

Measuring the Economic Impact of Electronic Gaming Machines in Regional Areas - Bendigo, a case study

Contents

Abstract	2
1. Introduction	2
a) Study outline	4
b) Choice of suitable model	5
c) Source of gaming data	6
2. Main findings of the study	7
a) Multiplier analysis and the gaming sector	7
b) Measuring impact through the use of hypothetical extraction	10
c) Extending the analysis to include social costs and benefits	14
3. Policy Implications	18
a) Possible deregulation of the gaming industry	18
b) Industry prohibition	19
c) Redistribution of gaming revenue	20
d) Increased regulation	20
4. Conclusion	21
References	22

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Abstract

Regional impact analysis using input-output modelling is widespread and has had a long history (Bergstrom et al, 1990; Batey et al,1993; Oster et al,1997). Little has been done however to assess the impact of gambling activities on regional economies. An approach to this issue has been developed to study the impact of electronic gaming machines on Australian regional cities. The findings suggest that the present distribution of gaming revenue leads to poor relative performance of the sector and large leakages out of the regional economy and in turn reduces levels of regional output, income and employment. An attempt was then made to quantify the net effects of gaming, including the social costs, to the regional economy. Policy options were then discussed. It is argued that the methodology used has application to the study of gaming in other regional areas.

1. Introduction

Economic impact analysis at the regional level owes much to the development of regional input-output models, which provide the practitioner with a wide variety of approaches. These range from the extraction of multipliers for wider comparison (Aruna et al,1997), the calculation of the direct, indirect and induced effects in dollar terms to calculate the impact of change by a particular industry sector (Grado et al,1997) or the calculation of a range of economic impacts linked to a number of different scenarios (Babcock et al 1997).

In a study of casino gambling (Gazel, 1998) was content to use a combination of available multipliers from other seemingly related sectors arguing that :

...producing one's own multipliers through established and survey data would be very expensive [p71, 1998].



In a later footnote, Gazel outlined the source of multipliers used to explain the industrial support and the induced effects of casino gaming:

A specific multiplier for casino activities is not available in the literature. Therefore a researcher must separate a casino's direct expenditure by type (wages and salaries, supplies, construction, and so forth) and then apply known multipliers to each of these types of economic activity to estimate the indirect impacts. (P84, 1998)

The problem here is that certain aspects of the casino industry might be very different to those in seemingly related sectors. In using a multiplier extracted from another sector, it is assumed that the output-labour ratio is going to be the same as, for example, the food and beverage sector.. The final assumption was that known multipliers extracted from one region had application to another.

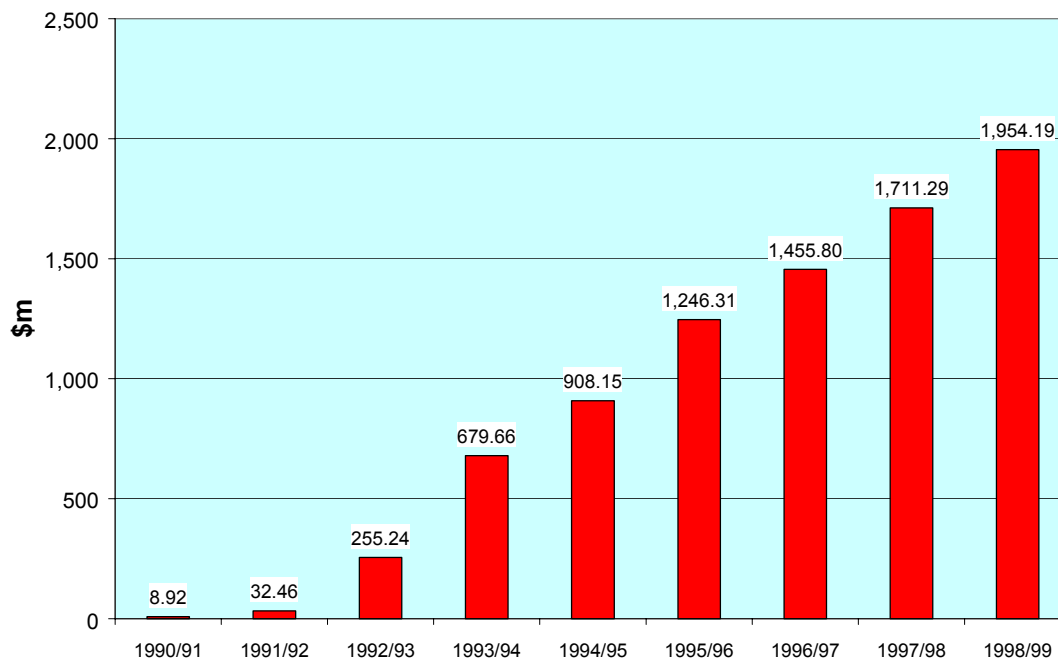
The alternative to the use of inappropriate but available data is to collect appropriate data directly related to the impacting agent. This approach has the advantage of providing data directly linked to the sector or region under scrutiny and avoids many of the pitfalls associated with the use of “borrowed multipliers”. It also provides information relating to the source of purchases of inputs by the firms so that leakages can be tracked. All this will add to the time taken, and consequently the cost of the study, but will provide more satisfactory results. With the above points in mind, an attempt was then made to assess the economic impact of electronic gaming machines on a regional local government area in Australia,

