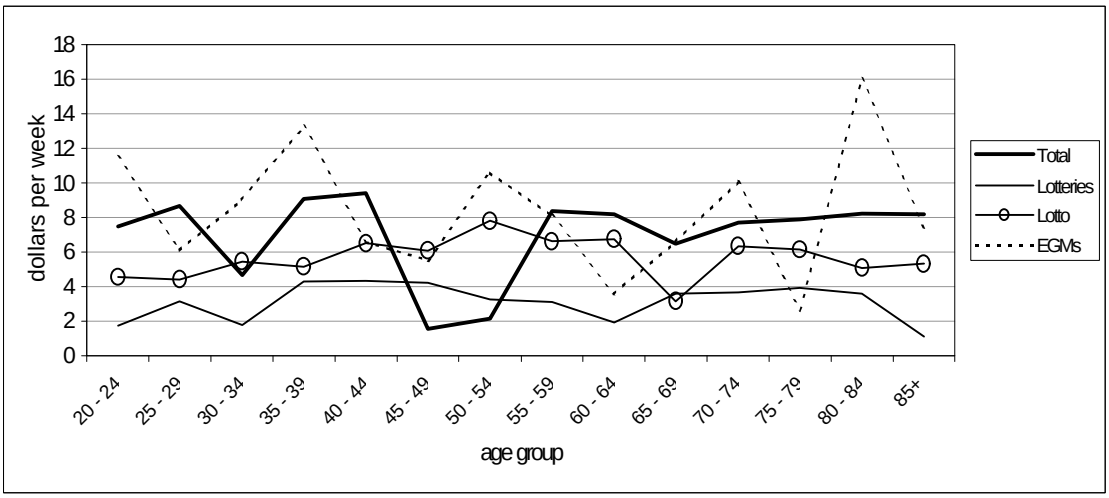
A.3 Expenditure on Gambling

The analysis in the previous section focused on the participation in gambling and how it relates to the characteristics of individuals and their family situation. We now turn to what the Household Expenditure Survey has to say about the gambling outlays. Using the Access Economics Micro Model, we derive estimates of spending on gambling both by individuals and by Households. In the first instance we ask whether the amount spent on gambling is related to factors such as sex, age and income. Second we investigate how gambling outlays relate to the economic situation of those involved.

The main features of gambling spending patterns are summarised as follows:

- Males and females spend roughly the same on gambling (around $6.5 per week). However, males on average spend more on most of the activities they participate in.
- Age does not appear to be an important factor in relation to the amount spent on gambling (see Figure A.7).
- While factors such as employment status and family status are important determinants of gambling participation, there is no obvious pattern in relation to the amount spent.

Figure A.7 Average Gambling Expenditure for Players by Age and Type of Game ($/week)



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).

Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

In order to assess the relationship between gambling expenditure and income we need to look beyond the situation of individuals. Two main issues emerge in this context. First, economic resources are shared among the individuals in families and households; a narrow focus on the incomes of individuals would in many cases lead to a false picture of the relationship between gambling expenditure and the economic capabilities of those involved. Even an income unit basis may be too narrow in many cases (for example, non-dependents living with their parents). Lacking a more appropriate alternative, we have therefore chosen the household as the unit of analysis.

The second issue arises from comparing the economic situation across households of different size and composition. This problem is normally dealt with by applying a so-called equivalence

scale whereby the individuals in a household are given different weights when calculating the average per person income of the household. Here we have used an internationally accepted scale, the OECD equivalent scale, whereby the first adult is given a weight of 1, other adult persons aged 14 and above are given a weight of 0.7 and dependent children are given a weight of 0.5. Based on this definition, Table A.6 shows average expenditures for households with non-zero gambling expenditure, by decile of equivalent disposable income for different gambling activities.

- The amount gambled is reportedly somewhat related to income (see Table A.6). Households with mid-range income spend slightly more than the income units at both the low and the high ends of the income distribution.

Table A.6 Average Expenditure for Households with Non-Zero Expenditure by Equivalent Disposable Income ($/week)

Decile	Disposable income[1]	Total gambling	Lottery tickets	Lotto and instant lotto	TAB, on course	EGMs	Casino	Other gambling
	$	$	$	$	$	$	$	$
1	214	8.3	3.6	7.3	2.7	5.4	-5.6	3.8
2	297	8.0	3.5	6.6	3.3	0.8	14.6	4.9
3	308	8.9	3.5	4.8	15.8	10.2	-3.3	4.3
4	399	11.0	4.2	7.7	2.9	11.7	-42.5	5.8
5	478	9.2	2.0	6.9	2.6	10.7	35.1	3.5
6	623	9.8	3.9	7.6	7.2	12.2	-101.6	1.7
7	715	10.7	3.1	8.0	-0.3	11.8	19.0	5.0
8	820	10.8	2.6	9.2	-8.7	12.8	21.5	5.5
9	928	-0.9	2.6	6.8	3.1	12.7	-468.0	-3.9
10	1236	13.1	6.3	5.4	19.5	6.7	97.7	4.5
ALL	620	8.9	3.6	7.1	4.1	10.2	-59.2	3.5

Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).

[1] The average disposable income for households with non-zero total gambling expenditure.

Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

- Expenditure on 'Lotto & Instant Lotto' shows a remarkably even level across income deciles, but with a tendency to higher outlays by households with mid-incomes.
- The average amount that households report spending on 'EGMs' is lowest for the bottom two deciles ($5.4 and $0.8 per week) and it increases to $11.7 for the 4th decile. Thereafter it remains relatively stable around $10-12 per week until the 9th decile and it then falls back to $6.7 per week for the top decile.

