The impact of socio-economic factors on gambling expenditure

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INTRODUCTION

State governments in Australia place relatively more emphasis on gambling-related revenues than most comparable economies. With Australian gambling turnover exceeding $50 billion the States successfully extracted more than $3,257 million in gambling-related taxation in 1996/97; or on average more than 9.78 percent of total State taxation. The sources of revenue include lotteries, Lotto and Instant Lotto, Totaliser Agency Board (TAB) and on-course betting, casinos, poker machines and other gaming devices. The revenues are obtained through fees and taxes on subscriptions, duties on gaming machines in clubs and hotels, taxes on turnover, and licensing fees and charges. It is recognised that all Australian State governments have played a major role in, first, the legalisation, design and provision of gambling activities, and second, the establishment of manifest revenue extraction devices.

Unfortunately, these revenues are not produced without some undesirable socio-economic problems. For example, whilst gambling participation is voluntary, the pattern of expenditure may work to the relative detriment of low income individuals and deepen the economic problems that must be addressed by other public support programs (Szakmary and Szakmary, 1995; Madhusudhan, 1996; Rivenbark and Rounsaville, 1996). Furthermore, there is evidence that certain forms of gambling have the capacity to create compulsive gambling and major addiction, attract criminal elements and foster corruption (Mason, Shapiro and Borg, 1989; Mikesell and Pirog-Good, 1990). Accordingly, and in addition to the concerns of equity and efficiency relating to the incidence of gambling-related taxation, there is the important question of the socio-economic burden of gambling expenditure itself. Most frequently this question concerns those households which have a high probability of engaging in gambling, and thereby may be subject to the adverse effects that expansion in gambling opportunities

pose. However, whilst these issues are of acute interest to policymakers and other interested parties, evidence relating to the socio-economic determinants of gambling activity is largely anecdotal. The present study is intended to fill this void in the Australian empirical literature.

The organisation of the paper is as follows. The second section discusses the data requirements for econometric estimation of the model of gambling expenditure, and the vector of socio-economic variables to be included in this model are detailed. In the third section the results are presented and the final section examines possible extensions to current research.

METHODOLOGY

The current paper presents a single equation econometric estimation of the demand for gambling in Australia, and follows the work of Gulley and Scott (1993) and Mason, Steagal and Fabritius (1997). The primary focus of this research is to estimate the effect of socio-economic factors on the probability of purchasing gambling products. Given that the observed dependent variable viz., the purchase of gambling products, is discrete rather than continuous, logit maximum likelihood estimation is appropriate. The estimators thereby obtained are consistent, asymptotically efficient, and asymptotically normally distributed. All data correspond to the financial year ending 1993/94 and are obtained from the Australian Bureau of Statistics' (ABS) 1993-94 Household Expenditure Survey Confidentialised Unit Record File. The variables apply to a sample of 8389 Australian households.

In terms of the dependent variables, six categories of binary choice variables are employed. These take a value of unity if household weekly expenditures on a particular category of gambling expenditure are positive, and zero otherwise. The categories of gambling expenditure are: (i) lottery tickets; (ii) Lotto-type games and instant lotteries,; (iii) TAB and on-course betting; (iv) poker machines and ticket machines; (v) blackjack, roulette and other casino-type games; and (vi) total gambling. Whilst few North American studies have employed more than a single expenditure classification as the dependent variable, the definitions adopted are consistent with Scott and Garen's (1994) and Kitchen and Powell's (1991) respective analyses of lotteries in Kentucky and Canada, Thiel's (1991) inquiry into Washington's Lotto and Hansen's (1995) study of Colorado instant lotteries, amongst others.

The vector of socio-economic variables upon which the household gambling expenditures will be regressed are detailed in Table I. Whilst there is no unequivocal rationale for predicting the direction and statistical significance of many of these putative explanatory

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variables, their inclusion is consistent with both past studies of gambling incidence and the presumed interests of policy-makers and other parties.