(a) Study Outline



Very little work has been carried out to measure the economic impact of EGMs on regional economies. For this reason an attempt was made to better understand this phenomenon through the use of a regional input-output model. This approach was selected because of its usefulness in being able to map patterns of transactional flows and to gauge the impact of an industry either in dollar terms or in a series of multipliers for output, income and employment.

Annual Gaming Expenditure Victoria. \$m



Electronic gaming machines are controlled by state law in Australia. They were first legalised in Victoria in 1992 as a response to lost revenue interstate and by 1998/99 accounted for an annual expenditure of \$1,954m. Expenditure or revenue was defined as the gross profit or conversely the net amount lost by gamblers and should not be confused with gaming turnover. Expenditure (revenue) amounts to \$556 per adult legally able to use the machines across the state (Tasmanian Gaming Commission, 2000, Tables 14 and 18).



Gaming revenue is shared between three groups, the State government (33.3%), the machine owners (33%) and the gaming venue (33.3%) with the exception that where the venue is a privately owned hotel and not a community-owned club, the share reduces to 25% with the balance going to a Community Support Fund. A very lucrative statewide duopoly has been granted to the machine owners, Tattersalls and Tabcorp.

The Bendigo region has been designated to be that area administered by the City of Greater Bendigo. The main commercial area of the city is 150 km north of Melbourne, which, is the capital city of the state of Victoria.

In June 1998, the gaming industry in the Bendigo region had an estimated total revenue (losses to gamblers) of \$32.35 million per annum. At the time of the study, there were 507 machines in nine venues serving a population of 81,000 or 49,000 adults over 18 years. The sector employed an estimated 110 equivalent full-time workers comprising 45 full-time and 150 part-time workers.

(b) Choice of a Suitable Model

The decision whether or not to use a commercially- provided or previously used regional input-output model was not an option. Models available were either too old (1985), the level of aggregation was too coarse (10 sectors) or previous researchers had left behind insufficient data. A “top down” approach was used to construct a regional model beginning with national tables and adapting these to the region via sectoral employment figures. Output for all sectors was adjusted with the use of simple location quotients (SLQ) and residuals were allocated to regional imports. It was recognised that multipliers extracted from such a model would most likely overstate rather than understate the overall impacts.



(c) Source of Gaming Data

The lack of appropriate regional models was mirrored in the unavailability of input data and multipliers for the gaming sector. To obtain details of total revenue and the allocation of expenditure on inputs for the year ended in June 1998, a survey of gaming establishments was distributed. Of the nine establishments operating at that time, only three responded with others expressing concern about the release of such information despite the assurance of confidentiality regarding individual establishments. There was also some evidence of operators being advised not to cooperate with the survey. In view of the fairly standard expenditures in the industry, it was felt that the sample size was adequate. This approach was confirmed by the consistency of data amongst the three venues regarding expenditure per gaming machine while reported revenue earned per machine was close to state averages.