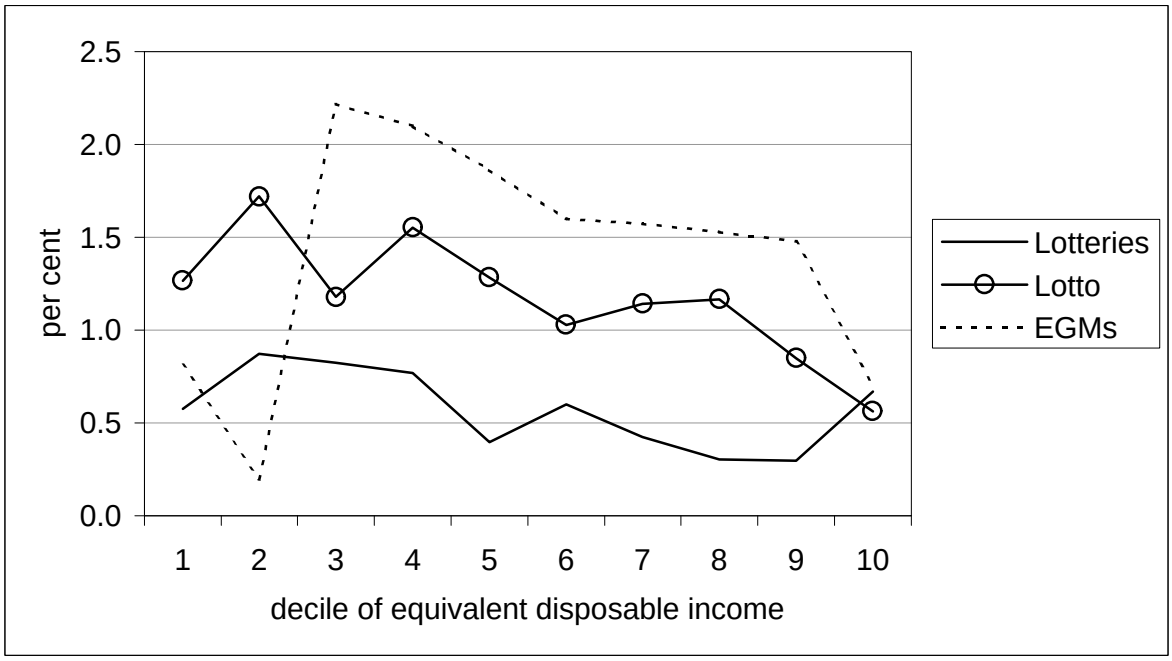
Gambling Spending and the Household Budget

A key issue in assessing the social implications of gambling is whether gambling represents a manageable proportion of income. To help answer that question, gambling expenditure is compared with income for various groups in the community. In the following we focus on 'Lotteries', 'Lotto & Instant Lotto' and 'EGMs' and reiterate the poor coverage of expenditure on the latter (just 10.6 per cent overall).

The average share of income spent on gambling depends significantly on the gambling participation rate. For example, for the whole population gambling represents 0.89 per cent of disposable income. For households that participate in gambling, gambling expenditure represents 1.81 per cent of disposable income. In order to abstract from the impact of different gambling participation rates for different groups, the analysis compares gambling expenditure with the family budget for households that actually gambled during the survey period (gambler households).

- While the amount that households spend on gambling is positively related to income, the share of total expenditure spent on gambling declines with level of equivalent income, at least above a certain level of income (see Figure A.8).
- The share of total expenditure spent on 'Lotto & Instant Lotto' decreases gradually, from around 1.5 per cent for the bottom deciles to just above 0.5 per cent for the top decile.

Figure A.8 Share of Total Expenditure on 'Lotteries', 'Lotto & Instant Lotto' and 'EGMs' for Households with Non-zero Gambling Expenditure by Equivalent Disposable Income Deciles



Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).

Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

- Expenditure on 'Lotteries' follows a similar pattern at a lower level.
- Reported expenditure on 'EGMs' is very low for the two bottom deciles (0.8 per cent and 0.2 per cent) but increases sharply to 2.2 per cent for the third decile. Thereafter it decreases gradually to 1.5 per cent for the ninth decile before it drops to 0.7 per cent for the top decile.

Table A.7 attempts to illustrate how gambling expenditure impacts on the household budget by relating the net expenditure for each household on different gambling products to the household's total expenditure. The first two rows show the distribution of the total number of households among players and non-players during the two-week reference period. The player households are then grouped according to their gambling expenditure's share of total expenditure. We have chosen to compare gambling expenditure with total expenditure rather than disposable income because of the difficulties involved with the concept of 'current usual income' recorded by the HES. The survey shows in particular that the households at the bottom end of the income distribution have expenditure vastly in excess of their total expenditure. It therefore seems obvious to conclude that their recorded income does not reflect the long-term economic situation of the household.

The table shows that by far the majority of the households who gamble do so within reasonable limits of the overall household budget:

- Around 94 per cent of 'Lotto & Instant Lotto' players have expenditure of less than 5 per cent of their total expenditure (6.1 per cent are net winners and 87.7 per cent spend 0-5 per cent).
- Around 86 per cent of 'EGM' players reported expenditure of less than 5 per cent of their total expenditure (12.9 per cent are net winners and 73.4 per cent spend 0-5 per cent).

Table A.7 Estimated Distribution of Households by Gambling Expenditure Share of Total Expenditure

	Total gambling	Lottery tickets	Lotto & Instant Lotto	TAB, on-course	EGMs	Casino	Other gambling
	%	%	%	%	%	%	%
Non-players	42.0	90.9	56.1	91.5	88.5	99.4	79.1
Players	58.0	9.1	43.9	8.5	11.5	0.6	20.9
of which:							
<0	8.2	8.1	6.1	19.6	12.9	14.4	3.9
0-5%	78.5	90.4	87.7	69.7	73.4	59.0	92.5
5-10%	9.0	1.1	4.9	5.6	9.1	18.0	2.8
10-15%	2.5	0.5	1.1	2.7	3.4	2.3	0.3
15-20%	1.0	0.0	0.2	0.7	0.7	2.9	0.2
20-25%	0.4	0.0	0.1	0.4	0.3	3.2	0.1
25+%	0.4	0.0	0.0	1.3	0.2	0.1	0.2
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: The 'EGM' estimates exclude South Australia, Western Australia and Tasmania (not present in 1993-94).
Source: Access Economics Micro Model and the 1993-94 Household Expenditure Survey, ABS.

A4 Gambling and Expenditure-Savings Patterns

Recent trends in total household expenditure on gambling products have been accompanied by other developments in household expenditure and savings patterns. However, the aggregate picture cannot fully explain what is driving these developments. The interaction between the competing household preferences for savings and different goods and services is the result of decisions that are essentially taken by households and, accordingly, the outcome is best examined on the basis of information about expenditure and savings patterns at the household level. The 1993-94 HES provides an opportunity to look in these issues in detail. In the following we investigate the relationship between gambling behaviour on the one side and household savings and expenditure patterns on the other side. In particular, we attempt to quantify the extent to which money lost/won on gambling activities offsets/adds-to other consumption or simply reduces/increases savings.

Gambling activities compete with other activities that, like gambling, consume time and economic resources. Time spent on gambling cannot, in general, be spent on other activities, although certain other activities are often associated with gambling. Likewise, money lost on gambling cannot be spent on other consumption. The question we ask here is: how does gambling expenditure interact with other expenditure?

A model has been constructed to assist in disentangling these issues. The model involves regressions that relate the expenditure and savings share of disposable income to the

expenditure on the six types of gambling identified by the 1993-94 HES. A range of other explanatory variables have also been included in the model in order to isolate the *indirect* effect of gambling activities caused by gambling participation being related to factors such as age, income and household type. It is desirable to separate the *direct* effect of gambling from indirect effects and this has been achieved by estimating the model in two steps. The first step only includes the non-gambling variables and the second step regresses the gambling variables on the residuals estimated from the first step estimations.