The first group of variables relate to both the level of weekly household income (in logarithmic form) and the sources of this income, and follow the work of Kitchen and Powell (1991), amongst others. For the former, the level of expenditure on gambling products is posited to increase with income, though at a diminishing rate. In the case of the latter, Scott and Garen (1994) have discussed the purported impact of welfare recipiency on gambling expenditures. It is posited that even after holding household income constant, certain groups of welfare recipients may engage in a disproportionate amount of gambling expenditure. The qualitative (dummy) variables included to test this hypothesis are firstly whether the household in question derives the larger portion of its income from salary and wages, investment and supernannuation, or governmental sources, and then the specific source of these governmental cash benefits. The second category details whether these benefits have been derived from aged or veteran's affairs pensions, sole parent payments, unemployment benefits (Job Search and Newstart), sickness benefits, or other government cash benefits.

The second group of qualitative variables relate to the demographic determinants of gambling expenditures. Studies such as Mikesell (1989), Borg, Mason and Shapiro (1990, 1991), Kitchen and Powells (1991), Coook and Clotfelter (1993), Scott and Garen (1994), Jackson (1994) and Hansen (1995) have advocated the inclusion of a vector of qualitative variables closely related to the gender, age, ethnicity and occupational classification of household reference heads, and the family composition of gambling and non-gambling households. Of course, whilst there are problems in extending the behavioural characteristics of the household 'head' to the entire unit, this approach is consistent with both existing work in this area, and the limits of the available data. All other things being equal, the extant literature hypothesises that a household headed by a 'blue-collar' male of an ethnic background will be more likely to engage in gambling activity of any form.

Finally, a vector of qualitative variables for the state of enumeration are included (Kitchen and Powells, 1991). Whilst some forms of gambling, such as TAB and on-course betting, have been long established in all states, others forms, such as casinos, have been more recently introduced. Furthermore, substantial differences exist in the marketing of gambling products across state borders, and in the level of implicit taxation, both tax and fee based. It is expected that the set of regional variables will capture both residual differences in gambling expenditure that may result from variance in the tenure of legalised gambling opportunities,

and various product and taxation considerations. The sign on the estimated coefficients would necessarily depend on a large number of factors.

RESULTS

The estimated coefficients and standard errors of the parameters detailed above are presented in Table I. Also included in Table I are statistics for joint hypothesis and likelihood ratio tests, and the results of a prediction success table for each dependent variable. The logistic regressions show that the probability of gambling expenditure in all six categories varies significantly with a large number of included explanatory variables. The estimated models are highly significant, with likelihood ratio tests of the hypothesis that all of the slope coefficients are zero rejected at the .01 level using the chi-square statistic. The percentage of observations predicted correctly on the basis of the given vector of socioeconomic variables varies from over 90 percent for lottery, TAB/on-course betting, poker machines and casino gambling, to just over 60 percent for Lotto and Instant Lotto and overall gambling expenditure. The results also appear sensible in terms of both the precision of the estimates and the signs on the coefficients. To detect multicollinearity, auxiliary regressions of each independent variable on all other independent variables are undertaken. The highest values for R^2 are found in those regressions with principal sources of household income ($R^2 = .4824$) and principal sources of governmental income (.4296) as the dependent variables. These results are to be expected given the nature of the microeconomic data, though the magnitude of the values suggests that the multicollinearity problem is not too serious.

To start with, in the case of household expenditures on lottery tickets, lotto-type games and instant lotteries, poker machines, casinos, and total gambling, the level of household income is a significant and positive influence on initial gambling participation. To facilitate comparability, elasticities are included in Table II. Whilst these marginal effects are most useful when the variable in question is continuous, as with household income, they also produce a reasonable approximation to the change in the probability that the dependent variable equals one at a point such as the regressor means. Using these elasticities, it appears that changes in income have a greater impact on the probability of play for poker machines and casino-type games, and a lesser impact for lotteries and TAB/on-course betting.

In terms of factors relating to the sources of income, the results are somewhat mixed. Recipients of aged and veteran's affairs payments have a greater probability of being a gambling household for all forms except casino-type games, whereas unemployment benefits appear to have a positive impact on the probability of Lotto and poker machine gambling, with sickness benefits negatively impacting on the probability of poker machines and casino

gambling. The most pronounced marginal effects are the increase in the probability of play on lotteries for aged and veteran's affairs recipients, and the decrease in the probability of play on casino-type games for recipients of sole parent payments and sickness benefits. As shown in Table I, for each of the six categories of gambling expenditure the null hypothesis of the joint insignificance of the welfare coefficients is rejected. We may conclude that all other things being equal, a household's major income source, and the types of welfare payments received, has a significant effect on the likelihood of engaging in gambling expenditure, even when income is held constant.

