

# **Measuring the Local Impact of Electronic Gaming Machines\***

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## **Abstract**

Recent growth in the utilisation of Electronic Gaming Machines (EGMs) has led to community disquiet about attendant problems of alleged loss of community standards, problem gambling and losses by retailers and other local businesses. Recent legislation provides an opportunity for local councils to object to any proposals to increase numbers of EGMs on the grounds of social and economic impact on the local community.

The Pokie Application Research Kit (PARK) is a software tool that aims to help local councils determine the local social and economic impact of the introduction of additional EGMs to venues within their boundaries. PARK evaluates the benefit of additional EGMs by tracing the way in which expenditures on EGMs feed, or do not feed, into the local economy. If expenditures do feed through to further local economic activity there is a benefit for the local economy. If the expenditures accrue to agents who repatriate them outside the local economy there is no benefit for it. In such a circumstance the expenditure is said to be 'leaked'.

The PARK model compares the situation that would arise with additional expenditures on EGMs with the status quo. In operationalising the comparison a number of crucial assumptions are required, the most important concerning 'leaked' expenditures. The analysis finds the results are very sensitive to these assumptions and the current structure of the model predisposes it to show large net losses from the introduction of additional EGMs. Alternative approaches to measuring the local economic impact of increasing the number of EGMs and the role of local economic impacts in the broader public policy debate are discussed in the paper.

## 1. Introduction

In 1991, the Victorian Parliament passed legislation to allow the introduction of Electronic Gaming Machines (EGMs), or poker machines, into licensed premises (venues) in Victoria. Since their introduction there has been a dramatic increase in the number of EGMS, in their patronage, and in the taxes flowing to the State Government from their use. There have also been increases in the reported level of social distress arising from their overuse by particular groups of people, and claims that the existing retail industry has suffered from competition from the venues. This has led to pressure on government to restrict usage in various ways. Over the last several years the original legislation concerning the availability and use of EGMs has been amended to require those proposing increases in the number in a locality to satisfy criteria to do with local social and economic well-being.

In the literature, a standard methodology for measuring the welfare impact of some class of consumer spending is to estimate the consumer surplus. To operationalise this to calculate local net benefit requires the measurement and utilisation of local elasticities. These are generally not available. In addition the consumer surplus approach implies the welfare of the local community as a whole derives from the revealed preferences of the consumers.

Recently an alternative method has been advocated which avoids the need to calculate local elasticities or to imply welfare from consumption. In this method local net benefit is calculated by tracing, categorising and enumerating expenditure and potential expenditure flows under the spending situation and under the status quo. An example of an application of the method is Doughney (2001). This alternative method has gained strong support among some local governments in Victoria and versions of it are currently being actively promoted. However there are concerns about both the logic of the method and its application. In this paper the method and its application are reviewed.

### 1.1. Background

Concern about local impacts of increased numbers of EGMs led to the introduction of amendments to the legislation concerned with the operation of EGMs. The relevant law is the *Gaming Machine Control Act 1991* (The Act) including amendments. It establishes a system for regulation, supervision and control of gaming and gaming equipment. Clause 12D of the Act states that:

‘The Authority must not grant an application for approval of premises as suitable for gaming unless satisfied that ...

(c) the net economic and social impact of approval will not be detrimental to the well being of the community of the municipal district in which the premises are located.

The Act also states in Clause 12CA:

‘Within 28 days after receiving a copy of an application for approval of premises, the relevant responsible authority may make a submission to the Authority –

(a) addressing the economic and social impact of the proposal for approval on the well-being of the community of the municipal district in which the premises are located; and

(b) taking into account the impact of the proposal on surrounding municipal districts.’

A key matter for those concerned with the legislation is the meaning of the clauses relating to economic and social impacts. A straightforward interpretation is that an economic and social impact statement would document the effects of any proposal on all the stakeholders. The statement would be expected to record the prospective size and importance of the new industry, the identity of businesses that would gain or lose as a result of the investment and the extent of such gains and losses, the effects on consumers and their families, the effects on other local householders and the implications for local government.