Expenditures were reduced to a per machine level, averaged for hotels and clubs, and multiplied by the existing 507 machines. Venues had been asked to estimate the proportion of business going to local players as opposed to visitors. Based on this information, 90% of revenue was allocated to spending by locals. Information was also obtained on the number of full and part-time employees and equivalent full time numbers. These figures were also reduced to employment per machine, averaged for hotels and clubs and multiplied by the total number of machines in the region. Figures for revenue (local and visitor), expenditure per industry sector, employment, taxes, imports and employment were then fed into the 17-sector regional model.



2. Main Findings of the Study

In examining patterns of transactional flows via direct coefficients, the most prominent observation was on just how little the gaming industry impacted on other sectors. Regional imports accounted for sixty-seven percent of total inputs for the gaming sector. Putting this in another way the backward linkages with the regional economy could be described as weak with a third of revenue going to the owners of the gaming machines (Tabcorp and Tattersalls) and another third payable to the State government. Demand for Gaming in the Bendigo region generated 1.1% of expenditure for the region but only 0.3% of wages and 0.4% of all regional jobs. While the sector only generates 0.5% of all regional exports, gaming is responsible for 5.1% of all regional imports. Similarly, the gaming sector only adds 0.5% to gross regional product. This is explained by the large leakages out of the economy in the form of taxes and payments to the machine owners with very little of the total revenue left to circulate in the regional economy. The same can be said in terms of forward linkages where the output for this sector is not really used as an input for other regional industry sectors. Similarly, the employment coefficient for gaming was lower than that for any of the other seventeen sectors.

(a) Multiplier Analysis and the Gaming Sector

Multipliers have been selected for their ability to better explain just how the gaming sector stands up alongside all other sectors of the regional economy. Following the performance described above, it is not surprising to find that multipliers for output, income and employment for the gaming sector are, in general, lower than those for most other sectors. These are set out in Table 1. The Type 1 multiplier for output suggests that for every \$1 of



increased output in gaming, only \$0.10 will be generated in direct and indirect industry support effects. Table 1 shows that this multiplier of 1.1 is equal lowest of all sectoral output multipliers which again emphasises the weak linkages (forward and backward) with all other sectors in the region. When households are factored into the equation, income earned is assumed to follow previous spending patterns and generate a further final demand, namely induced spending. This is reflected in the Type II multiplier results. Induced spending in this sector is the lowest for any other sector of the regional economy, again reflecting weak forward and backward linkages and the large level of leakages out of the region.

TABLE 1
Gaming Multipliers Compared to All Other Sectors

SECTOR	OUTPUT		INCOME		EMPLOYMENT		VALUE ADDED	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
Gaming	1.10	1.28	1.25	1.77	1.19	1.64	1.24	1.63
Ranking /18	(17)	(18)	(13)	(13)	(16)	(16)	(15)	(17)
Other Sectors								
(Mean)	1.40	2.00	1.38	1.95	1.36	1.96	1.51	2.04

Income multipliers measure the effect of output changes on household income. The Type I and Type II income multipliers for gaming fare a little better than output and rank thirteenth out of a total of 18 sectors. Higher than regular levels of sales per worker (productivity) are not enough to overcome the low flow-on effects for this sector.

Out of the total of eighteen sectors, the Type I and Type 2 employment multipliers rank sixteenth. Employment multipliers are determined by the degree of labour intensity and the forward and backward linkages revealed in the output multipliers. The only sector with lower employment multipliers is that of Education which is low because of low levels of employment intensity.



The final multipliers examined were those measuring the extent of the value added to output and focus on the overall effect less any intermediate sector changes to measure the overall changes to final goods and services or gross regional product. These also follow the trends in the above multipliers with Type 1 and 2 multipliers well below average levels and ranking respectively in fifteenth and seventeenth positions.