This two-step method clearly gives priority to the non-gambling over the gambling variables and the motivation for this design is a presumption about the causality structure among the variables involved. Unlike the expenditure/savings variables, the non-gambling variables have no (or very little) behavioural content in relation to the present problem. It seems obvious that expenditure behaviour does not influence variables such as age, sex and household type. It also seems plausible to suggest that income is exogenous to expenditure behaviour, at least in the short term[4]. Accordingly, it seems justified to regard these variables as predetermined (or exogenous) from a causality point of view in cross-sectional analysis.

The variables related to gambling activity are different – they are not exogenous. The expenditure/savings decision is a joint one and the concept of causality and the relationship between gambling behaviour and other expenditure estimated from a cross-sectional sample should be interpreted as just that: a relationship. Other methods are required in order to make statements about the direction of causality.

The first step amounts to estimating the following equations:

$$s_i = \alpha_0 + \beta_0 x_i + \varepsilon_{i0} \qquad i = 1, \ldots, I$$

(A.2)

$$w_{ij} = \alpha_j + \beta_j x_i + \varepsilon_{ij} \qquad i = 1, \ldots, I;\ j = 1, \ldots, J$$

The dependent variables, s_i, is the savings ratio of household disposable income and w_{ij} the expenditure share for expenditure group *j* for the household *i* in the sample[5]. The definition of saving is a 'saving of current income' concept ($s = Yd - \Sigma w$) and does not include certain types of non-current income such as windfall gains, capital gains, debt deflation etc. The vector of explanatory variables *x* includes a number of household characteristics. Table A.8 show the estimation results for first step regression and it is clear that all the variables have strong predictive power in relation to the share of household income that goes to savings and the different expenditure groups.

[4] It could be argued that certain expenditure behaviour makes family relations unstable and that current savings increase future income.

[5] A number of households with extremely low income (typically self-employed) have been excluded from the full HES sample. These households would lead to 'outlier' observations for expenditure and savings ratios that would bias the estimation results.

The second step is the estimation of the following equations:

$$\varepsilon_{i0} = a_0 + \gamma'_0 n_i + \gamma_0 p_i + \delta_0 g_i + e_{i0} \qquad i = 1, \ldots, I$$

(A.3)

$$\varepsilon_{ij} = a_j + \gamma'_j n_i + \gamma_j p_i + \delta_j g_i + e_{ij} \qquad i = 1, \ldots, I;\ j = 1, \ldots, J$$

The dependent variables in these equations are the estimated residuals from the first step regressions. The explanatory variables are defined as

$n_i(k)$ = 1, if household *i* had a win from gambling activity *k*; = 0, else.

$p_i(k)$ = 1, if household *i* had a loss from gambling activity *k*; = 0 else.

$g_i(k)$ = is the expenditure share on gambling type *k* of disposable income, if household *i* had a *loss* from gambling type *k*; = 0 else.

The results from the estimation are shown in Table A.9. The estimated model is designed to facilitate the interpretation of the relationship between gambling activities and savings/expenditure behaviour in general.

The effect of gambling wins has been treated separately by introducing a set of indicator variables (n_i) whereby the (negative) net expenditure of losers has been isolated. Winners may be different from losers and as a result of their win they do have a higher savings rate than losers. However, there is no evidence to suggest that winners display expenditure behaviour that is different from that of other players.

The dependent variables are the residuals from the first step regressions and they are thus centred around zero. The parameters of the variables in the model are therefore interpreted as an explanation of over-propensity to save or consume. The estimated constant term is interpreted as over-propensity for non-gamblers while the γ'-estimates measure the over-propensity for winners. The effect of positive net gambling expenditure (the losers) is measured by the linear component $\gamma_j p_i + \delta_j g_i$.

Looking first at the estimates for the constant terms, it is apparent that the population of non-gamblers has a propensity to save of an estimated 3.7 per cent above the 'cleaned' average. This figure is higher than the average net gambling expenditure for losers of around 2.4 per cent of disposable income indicating that the savings propensity of gamblers is more than offset by the gambling expenditure itself. The estimated values of the constant terms of the expenditure equations suggest that non-gamblers have under-propensity to spend on a number of expenditure categories ('Tobacco': 0.3 per cent; 'Alcohol Non-licensed': 0.3 per cent; 'Alcohol Licensed': 0.4 per cent; and 'Restaurants & Take-away': 0.2 per cent).

The relationship between positive gambling expenditure and the propensity to save and consume is illustrated in Figures A.9a to A.9g. Figure A.9a shows how the propensity to save relates to different levels of net expenditure for each of the six types of gambling. The level for non-gamblers has been included as a straight line for comparison. The figure shows that at almost all levels of gambling and for all types of gambling, the propensity to save is below that of non-gamblers. The exception is low-level 'Lotto & Instant Lotto' players with an expenditure ratio of less than 1 per cent of disposable income, which is around two-thirds of

the average (losing) player household's expenditure (1.45 per cent). For all types of gambling the propensity to save decreases with the level of expenditure. In the case of 'Lotteries', 'Lotto & instant lotto' and 'EGMs' the relationship is so strong that the gambling expenditure more than offset savings (the gradient coefficient is significantly less than –1). The level of savings is very low for casino players although this to some extent reflects the high outlay/low frequency that characterises casino gambling compared with other forms of gambling. However, the average expenditure on casino gambling only amounts to 4.8 per cent of disposable income which is significantly less than the under-savings of around 20 per cent.

The observed over-offsetting of savings by gambling expenditure has a net over-expenditure counterpart and Figures A.9b to A.9g show the relationship between the over-propensity consume on selected expenditure groups namely 'Tobacco', 'Alcohol Non-licensed', 'Alcohol Licensed', 'Restaurants, Snacks & Take-away', 'Other Food' and 'Other Expenditure'.

The share of income spent on 'Tobacco' is positively related to the presence of gambling expenditure (see Figure A.9b). The average non-gambler has 0.3 percentage points lower 'Tobacco' expenditure, which is 18 per cent, compared with the total expenditure share of 'Tobacco'. Only gamblers of the 'Other' category and below average 'Lottery' players have 'Tobacco' expenditure below non-gamblers. Households with 'TAB & on-course' or 'EGM' expenditure have the highest over-expenditure on 'Tobacco' of around 0.4 percentage points (circa 25 per cent over-expenditure) and the usage is slightly increasing with 'EGM' expenditure. Above average 'Lotto & Instant Lotto' users also have over-expenditure on 'Tobacco'.

Figure A.9c and A.9d show the over-expenditure on 'Alcohol on Licensed Premises' and 'Alcohol not on Licensed Premises'. The figures show that gamblers generally spend a larger proportion of their income on alcohol than non-gamblers and that is particularly the case for 'Alcohol on Licensed Premises'. However, some types of gamblers drink more than others do. Playing EGMs is particularly indicative of alcohol consumption and the higher EGM expenditure the higher the alcohol expenditure - especially at licensed premises. 'TAB & on-course' gambling is also a strong indication of over-expenditure on alcohol.