For issues relating to demographic incidence a number of points may be made. In terms of ages, households headed by a person aged between 45 and 64 years tend to have a greater probability of gambling on Lotto and TAB/on-course betting, but age appears to exert little influence over most other forms of gambling. However, only in the case of casino-type games does the null hypothesis of joint insignificance for the age of the household head fail to be rejected. Where the household reference head is female, there is a lower probability of TAB/on-course betting, but an insignificant influence on the choice of gambling otherwise. The remaining socio-economic variables likewise yield conflicting results. Households where the reference head was born in Europe or the former USSR have a lower probability of gambling overall and TAB/on-course betting, and those from the Middle East a lower probability of Lotto, TAB/on-course and casino gambling, but higher for poker machines. Asian households on the other hand have a lower probability of engaging in most forms of gambling, except blackjack, roulette and other casino-type games. The largest marginal effects are the decrease in probability of play on TAB/on-course betting for household heads born in Europe and the former USSR, and the decrease and increase in probability of play on casino-type games in Middle Eastern and Asian households, respectively. For each dependent variable, the 'ethnicity' coefficients are jointly significant. Finally, households where the reference head is classified as a manager or professional have a lower probability of gambling overall and for Lotto and poker machines, whilst 'blue-collar' occupations have a higher probability of poker machine gambling. The null hypothesis of the joint insignificance of occupation as a factor determining the probability of a household being a gambling one is rejected for all gambling categories except TAB/on-course betting.

The final area of analysis concerns the impact of geographic factors on the probability of gambling. As noted above, the estimated coefficients of these parameters are likely to reflect a large number of factors. These include ease of access to gambling opportunities, as is the case

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with casino-type games, or specific differences in the design of gambling products. In most cases, the geographic variables are significantly associated with the probability of play. The largest positive marginal effects are those related to the probability of play on TAB/on-course betting in New South Wales, and casino-type games in Queensland, Tasmania and the Northern Territory. For negative marginal effects, the probability of play on lotteries in Victoria is the most significant, followed by poker machines in South Australia and Western Australia.

Overall, the results are highly supportive of the notion that socio-economic factors are a significant influence on the probability of a household engaging in gambling. They are also indicative of these factors varying significantly across the range of available gambling products. This is to be expected: the social environment, level of requisite knowledge and intrinsic characteristics of these gambling opportunities also vary significantly. The results also support the anecdotal evidence that some of the problems associated with gambling expenditures may be disproportionately allocated across the community. All other things being equal, ethnicity, income sources, and income levels influence the probability of a household gambling. This has obvious implications for the design and regulation of public support programs, especially those designed to mitigate problem gambling.

CONCLUDING REMARKS

The present study uses a binary choice regression model to investigate the influence of socio-economic factors on the probability of households gambling during the period 1993 to 1994. The current paper extends empirical work in this area in at least two ways. First, and as far as the authors are aware, it represents the first attempt to test these purported factors in the Australian institutional milieu. Second, the paper also examines a wider range of gambling activities and explanatory variables than has been the case in comparable North American studies. The results indicate that the impact of socio-economic factors vary significantly across different types of gambling activity. This has obvious implications for both the design of new products and tax structures.

There are at least four ways in which this research may be extended. First, it would be useful to extend the methodology employed in the current study to account for both the influence of the various explanatory variables on the decision, in the first instance, of whether or not to purchase gambling products, and latterly on their influence on the subsequent decision regarding the amount to spend. Tobit estimation would be appropriate for this extension. A

second extension would be to more rigorously define the extant posited determinants of gambling-related expenditure, and extend the vector of explanatory variables within the confines of the available data. For example, the Household Expenditure Survey Confidentialised Unit Record File used in the current study also contains information relating to indexes of socio-economic disadvantage and other household expenditure categories. The latter may serve to quantify the substitution effects between both gambling and expenditures on other 'leisure' activities, and gambling expenditures and more pressing needs such as education and health. Finally, similar techniques to the present study could be used to analyse the issues of determinants and implicit tax-incidence as they relate to other economic 'bads' such as tobacco and alcohol [in much the same manner as the early work of Clotfelter and Cook (1987)]. This may serve to highlight additional issues of concern to policy-makers and other interested parties.

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