The need (and/or opportunity) for municipalities to form views about local economic and social effects led, in 1998, four Melbourne councils - Brimbank City Council, Greater Dandenong City Council, Maribyrnong City Council and Moreland City Council – to commission Dr James Doughney and Mr Tony Kelleher from Victoria University to examine the economic and social effects of poker machines in local government areas. Subsequently Dr Doughney and Mr Kelleher produced a report entitled, *Preliminary Local Area Gambling Research: Economic Effects* (Doughney and Kelleher, 1999). In the report, the authors provided a critique of existing studies of the economic and social effects of gambling, and proposed a ‘model of local area impact’.

Following the work of the four councils, the Victorian Local Government Association (the VLGA), the umbrella body of Victorian municipalities, commissioned further work to develop the model into a computer tool to enable the measurement of likely economic effects for any proposed local increase in the number of poker machines. This work was undertaken by Dr Doughney and colleagues and resulted in the development of the Local Area Pokie Impact Software Tool or LAPIST (Workplace Studies Centre, 2000).

Recently a 'revised' and updated version of LAPIST, now called the Pokie Application Research Kit or PARK, has been produced (Workplace Studies Centre, 2001). Most of the revisions relate to social rather than economic effects. The economic impact is estimated using the same method as in the earlier version. The PARK software is now being promoted to local government as a way in which councils can calculate local economic and social effects.

In response to the legislation and growing public concern about the effect of the growth of EGMs on local communities a number of other methodologies have been applied to calculate the economic and social effects. The Productivity Commission (1999) undertook a major study that measured the welfare effects using the concept of consumer surplus. This concept measures the welfare value of some good or service by the strength of desire for it revealed by the price the individual is willing to pay for it.<sup>1</sup> However in applying the method the Productivity Commission took particular care to consider the situation of problem gamblers who may not be regarded as benefitting in proportion to the level of their consumption. Other researchers have utilised the consumer surplus method but not necessarily taking all of the precautions of the Productivity Commission (see for instance ACIL consultants, 2001).

## 1.2. In this paper

This paper focusses on the PARK method, which is outlined in section 2. A detailed critique of the approach and its implementation follows in section 3. In section 4 alternative approaches to calculating the local social and economic effects are discussed. With respect to social impacts a more sophisticated treatment of the pokie loss severity index is suggested that overcomes an important problem of the existing index.

With respect to economic impacts, a number of alternatives are discussed. These include:

- use the PARK method but with alternative assumptions;

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<sup>1</sup> An individual buys a quantity of service (say an amount of time playing an EGM),  $q$ , for a price  $p$  but would have been prepared to pay a higher price for a lower amount of time. The level of welfare the individual receives from the actual transaction can be estimated by the total amount the individual would have been prepared to pay for all the increments of time. With a demand curve sloping down to the right this measure of welfare is the area of the triangle formed by the vertical axis the demand curve and the price line. Total expenditure on the service is the area of the rectangle formed by the price and quantity lines and the axis. This measure of welfare assumes that consumers are sovereign and rational and that the strength with which they desire a good or service represents the amount of welfare they may obtain from it. For more on consumer surplus see Ng (1983).

- modify the method and use alternative assumptions;
- employ a welfare model using the concept of consumer surplus such as that proposed by the Productivity Commission; and
- develop an alternative framework.

The final section, 5, discusses the choice set for local communities (LGAs) and the broader (and different) choice set of the state government and summarises.

## 2. The PARK method

The PARK method aims to measure the social and economic impact of changing the number of EGMs compared to the status quo. The social impact was estimated in a previous version of PARK (LAPIST) with the help of what is called a ‘pokie loss severity tool’ and social data from the Australian Bureau of Statistics (ABS). In PARK the pokie loss severity tool is discarded in favour of a much more extensive compilation of local social impacts.<sup>2</sup>

An algebraic summary of the equations used by the PARK model to measure the economic impact on the local community is outlined in Appendix B.<sup>3</sup> Using this it is a simple task to see how the model works, to see what assumptions are hard-wired and what are not, and to vary the assumptions to see their effect.