The relationship between gambling and food expenditure has been broken up into 'Restaurant, Snacks & Take-away' and 'Other food' (see Figures A.9e and A.9f). The outgoing activities 'EGM' and 'Casino' are clearly indicative of over-expenditure on 'Restaurant, Snacks & Take-away' while 'Lotto & Instant Lotto' players actually have slightly lower level of this type of expenditure than non-gamblers. The 'EGM' players' over-expenditure on 'Restaurant, Snacks & Take-away' is more than offset by under-expenditure on 'Other Food'.

The estimates in Table A.8 show some interesting results for gambling winners. The results suggest that winners do not spend everything they have won on other types of consumption. The following table compiles the over-saving for the winners of the six categories of gambling and compares it with the average share of the win of disposable income. The table shows that the winners of 'Lotteries', 'Lotto & instant lotto' and 'TAB & on-course' have an over-propensity to save that exceeds what can be explained by their windfall gain from the win. The winners of 'EGMs', 'Casinos' and 'Other' appear to spend some of their win.

	Lotteries	Lotto etc	TAB etc	EGMs	Casino	Other
Over-saving	5.2	4.0	14.4	-5.7	73.1	3.1
Win	1.1	3.5	9.3	4.3	91.0	5.6
Spent win	-4.2	-0.5	-5.1	9.9	15.8	2.5

The peculiar result that 'EGM' winners tend to over-spend in excess of their win could lead to the suspicion that part of the under-reporting problem stems from winners who over-report their win.

On the expenditure side, the results for the winners are more consistent with the findings for the net losers. In most cases, the γ'-estimates are found on the line segment defined by $\gamma_j p_i + \delta_j g_i$, which indicates that the average winner displays expenditure behaviour similar to the corresponding gambling expenditure share of the losers. For example, the 'EGM' estimates for tobacco expenditure suggest that the average winner has tobacco expenditure at the same level as a loser who spend around 11 per cent of disposable income on playing EGMs.

It is difficult to use the above results to conclude whether gamblers save less because they gamble or because gamblers and non-gamblers generally have different attitudes towards savings. There is evidence that gamblers tend to save less than non-gamblers. In fact, their under-saving exceeds the amount lost on gambling activities. The reason is that they also spend a larger proportion of their income on other expenditure groups such as 'Alcohol', 'Tobacco' and 'Restaurant, Snacks & Take-away'. These observations cannot, however, be used to conclude that the differences in gamblers' savings and expenditure patterns are *caused* by the gambling activities. Indeed, it seems plausible that the differences to a large extent are caused by 'common factors' rather than gambling itself.

We know from the above analysis that households who spend money on gambling tend to save less than non-gamblers and they spend more on certain other expenditure categories. However, if 'common factors' determine this relationship between gambling and other expenditure, it means that the relationship is not a result of causality between the variables. Accordingly, we are interested in the extent to which common factors drive the relationship.

It is useful to distinguish between two categories of common factors, which we could refer to as *characteristic* and *behavioural* factors. The *characteristic* factors are represented by variables such as age, income, employment status, household type, and country of birth and state of residence. These variables are observed and the effect can thus be tested statistically. The *behavioural* factors are more complicated because they are rarely observed directly and they have not been recorded by the HES. A person's moral attitudes and interests (for example, preferences for leisure time activities), the attitudes towards risk and personality in general, are examples of *behavioural* factors.

The effect of the first type of common factors has been estimated by an experimental method that relies on the fact that at the time of the survey, in 1993-94, there were no EGMs in the three states of South Australia, Western Australia and Tasmania (the non-EGM states). In Section A.2, a model for the probability of being an EGM user was described. The estimation of the model was based on the population in the remaining states (the EGM states) where EGMs were available in 1993-94. The model relates the probability of being an EGM player to a set of explanatory variables. These variables represent the *characteristic* factors mentioned above. The model has been used to simulate the population of EGM users in non-EGM states under the scenario that EGMs are available at the same level as in the EGM states. The simulation is performed by drawing a random number (between 0 and 1) for each person in the non-EGM states. The draw is then compared with the predicted probabilities from equation (A.1):

(A.4) $z_i < P(EGM=1|X_i\beta)$ $\quad i \in WA/SA/TAS$

The persons who satisfy this criterion are chosen to represent EGM players in the non-EGM states. The outcome of this experiment is a population of simulated EGM players for which the relationship between being a (simulated) player and the explanatory variables in the non-EGM states is on average[6] the same as for the actual players in the EGM states.

The next step is to estimate a modified version of equation (A.3) on the basis of two samples: one for the EGM states and one for the non-EGM states. The estimation based on the sample from the EGM states uses the *actual* EGM usage while the estimation based on the sample from the non-EGM states uses the *simulated* EGM usage from (A.4). The estimation requires a slight modification of equation (A.3) for the explanatory variables representing EGM usage, which has been modelled as an indication of EGM use rather than the net EGM expenditure. An indicator variable for EGM usage has thus replaced the three variables for EGM use in equation (A.3).

These estimations result in two sets of parameter estimates for the EGM variables. There is one set of parameters for the *actual* EGM usage in the EGM states and another set of parameters for the *simulated* usage in the non-EGM states. As a result there is an *actual* and a *simulated* EGM parameter for savings and for each expenditure groups. The estimated parameters have been used to decompose the over-expenditure (or under-saving) for EGM players. Table A.10 summarises this decomposition for the *actual* and the *simulated* case.

[6] 'On average' in the sense that a 'large' number of experiments are performed. The presented here are based on 500 repetitions of the random selection process for each person in the non-EGM states. This was found to be sufficient to reduce 'Monte Carlo' variability and thereby stabilise the outcome.

Table A.10 Estimated Over-expenditure of EGM Players: Actual in States with EGMs and Simulated in States without EGMs, Percentage of Disposable Income for Households in 1993-94.

	Actual *EGM states* %	*Simulated* Non-EGM states %	*Difference* (unexplained) %
Over-expenditure[1]			
Gambling (0.9 %)	2.17	0.05	2.12
Alcohol (3.0 %)	2.44	0.12	2.32
Tobacco (1.6 %)	0.93	0.01	0.92
Other (97.7 %)	-0.09	1.54	-1.63
	5.45	1.72	3.75
Under-saving	5.49	1.77	3.72

[1] For comparison, the expenditure shares of disposable income are shown in brackets (notice that reported expenditure exceeds disposable income by 3.3 percentage points).

Source: Access Economics and the 1993-94 Household Expenditure Survey, ABS.