To summarise the above it can be seen that the gaming sector is a very poor performer when examined alongside the other seventeen sectors. This is attributable to a number of factors:

- (a) the relatively weak backward and forward linkages with other sectors,
- (b) a low level of labour intensity, which is directly linked to
- (c) a relatively low level of wages going to the household, and
- (d) smaller than average consumption effects.

This poor performance is a direct result of the way gaming revenue is distributed and it can be argued that a formula which allows an immediate leakage of two-thirds of the total revenue to the region is excessive.

(b) Measuring impact through the use of hypothetical extraction

In order to quantify the adverse effects of EGMs, it was decided to employ the technique of hypothetical extraction. This is the process by which one industrial sector is removed from the economy by the “omnipotent” economic modeller being able to close down this sector or open another. By doing this, it is then possible to measure the output levels of the surviving sectors and compare these with the present state. It also offers an additional insight into the way the removed sector links with other sectors and provides a quantitative measure



of its likely impact on output, income and employment. It has been suggested (Kurtz et al, 1998,p xxxI) that as a technique, hypothetical extraction method was going through a “remarkable revival”. Given the usefulness of the technique, this is not surprising.

Several sectors including the gaming sector were “closed down” or reduced by the estimated amount spent on gaming machines of \$32,350,000 in the year ended, June 1998 using the regional economic model. The direct, indirect and induced effects were then measured in terms of output, income, employment and value added. Such a process allows an examination of the overall effect of each of these on the regional economy and a comparison in terms of relative importance. It should be kept in mind that the approach does assume constant savings. Any change in savings patterns would alter the results. A selection of these results is set out in Table 2.

TABLE 2
Sectoral Effects of Reduced Spending by \$32.35m

SECTOR	OUTPUT \$'000	INCOME (household) \$'000	EMPLOYMENT units	VALUE ADDED \$'000
Gaming	41,355	5,099	180	5,234
Manufacturing	66,871	13,247	472	29,200
Retail Trade	68,343	8,771	721	20,207



Government Admin.	76,530	23,232	682	37,867
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The data from Table 2 again reinforces the earlier message concerning the relatively poor performance of the gaming sector. For any increase (or decrease) in expenditure of \$32.350m, the gaming sector is the worst performer. Because the weak underlying economic linkages, performance in terms of additional income, employment and value adding will also be restricted, even if the respective coefficients for income and employment were similar. However these coefficients were measurably smaller and the effect of weak linkages is seriously exacerbated. The actual gaming sector coefficient for household earnings was 0.089 (mean for all sectors 0.2942) and 0.0034 for employment (mean for all sectors was 0.0090). These coefficients were again the lowest for all sectors.

Looking at the four sectors surveyed, any need to boost output, household income and the value added to production would best be satisfied through a boost to spending on Government Administration, a worrying result given the extent of regional cutbacks in this area. If however the goal was to boost employment opportunities, then an increase in spending in the retail sector would be the best option. All this suggests that a switch in expenditure towards electronic gaming machines has had serious economic consequences for the regional economy. The problem arises in terms of how to track changing expenditure patterns in order to quantify the extent of this change. An earlier study of the effect of gaming on retail trade in the state of Victoria provided a very mixed message (Pinge, 2000). While retail trade showed no overall negative effects due to gaming, some sub-sectors of retail trade such as department stores, clothing and footwear and furniture and floor coverings did show signs of negative behaviour.



Early discussions with gamblers as to where they might otherwise have spent their money soon dispelled any ideas of conducting a survey, as most gamblers had little or no idea. This was supported by a survey of local respondents that provided estimates of gaming expenditure per person, which was half of the actual amount spent (Victorian Casino and Gaming Authority, 1997, p55). To avoid the problems outlined above, it was decided to apportion this spending in line with the average expenditure patterns of the household sector. This of course assumes that any additional consumption will follow previous patterns of behaviour or that the marginal propensity to consume matches the average propensity to consume. The annual amount spent on gambling (\$32.350m) was then apportioned to each sector according to the coefficients in the household consumption column and then extracted from the model. The results of this adjustment are shown in Table 3

TABLE 3
The Net Regional Effect of Gaming Expenditure (\$32.35m) Compared to Normal Patterns of Expenditure.