The PARK model evaluates the benefit of additional EGMs by tracing the way in which expenditures on EGMs feed, or do not feed, into the local economy. If expenditures feed through to further local economic activity there is a benefit to the local economy. If the

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<sup>2</sup> The pokie loss severity tool is derived from information about the socio-economic characteristics of the local area, and the expenditures on EGMs in the local area. The ABS gathers information about local areas down to the level of collectors district (normally between 150 and 400 households) in the five yearly census. This data may be combined to form a Socio-Economic Index For Areas SEIFA. The ABS constructs a number of such indexes, but the one most relevant to this purpose is the index of disadvantage, which combines information on income, employment, education, housing and fluency in English.

The Victorian Casino and Gaming Authority (VCGA) regularly publishes the distribution of net expenditures on EGMs by venues. Since the location of venues is known, it is possible to attach the expenditures to the local areas in which they are situated, provided it is assumed that expenditures at venues are made by local residents. The pokie loss severity index is defined as the simple ratio of the SEIFA index to the annual expenditures per head of population, with the ratio normalised to have a value between one and a hundred. While for most purposes this is sufficient, the index does assume that expenditure at a venue is made entirely by local people. A more sophisticated method that avoids this assumption is outlined in Appendix A.

<sup>3</sup> The equations have been gleaned from the software provided (Workplace Studies Centre, 2001).

expenditures accrue to agents who repatriate them outside the local economy there is no benefit to it. In such a circumstance the expenditure is said to be ‘leaked’.

### 2.1. Net benefits of new EGMs

Benefits to the local area arise when money spent in the local economy generates further economic activity. In the context of the use of EGMs, ‘money spent’, or net expenditure, is the losses (the amount staked less winnings) of people playing EGMs. The extent to which local activity is generated depends crucially on the extent to which the net expenditure is retained within the local area rather than repatriated outside the local area. If the net expenditure is repatriated outside the local area, the expenditure is leaked and provides no benefit to the local economy.<sup>4</sup>

The alternative to spending on new EGMs is to spend on other activity, in the local economy or elsewhere. As with spending on EGMs, if the alternative spending occurs outside the local area, it is a leakage, and provides no benefits to the local economy. The authors of the PARK model assume that the alternative to spending on EGMs is spending in the local retail sector.

The net benefit of the introduction of new EGMs to the local area is the difference between the benefits from spending on new EGMs and the benefits from spending on the alternative (the status quo). If, in comparison to the alternative, more of the spending on EGMs is retained locally rather than leaked to other regions, the addition of EGMs will add to economic activity in the local area. If however, less of the spending on EGMs is retained, the net benefits from spending on new EGMs will be smaller, and there will be a fall in economic activity in the local area.

Assumptions about ‘leakages’ are the key to determining the net benefit of new EGMs as calculated by the model. Some assumptions may be changed by the user but most may not; they are hard wired in the model.

### 2.2. Assumptions in the PARK method

The model entails both implicit and explicit assumptions. The implicit assumptions are:

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<sup>4</sup> For instance, all of the state government tax on EGM net expenditures (gambling losses) is regarded as a leakage in the PARK method. Since all net expenditures are taxed at a constant rate of 33.3% then the leakage from this source is 33.3%.

- all government taxes are leakages;
- all contributions to the Community Support Fund are leakages;
- all of the revenue of EGM providers<sup>5</sup> is a leakage;
- the gross operating surplus of hotel venues is a leakage;
- the appropriate counterfactual is local retail spending;
- the appropriate multiplier for EGM activity is that for cultural and recreational services; and
- the appropriate multiplier for the counterfactual spending is that for retail trade.

The explicit assumptions of the model are generally less contentious and include:

- leakages with the counterfactual spending (called escape spending) is twenty percent;
- eighty percent of spending on EGMs is diverted from other consumption;
- the assumption that there are no behavioural responses to changes induced by the introduction of more EGMs; and
- spending by locals on EGMs outside the local area is matched by spending within the local area on EGMs by people from outside the local area.

### **3. Problems with the PARK method**

There are a number of major concerns with the PARK framework. These concern the choice of counterfactual, the definition of leakages, the use of multipliers, some concerns related to general equilibrium effects and various other minor issues.

#### **3.1. The choice of the counterfactual**

Whether a particular investment is shown to be a net benefit or a net loss depends on what it is compared with. In many cases the status quo is not the best counterfactual since in the absence of the investment there would have been other changes. The appropriate perspective is how different the situation will be from what it would have been in the absence of the investment.