The column to the left decomposes the over-expenditure/under-saving of EGM players in the EGM states in 1993-94. The average over-expenditure for EGM players is estimated to around 5.5 per cent. In line with the results presented above, the over-expenditure can largely be attributed to three types of expenditure: gambling, alcohol and tobacco. The over-expenditure on gambling is estimated to 2.17 per cent, with 1.39 per cent on EGMs and 0.78 per cent on other types of gambling. The over-expenditure on gambling thus accounts for around 40 per cent of total over-expenditure with alcohol (2.44 per cent) and tobacco (0.93 per cent) accounting for the rest. The EGM players have a slight under-expenditure on 'Other' expenditure items although this estimate is rather insignificant.

These result suggest that, relative to non-gamblers, the EGM players' have over-expenditure on gambling, alcohol and tobacco, which is not offset by a lower spending on other types of expenditure. However, for an evaluation of how EGM usage affects expenditure behaviour, the expenditure pattern of non-gamblers is not the appropriate benchmark. For this purpose we are interested in how the EGM players would have behaved if EGMs had not been available. The simulation of EGM usage in the states where EGMs were not available provides valuable insight into this problem.

The mid-column shows the decomposition of over-expenditure for the *simulated* EGM usage in the non-EGM states. These estimates are interpreted as the over-expenditure that can be explained by the *characteristic* factors (represented by the explanatory variables in equation (A.1)). Interestingly, the simulated EGM players have over-expenditure on the 'Other' group

of an estimated 1.54 per cent of disposable income. In other words, the EGM players in the EGM states spend 1.63 per cent less than the similar group (in terms of the *characteristic* factors) in the non-EGM states. This amounts to around 75 per cent of their total over-expenditure on total gambling for EGM users and 117 per cent of the net expenditure on EGMs.

However, the over-expenditure on gambling, alcohol and tobacco cannot be attributed to the *characteristic* common factors alone. Around 3.7 out of the 5.5 percentage points remain unexplained and the remaining over-expenditure on alcohol and tobacco can be attributed to two types of explanation. The first type of explanation refers to a causal relationship whereby the over-expenditure on other gambling, alcohol and tobacco is the result of the gambling activity itself. The second type of explanation refers to the existence of unobserved common factors (of the *behavioural* type).

While we might never know the correct solution to this puzzle, there are three observations from the aggregate analysis that support the common factor hypothesis:

1. The evidence presented in Chapter 3 suggested that different types of gambling are substitutes and that introduction of one product tends to replace other gambling products.
2. During the period since the early nineties when gambling share of total expenditure has increased the total expenditure on tobacco has been stable.
3. During the same period the consumption of alcohol (in dollar terms) has fallen.

These observations suggest that the increase in gambling expenditure since the early nineties has not happened at the expense of an increase in other expenditure or, indeed, a decrease in the savings performance. To counter this evidence, the over-simplistic view that gambling offsets savings appears to have no empirical support.

Table A.8 The Estimation Result for Equation (A.2)

	Savings		Tobacco		Alcohol Non-Licenced		Alcohol Licenced		Restaurant, Snack & Take-away		Other Food		Other Expenditure	
	Estimate	St dev	Estimate	St dev	Estimate	St dev	Estimate	St dev	Estimate	St dev	Estimate	St dev	Estimate	St dev
Constant	-0.320	0.054	0.038	0.003	1.707	0.169	0.938	0.128	3.022	0.263	0.149	0.008	1.027	0.048
# Aged 0-1	-0.004	0.030	-0.002	0.002	-0.167	0.092	-0.170	0.070	-0.408	0.144	0.025	0.004	-0.006	0.026
# Aged 2-4	-0.045	0.023	-0.001	0.001	-0.201	0.072	-0.194	0.054	-0.439	0.112	0.027	0.003	0.037	0.020
# Aged 5-12	-0.008	0.012	0.001	0.001	-0.122	0.038	-0.147	0.029	-0.260	0.059	0.029	0.002	-0.013	0.011
# Aged 13-14	-0.035	0.029	0.001	0.002	-0.147	0.091	-0.120	0.069	-0.321	0.142	0.035	0.004	0.015	0.026
# Aged 15-17	-0.097	0.023	-0.003	0.001	-0.041	0.072	-0.165	0.055	0.140	0.113	0.035	0.003	0.068	0.021
# Aged 18-19	-0.162	0.028	0.003	0.002	0.178	0.086	0.146	0.065	0.510	0.134	0.033	0.004	0.110	0.024
# Aged 20-24	-0.191	0.019	0.005	0.001	0.093	0.060	0.336	0.046	0.680	0.094	0.036	0.003	0.124	0.017
# Aged 25-44	-0.204	0.018	0.005	0.001	0.301	0.056	0.152	0.042	0.741	0.087	0.046	0.003	0.127	0.016
# Aged 45-54	-0.212	0.021	0.008	0.001	0.361	0.065	0.144	0.049	0.600	0.101	0.051	0.003	0.132	0.018
# Aged 55-59	-0.201	0.026	0.007	0.002	0.472	0.081	0.192	0.061	0.417	0.126	0.058	0.004	0.111	0.023
# Aged 60-64	-0.313	0.028	0.006	0.002	0.578	0.087	0.112	0.066	0.353	0.135	0.065	0.004	0.214	0.025
# Aged 65-74	-0.194	0.025	0.003	0.001	0.637	0.078	0.203	0.059	0.137	0.122	0.058	0.004	0.107	0.022
# Aged 75+	-0.136	0.043	0.001	0.002	0.470	0.133	-0.053	0.100	0.008	0.207	0.038	0.006	0.080	0.038
Dispinc	1.1E-03	3.6E-05	-4.4E-05	2.1E-06	-9.2E-04	1.1E-04	-5.3E-04	8.5E-05	-1.4E-03	1.7E-04	-2.3E-04	5.2E-06	-7.6E-04	3.2E-05
DispInc^2	-1.3E-07	1.0E-08	5.2E-09	0.0E+00	9.7E-08	3.0E-08	5.4E-08	2.0E-08	1.5E-07	4.0E-08	2.6E-08	0.0E+00	8.6E-08	1.0E-08
AgeRef sq.	-0.035	0.017	0.001	0.001	-0.108	0.052	-0.034	0.040	-0.100	0.082	0.007	0.002	0.026	0.015
AgeRef sq.	0.004	0.001	0.000	0.000	0.000	0.004	0.000	0.003	0.002	0.006	0.000	0.000	-0.003	0.001
R^2/adj.	0.1305	0.1287	0.0675	0.0655	0.0224	0.0203	0.0286	0.0266	0.0315	0.0295	0.3132	0.3118	0.0849	0.0830

Table A.9 The Estimation Result for Equation (A.3)