SECTOR	OUTPUT \$'000	INCOME (household) \$'000	EMPLOYMENT units	VALUE ADDED \$'000
Normal Consumption	50,265	13,327	437	28,527



<i>Less</i> Gaming: Local Venues	41,355	5,099	180	5,234
<i>Plus</i> Machine and venue owners local expenditure	3,580	752	20	2,200
Net Effect of Gaming	-5,330	-7,476	237	-21,093

As expected, the flow-on effects for output, income, employment and the value added to production were all greater for non-gaming expenditure. The difference between the effects for non-gaming and gaming expenditures was then calculated in terms of the Net Effect of Gaming. As the gaming result is smaller, the difference in outcomes coming from gaming and non-gaming expenditure provided a measure of the opportunity cost of gaming in the region. If an allowance is made for some spending by the owners of the machines and the venue owners, and that part of this spending finds its way into the regional economy, then the picture is moderated a little. This spending would cover services and maintenance to gaming outlets and local spending of profits by venues and has been estimated at \$2m per annum. Based on the above, the opportunity cost of gambling amounts annually to \$5.330m lost to output, \$7.476m lost in household income and a loss of 237 jobs resulting from the switch to gaming activities in the region. Savings were assumed to be constant (an assumption worthy of further research) and the extent of government cutbacks over the period under scrutiny supports the assumption that government expenditure in the region had not increased.

(c) Extending the analysis to include social costs and benefits

It has been pointed out by Jensen and West, (1986, p75) that an economic impact study does not constitute a full evaluation of the cost-benefit process that takes both the costs and



benefits of a process into account. By examining an alternative to gambling expenditure, one problem has been reduced through the introduction of an opportunity cost to the sector under consideration. There are however further issues that would need to be taken into account. In an attempt to delineate some of the external costs and benefits, Gazel (1998) set out a comprehensive list of some of the costs and benefits of gambling (casino) that needed to be taken into account. A number of these have been covered in the above impact analysis but there are some additional effects that need further scrutiny. On the positive side Gazel added gambling that previously took place outside the region. Any replacement of this takes the form of import replacement activity.

Turning to *external* effects, Gazel covered trade going to other businesses from visitors attracted to gambling activity. Some reservations need to be placed on this point when it comes to the present study of EGM venues. Unlike visitors attracted to visit large casino complexes, gaming machine patrons do not generally have to travel, given the widespread adoption of gaming machines in most areas of the state. Any external effects will be assumed to be small. An estimated ten-percent of gaming machine revenue in the region was already assumed to be from visitors so some small allowance should be made for the positive effects of visitors on other sectors including lodgings, food and beverages and retail activity. On the negative side, Gazel listed the effects of cannibalisation to existing businesses (already accounted for), regulation costs, higher crime rates and gambling addiction. A further cost not raised by Gazel is the cost of welfare services provided to problem gamblers.

There is little doubt that the negative externalities will be greater than any positive externalities resulting from gaming machine activity. The costs of problem gambling as it



impacts on the person, the family, the community, work, study, as well as the legal and financial aspect of life could prove to be most significant. One estimate put problem gambling in Australia as high as 1.8% of all adults (Productivity Commission, 1999, p 6.45), most of this being linked to casino gambling and gaming machines. It has been argued that problem gamblers are responsible for 33% of all gambling expenditure (Productivity Commission, 1999, p 7.41). Regional behaviour appears similar. One regional survey, which included 393 telephone interviews from regions, including Bendigo, estimated that 1.3% of the sample admitted to a gambling problem. Problem gambling was defined by this survey as:

Problem gambling refers to the situation where a person's gambling activity gives rise to harm to the individual player, and/or to his or her family, and may extend to the community. (Victorian Casino and Gaming Authority (VCGA), 1997.p 69).