The method used in the PARK model incorporates an explicit counterfactual. The counterfactual is the opportunity cost to the local community in foregone activity.<sup>6</sup> However,

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<sup>5</sup> The PARK documentation refers to EGM providers as operators. This is confusing. The term operator is better used for the people who run the venues, that is the clubs and pubs. The EGM providers are Tattersalls or Tabcorp and they own the EGMs that are leased to venue operators.

<sup>6</sup> It is the spending that would have occurred in the absence of the additional EGMs. This counterfactual avoids the problem, discussed above, of not holding constant other factors. Since other factors might be expected to



in considering this counterfactual, very strong assumptions are required to identify the precise nature of the alternative spending. The model assumes a particular pattern of alternative spending (on the retail industry in general) without providing sound justification for it. In implementation, this particular choice leads to the use of various shares and multipliers that predispose the net benefits of any new proposal to be negative.

### 3.2. Arguments for discounting leakages through Government taxes and the Community Support Fund

The PARK model assumes taxes paid to government from the net expenditure of gamblers are completely leaked from the local community. This is a contentious and misleading assumption reflecting an inappropriate use of marginal analysis. It is true, that in the short term, the taxes raised from the additional EGM spending may not be returned as benefits to the local area (this is also true of taxes raised on any new expenditure). However, it is also true that, in the longer term, and over all existing and new activity, the local community can probably expect to receive, from government, benefits broadly commensurate with the amount of taxes raised from the community.<sup>7</sup>

Further, all actions in the economy are linked. If government cannot raise enough tax from one source to fund its activity, it will respond. Existing taxes will be raised, new taxes will be levied, or government services will decline. It is not sensible to assume, as does the PARK approach, that taxation of one type of activity in one jurisdiction is independent of the general revenue raising needs of government.<sup>8</sup>

Just as plausible a case could be mounted that assumes no leakage for government taxes. This is equivalent to arguing that for every dollar spent on tax, the local area will receive that level of benefit one way or another. The rate of tax on EGM expenditures is high relative to some

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affect both the scenarios with additional EGMs and without additional EGMs they can be considered to cancel each other out and can be ignored in the analysis.

<sup>7</sup> Nevertheless it may be true that some communities pay more than their fair share of aggregate tax. It may also be true that some types of expenditure and activity raise more revenue for government than others.

<sup>8</sup> It is also not sensible to consider only the activity of the state government. Taxes in all jurisdictions are fungible both within and between jurisdictions. First through state-federal agreements taxes raised in one jurisdiction are spent in another. Second even without such arrangements there would still be a linkage since the provision of benefits by one level of government relieves other levels of the need to provide these benefits. It is rarely sensible to isolate jurisdictions. Government spending in all jurisdictions, amounts to about 30 percent of GDP and all of this is spent on *some* local community.

forms of expenditure and activity taxes (eg 33% compared to 10% for the GST), but low compared to other forms of expenditure (eg tax on alcohol, tobacco and on petrol which range around 50 to 60%). Given that it is not clear what the counterfactual spending is, it would be sensible to adopt a range of values.<sup>9</sup>

### 3.3. Argument for discounting leakages to EGM providers

The PARK method assumes that revenue to EGM providers (Tattersalls or Tabcorp) is completely leaked. The leakages to EGM providers will provide revenue for wages and salaries of persons employed by the providers, for the manufacturers of EGM equipment and for profits for EGM provider shareholders. The location of the workers and owners are unknown, but are likely to be spread throughout the Victorian and Australian population in much the same way as business in general.

It may be true that more shareholders (owners) will be concentrated in higher income areas, however so too may be the owners of the alternative activity or item of spending (ie retailers).<sup>10</sup> The implicit assumption in PARK is that owners of EGM providing facilities are all non-local, while owners of retail activity are all local. This is an extreme assumption; there is no evidence for it and it cannot be true over all local communities (since owners must live somewhere too).

In the absence of knowledge about the particular regional distribution of shareholders and workers of EGM provider companies and of the owners of alternative activity (to spending on EGMs), it appears sensible to assume a distribution similar to that of business in general for both.