		Gambling Est.	Gambling StDev	lotteries	lotto	TAB	EGM	Casino	Other
Savings	constant	0.037	*0.012*			0.037			
	dummy - negative	0.047	*0.037*	0.016	0.040	0.144	-0.056	0.751	0.031
	dummy - positive	-0.020	*0.017*	0.016	0.033	-0.015	-0.004	-0.183	-0.060
	share positive	-1.783	*0.172*	-7.560	-3.397	-0.636	-1.572	-0.591	-0.022
	R-sq / adj, R-sq	0.0161 / 0.0158				0.0139 / 0.0118			
Tobacco	constant	-0.003	*0.001*			-0.003			
	dummy - negative	0.010	*0.002*	-0.002	0.009	0.006	0.017	-0.007	0.009
	dummy - positive	0.003	*0.001*	-0.003	0.002	0.006	0.004	0.002	-0.003
	share positive	0.076	*0.010*	0.410	0.089	0.011	0.120	-0.050	0.001
	R-sq / adj, R-sq	0.0120 / 0.0117				0.0195 / 0.0173			
Alcohol (not Licenced)	constant	-0.003	*0.001*			-0.003			
	dummy - negative	0.008	*0.002*	0.011	0.001	0.010	0.006	0.003	0.001
	dummy - positive	0.003	*0.001*	0.001	-0.001	0.006	0.007	-0.003	0.002
	share positive	0.062	*0.010*	-0.077	0.124	0.005	0.064	0.083	0.000
	R-sq / adj, R-sq	0.0085 / 0.0081				0.0136 / 0.0114			
Alcohol (Licenced)	constant	-0.005	*0.001*			-0.004			
	dummy - negative	0.013	*0.002*	-0.005	0.000	0.013	0.019	0.030	0.009
	dummy - positive	0.005	*0.001*	-0.002	-0.002	0.009	0.006	0.004	0.008
	share positive	0.093	*0.008*	0.222	0.165	-0.047	0.249	-0.045	0.000
	R-sq / adj, R-sq	0.0350 / 0.0347				0.0756 / 0.0736			
Restaurant, Snack & Take-away	constant	-0.003	*0.001*			-0.002			
	dummy - negative	0.006	*0.003*	-0.008	-0.007	0.010	0.005	0.059	0.001
	dummy - positive	0.002	*0.002*	0.007	-0.004	0.001	0.011	0.021	0.003
	share positive	0.111	*0.016*	-0.153	0.080	0.085	0.145	0.182	0.127
	R-sq / adj, R-sq	0.0073 / 0.0069				0.0139 / 0.0118			
Other Food	constant	-0.006	*0.002*			-0.005			
	dummy - negative	0.009	*0.005*	-0.002	0.005	-0.005	0.000	-0.006	0.025
	dummy - positive	0.008	*0.002*	0.000	0.001	0.002	-0.011	0.010	0.006
	share positive	0.060	*0.025*	0.972	0.451	-0.134	-0.161	-0.062	0.143
	R-sq / adj, R-sq	0.0030 / 0.0026				0.0134 / 0.0112			
Other Expenditure	constant	-0.005	*0.011*			-0.009			
	dummy - negative	-0.010	*0.033*	0.005	-0.014	-0.082	0.054	0.034	-0.082
	dummy - positive	-0.001	*0.015*	-0.018	-0.031	-0.014	-0.012	0.141	0.048
	share positive	0.411	*0.154*	5.265	1.593	-0.298	0.141	-0.468	-0.028
	R-sq / adj, R-sq	0.0010 / 0.0006				0.0052 / 0.0030			

Note. The areas shaded dark grey indicate that the estimate is not significant and the light grey indicate weak significance.

Figure A.9a Estimated Relationship Between the Over-propensity to Save and Gambling Expenditure by Type of Game.

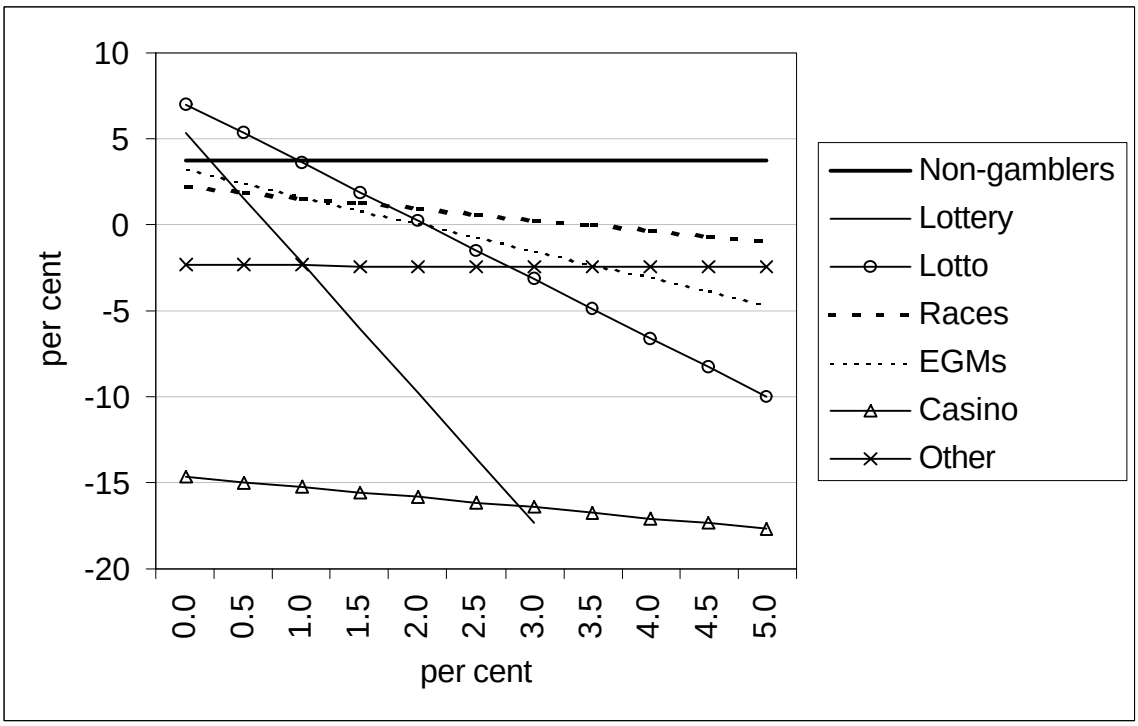


Figure A.9b Estimated Relationship Between the Over-propensity for Tobacco Expenditure and Gambling Expenditure by Type of Game.