From another direction, 5.9% of EGM gamblers responded that they were not “satisfied with their gambling life” (VCGA, 1997, Pp 66-7).

The survey also examined a group labelled as ‘Heavy EGM Gamblers’ defined as those surveyed whom in the past week and had spent “more than 10% of their estimated personal weekly income”. It was assumed that this group would not be very different to those rated as problem gamblers in other studies. The figure for Bendigo was 1.045% of those surveyed (Victorian Casino and Gaming Authority, 1997. pp 67-8). Taking this lower figure and the above assumption that this group would spend 33% of all gaming expenditure this amounts to average spending of \$18,464 per problem gambler, which is higher than national estimates of \$12,200 (Productivity Commission, 1999, p7.40). It was again decided to take the more conservative estimate recognising the fact that gamblers’ behaviour ranges from the



responsible gambling on one end of a continuum to totally irresponsible at the other. Any line dividing out problem gamblers will be purely arbitrary and is likely to overlook other gamblers experiencing some degree of difficulty with gambling. As such, it is likely that estimates of social costs linked to problem gambling is likely to be understated.

An estimated 72.1% of all EGM gamblers in the Bendigo area earned less than \$30,000 per annum. Working on an average spend of \$12,200 for problem gamblers, and allowing annual living costs of \$23,000, that left a shortfall of \$5,200 per annum for each problem gambler.

Using the most conservative and probably understated figures above of 846 problem gamblers, the total annual shortfall amounted to \$4.4 million, which could come from unpaid loans, welfare payments from welfare agencies and theft from employers, family and friends.

It was assumed that at least those in the regional economy would meet half of this shortfall.

Consequently flow-on effects of a further \$1.2m have been added, taking the total effect to \$5.6million. The sale of assets might temporarily offset the problem but it would be expected that such behaviour would not be sustainable. Problem gamblers under counselling have estimated a 7.9% decline in work performance (Productivity Commission, 1999, p7.39).

Extracting output per worker from the model of \$102,774, the total performance loss by the estimated 846 problem gamblers was estimated at \$6.87 million taking annual negative externalities up to \$12.47 million.

In an attempt to collate the above figures, it was assumed that the annual external benefits to the region amounted to \$4.2 million. This would include the reduction of gambling outside the region (\$2.2m) in the form of import replacement, and additional business generated as a consequence of gaming activity such as accommodation, conferences and food (\$2m). It must



be stated that more work needs to be done to estimate the true extent of positive and negative externalities for this sector

On the cost side of the equation we have the following:

Regional Output Loss due to gambling inc flow-ons	\$5.30m
Negative externalities (problem gamblers)	\$5.60m
Loss of productivity due to gambling	\$6.87m
Total	\$17.77m
less external benefits of gaming inc flow-ons	\$6.2m
TOTAL NET LOSS TO REGION	\$11.57m

3. Policy Implications

In its present form, the gaming industry is having a serious and negative impact on the regional economy. Possible solutions to this problem could include a combination of:

- (a) deregulation to increase competition and reduce the price of gaming.
- (b) the prohibition of gaming,
- (c) a rewriting of the formula for the distribution of revenue, or
- (d) further regulation to reduce the extent of gaming.