### 3.4. Assumption regarding gross operating surplus of hotels as leakage

The model assumes that the gross operating surplus of hotels is a 100 percent leakage. As before, this is a very strong assumption. It is tantamount to saying that no owners of hotels

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<sup>9</sup> That is not to say that some communities may not spend in ways different from others thus attracting different levels of tax, but proper evaluation of this matter requires detailed knowledge of the pattern of local spending and the associated pattern of taxation. There is no data on either of these.

<sup>10</sup> The ownership of corporations is much more widely based than is commonly believed. It is an outcome of the growth of both universal superannuation (through the Superannuation Guarantee) and continued development of occupational super and managed funds. These funds operate broad portfolios of shares on behalf of a very wide distribution of clients with a diverse locational base.

are local and/or there are no local shareholders in companies owning local hotels. The arguments here are the same as for the leakages to EGM providers.

It is not enough to argue that some hotels are owned by people who are not locals. The issue is the extent of local ownership of hotels relative to the extent of local ownership of the alternatives to spending on EGMs. To claim any part as a leakage, it would be necessary to show, not that ownership of hotels was less in the local area than elsewhere, but that the share of ownership of hotels was less than the share of ownership of the alternatives on which diverted EGM expenditures would be spent. No evidence is supplied to indicate that this is the case. In the absence of data, the most likely situation is that local ownership of hotels is much the same as local ownership of other retail activity.

### 3.5. The use of multipliers

The PARK method accounts for second and later round economic effects through the application of multipliers. Unfortunately they also provide the opportunity to magnify mistakes. The multiplier is a useful economic tool in some circumstances, but generally it is poorly understood and the data on which it depends on is usually very aggregated and unreliable. Some explanation of the multiplier is useful.

Income analysis shows that an increase in investment will increase national income by a multiplied amount. This amplified effect of investment on income is called the investment multiplier principle. The 'multiplier' is the number that the change in spending (or investment) is multiplied by to produce the increase in income.

Consider, for instance, an investment in a new factory. This will provide new jobs, an increased income for workers engaged in its construction, an increased income for merchants supplying the builder, and so on. Consequently money initially spent on the factory has set off a chain reaction, as money is spent and then re-spent and so on.

The regional multiplier is an analogous idea that may be obtained from regional economic analysis. Regional economic analysis stresses the inter-relationships of sectors within the economy of a specific region. Because such relationships exist, impulses originating in one sector will spread, directly or indirectly, to other sectors. This represents the multiplier effect. The calculation of multipliers for each sector enables researchers to establish the effect of a change in one sector on all other sectors (For instance a typical multiplier for the value added

by a particular industry is 2 meaning that a dollars worth of initial impact will generate two dollars worth of total extra activity).<sup>11</sup>

Using multipliers and interpreting the subsequent results requires care. To measure the performance of an industry it is reasonable to compare the 'multiplied up' level of activity with activity in other industries that also have been 'multiplied up'. Differences then reflect the variation in the number and value of steps in production in the region. In general the greater the number and value of regional steps the greater will be the multiplier. It is not sensible to compare the multiplied up value with any figure such as aggregate activity, or activity in another industry, that has not also been multiplied up in a comparable way. Nevertheless the multiplier is useful for indicating the total *eventual* increase in activity of the regional economy as a result of an expansion in a particular industry.

However, there are other caveats. Multipliers are often used in impact analysis to estimate the amount of extra activity likely to be generated by an extra dollar of output in a particular industry. Three assumptions are implicit in this situation. These are that the demand for the extra output is wholly exogenous, that there are no supply constraints, and that the technological coefficients that describe the input requirements of each industry are fixed. These assumptions may be reasonable for the addition of small amounts of extra demand, but may *not* be reasonable for large amounts of extra demand.

The assumptions are not valid because each increment of demand will change the price structure and therefore have repercussions for supply; and ultimately the technological coefficients will also change. At the margin these changes will be small and may be neglected (as in impact analysis), but where all increments of demand are considered together they will be large and profoundly alter the technological coefficients (as when the multipliers are applied to large increments of demand).

The assumptions about multipliers are also more likely to be valid in the short term when investment and supply is fixed than in the longer term when dynamic effects can have large influences on demand and on technical relationships.

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<sup>11</sup> A much more detailed definition and discussion of multipliers is provided by ABS (1994).