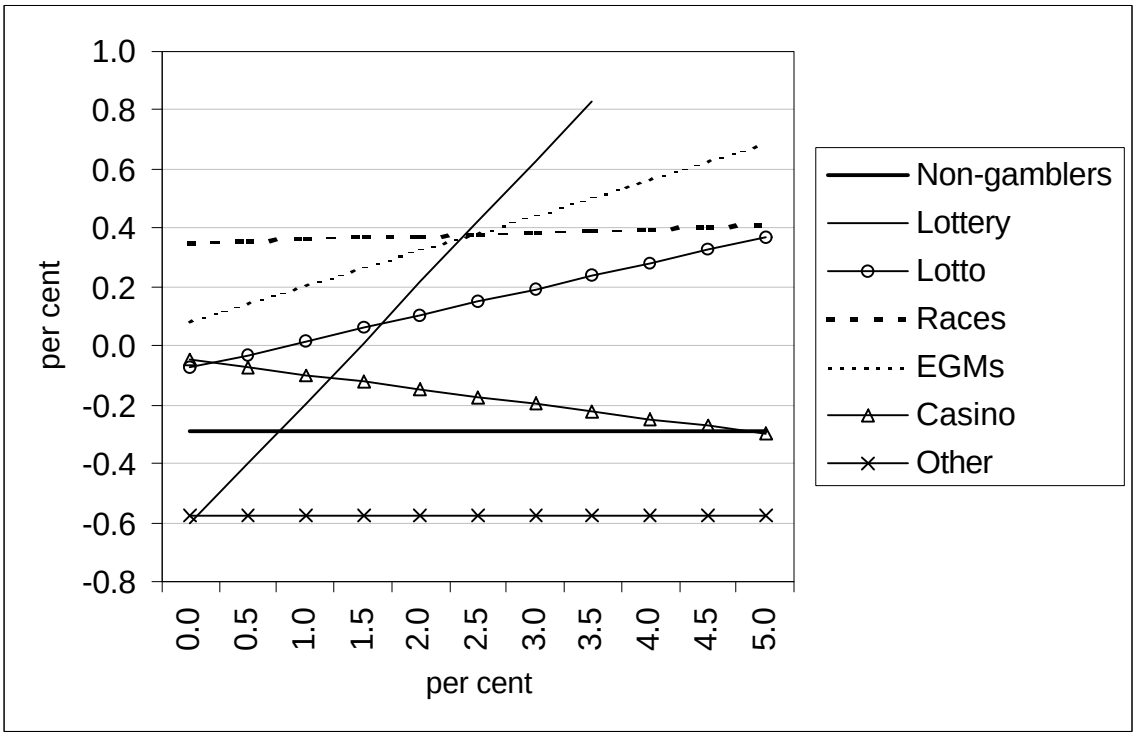


Figure A.9c Estimated Relationship Between the Over-propensity for 'Alcohol, on Licensed Premises' Expenditure and Gambling Expenditure by Type of Game.

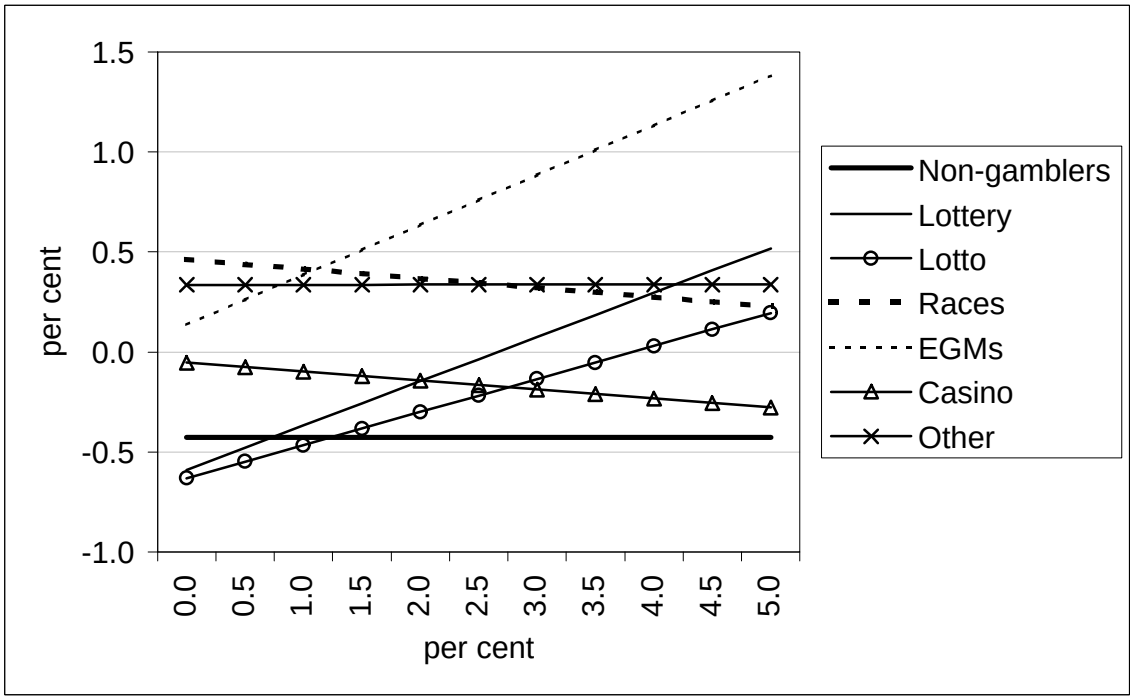


Figure A.9d Estimated Relationship Between the Over-propensity for 'Alcohol, not on Licensed Premises' Expenditure and Gambling Expenditure by Type of Game.