(a) Possible Deregulation of the Gaming Industry



Deregulation is often put forward as a means of overcoming poor industry performance by removing barriers to entry, encouraging more players into the market and boosting competition. Consumers would then be expected to benefit from better performance through reduced profits and lower prices. The present duopoly granted to the machine owners, the fixing of the price of gambling in the form of minimum payouts of 89% on all turnover, the cap on the number of machines in the State of Victoria and the rigid rules governing the distribution of revenue make such an option, at first glance, attractive. Three factors seem to exclude the gaming industry from what could be termed “normal” or “typical” industries. The first is the apparent irrational behaviour of one sector of the market in the form of addicted gamblers. In this situation the law of diminishing marginal utility disappears where for some consumers, each successive unit of consumption for gambling leads to an undiminished level of satisfaction. Rationality in this particular case does not seem to apply. Any attempt to deregulate this industry would leave these vulnerable sectors of the market without protection as operators set out to maximise profits. The second factor to keep in mind is the propensity of this industry to fall into the hands of criminal elements that could be tempted to “cheat” in order to extract even higher profits or use gambling venues as a vehicle for money laundering. Finally, the existence of negative externalities means that without regulation, such an industry left to market forces would lead to supply beyond the point of allocative efficiency. Given the above factors, deregulation does not appear to offer a solution to the issue of problem gambling and regional imbalance and may cause further damage.

(b) Industry Prohibition



At a time of widespread deregulation, there are still some industries that face widespread prohibition. Child pornography and prostitution are two such cases. Any attempt to impose a policy of prohibition on EGMs is likely to encourage the growth of other forms of gambling such as the recent emergence of internet gambling. Policies setting out to protect a small sector from the harms of gambling addiction may or may not be widely supported. Any “addiction” of state governments to the revenue generated by gambling activities could also create a barrier to such an approach. The use of very high rates of taxation has not been sufficient, and would not appear sufficient to curb addictive behaviour, as would be the case in many examples of negative externalities. At the same time, a narrow corridor of opportunity may exist at a time when the newly introduced Goods and Services Tax and the revision of company taxes in Australia may generate considerably more revenue than expected. A federal government with the will for change may have the funds necessary to compensate state revenue in return for the reduction or elimination of EGMs in the states.

(c) Redistribution of Gaming Revenue

An attempt to redistribute some of the revenue back to its source is currently in progress in Victoria. Some of the funds collected under the banner of the Community Support Fund are presently being distributed back into the areas of origin. This could amount to 8.3% of all revenue earned in the private hotel sector that control approximately half of the state’s gaming machines. This policy could only return a maximum of \$1.34 million to the region. Even taking the flow-on effects into account, the amount is a mere drop in the bucket and would do little to redress the regional impact of EGMs which have been estimated to be just over \$11.5m given the above calculations. In order to overcome the present imbalance it



would be necessary to redirect considerably more gaming revenue back into the region. Options include an increased payout of EGMs although, given the addictive nature of problem gamblers, this option might not succeed. Another option would be to provide a larger share of revenue to local operators, either clubs, or clubs and hotels. More desirable would be the tagging of more funds generated by gaming for regional use and boosting the distributions through the Community Support Fund, provided these distributions matched the share of revenue taken out of the areas. In the interests of regional balance, lowering the share of gaming revenue distributed between the state government and the companies owning the gaming machines would best finance such an outcome.

(d) Increased Regulation

Further regulation to reduce accessibility through shorter operating hours, enforced breaks during the day and greater vigilance in the case of problem gamblers offers another possible strategy in the attempt to reduce gambling activity, particularly directed towards those showing addictive behaviour. Other strategies could be directed towards reducing amounts gambled such as smaller or fewer bets, reduced convenience when it comes to money changing, the non-acceptance of banknotes in machines, and the slowing down of the gaming process by the restriction on automatic plays. More effort could be given to the responsible serving of gaming services along the lines of those imposed on alcohol. It must be very clear to those working in the industry that certain players have a gambling problem. Unfortunately the combination of addictive behaviour and the profit motive make a dangerous mix.

4. Conclusion



The adoption of EGMs in Bendigo has had a significant negative impact on the region. This has included the net loss of output, income and jobs to the region and high levels of social costs. The conclusion is that, subject to similar findings in other regions, such a situation should not be allowed to continue and that governments must act on an industry that not only imposes its burden on lower income groups, but also on particular communities. Possible policy options would include prohibition, further regulation, or a more equitable distribution of gaming revenue.

More work will be needed in the area of costing the positive and negative externalities of gaming including the costs to society of problem gambling. It would also be useful to examine the economic impact of EGMs in other regions using methodology similar to that used in the present study.



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