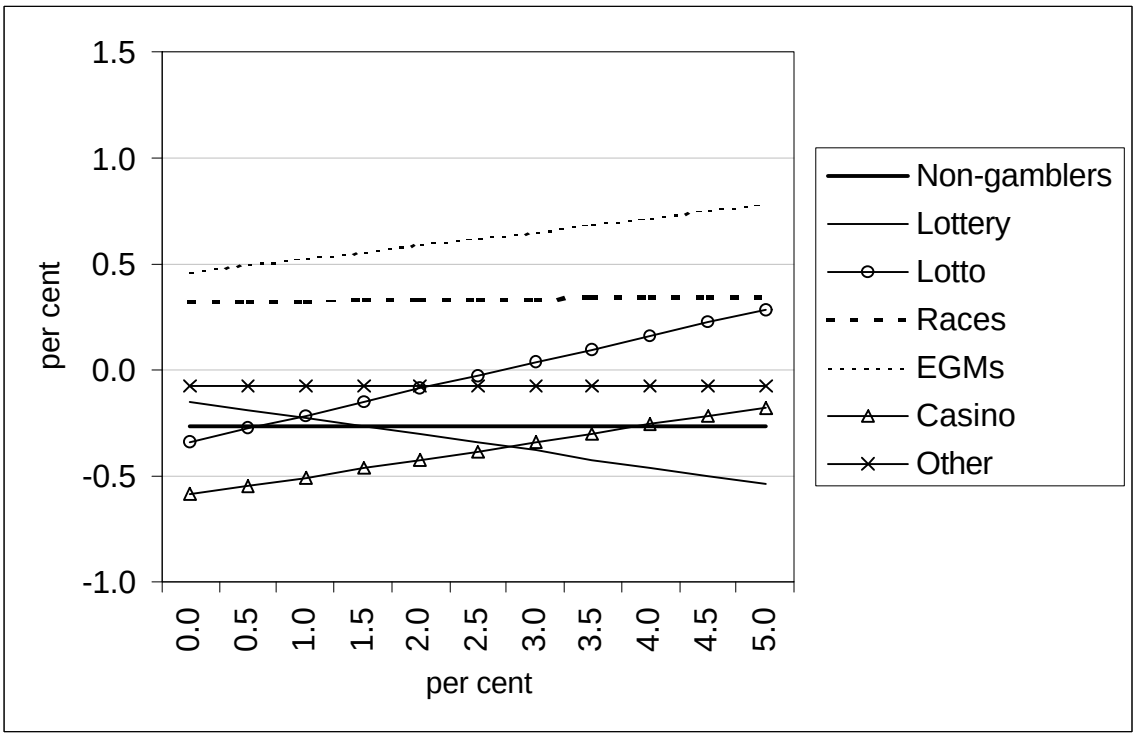


Figure A.9e Estimated Relationship Between the Over-propensity for 'Restaurant, Snack & Take-away' Expenditure and Gambling Expenditure by Type of Game.

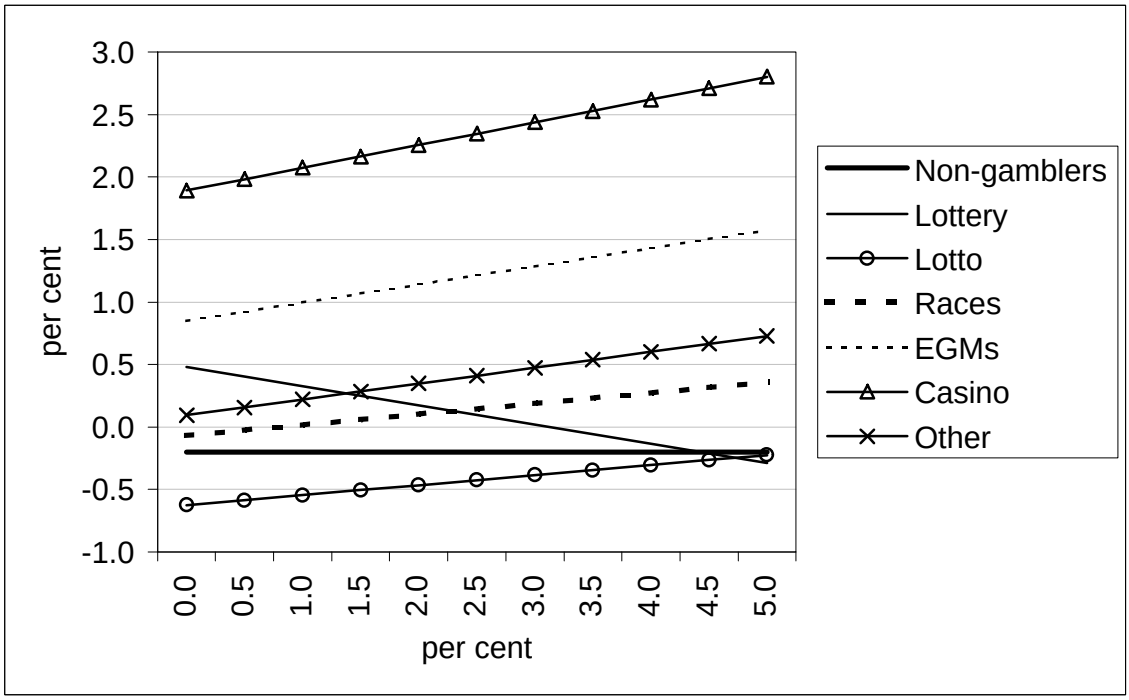


Figure A.9f Estimated Relationship Between the Over-propensity for 'Other Food' Expenditure and Gambling Expenditure by Type of Game.

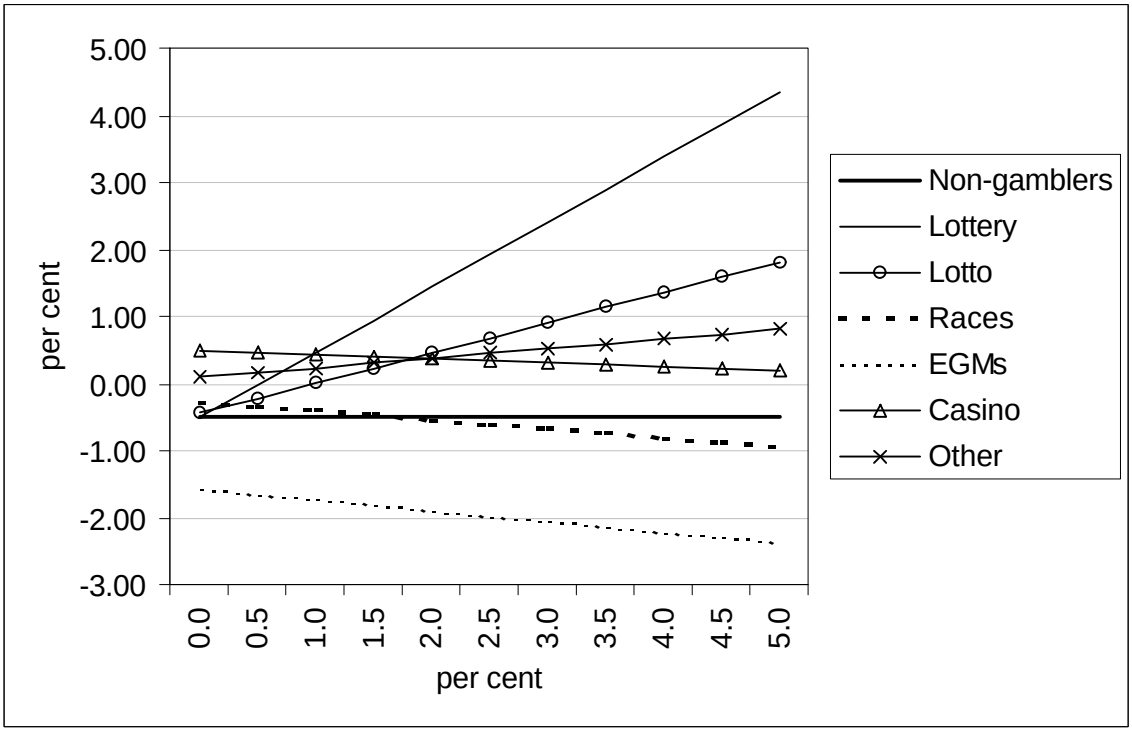


Figure A.9g Estimated Relationship Between the Over-propensity for 'Other Food' Expenditure and Gambling Expenditure by Type of Game.