### 3.6. Use of multipliers in the PARK model

The discussion above indicates that multipliers may be helpful when comparing activity generated by different sorts of investment. Because the method used in the PARK model incorporates considering spending on EGMs and the counterfactual (alternative retail spending), and multipliers are used on both the analysis is a valid comparison; like is compared with like.

However, the choice of the particular multipliers in the PARK model needs consideration. Consider the multipliers used for the consumption effects. The multiplier of 0.921 is chosen for new spending on EGMs. This is the multiplier for consumption-induced effects for the industry, 'cultural and recreational services'. In the counterfactual the foregone consumption induced effects are encapsulated by use of the multiplier for Retail trade of 1.274. This choice of multipliers will reduce the benefits of EGM spending relative to the alternative.

There are major problems with the choice of these multipliers. First the multipliers are derived from ABS input-output tables in which gaming forms one small part of a very aggregated industry.<sup>12</sup> It is not even clear that much of the gaming activity of concern is located in the industry chosen, the 'cultural and recreational services' industry. Much of it might better be allocated to the industry 'accommodation, cafes and restaurants', which includes club and pub activity (and has a higher induced consumption multiplier of 1.05).

Second, the assumption is made that the appropriate substitute for gaming activity is retail activity. Retail activity is just one of a number of other possible ways in which money diverted from gaming may be spent. Closer substitutes may well be other cultural and recreational services –which would have the same multiplier as that attributed to gaming activity, or for accommodation, cafes and restaurants.

In summary, the choice of the particular multipliers reduces the apparent benefit of spending on new EGMs relative to the counterfactual but the grounds for the selection of the particular value are arbitrary. If the multipliers selected in the PARK model are exaggerated then the model will exaggerate the negative impacts on a local community of an increase in EGMs.

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<sup>12</sup> According to the ABS table of product details (ABS, 1996) the four components of gambling industries; lottery operation, casinos operation, gambling services nec and totalisator agency services had Australian production of \$3083 mill in 1994-5, just 19 percent of total Australian production of \$15830.9 million for the aggregate industry Cultural and recreational services.

The use of multipliers in the context of the PARK model has not improved the analysis. Rather, their use distracts readers from understanding the true nature of the assumptions embodied in the analysis.

### 3.7. General equilibrium issues

The strategy underlying the PARK model is that the introduction of more EGMs, if found to be detrimental to the local economy, is grounds for limiting their introduction. There is an abiding conceptual issue that brings into question this strategy. The definition of detrimental to the local economy is that lower local economic activity would be generated by EGMs than by existing alternative consumption activity and that this would lead to a net loss of local activity. Local activity is defined according to the location of the beneficiaries of the activity. If the main beneficiaries are the owners of the EGMs and they live outside the local area whereas the main losers are other retail operators who live within the local area, then a net loss to the local community is said to have taken place.

It is likely that owners of retail and recreational activity, indeed any activity, will be congregated in more affluent areas. However there is no feature of EGM activity that suggests that ownership is more or less geographically concentrated than other forms of retail or recreational activity (though this could be the subject of further research). Nevertheless even were it true, there is no guarantee that constraining activity that was not locally concentrated would lead to a net increase in local ownership of activity. This is because potential owners from affluent areas, if constrained in the development of gaming activities, will pursue the next best alternative. Entrepreneurial activity diverted from gaming will emerge in other alternatives. Many of these alternatives will be based in the same local areas as would have been the gaming machines. The longer term general equilibrium effect may be no change in the local ownership of activity.

### 3.8. Other issues

A number of other matters have received some discussion by the authors of the PARK method or by others. These include the issue of saving, of escape spending and of gambling out and gambling in.

*Saving*

The Doughney and Kelleher report makes much of debunking the argument made by NIEIR (1997, 2000) that new gambling expenditure is at the expense of household savings. They reiterate the point that savings is simply future consumption and, in a steady state, the best approach is to treat spending on EGMs as an alternative to other retail spending. This point is not novel and has been made by others (eg DHSA, MIAESR and NIEIR, 1997, p166). The discussion of saving is correct but not particularly germane to the calculation of net benefit to local areas.

*Escape spending*

The analysis incorporates leakages in the counterfactual circumstance in the form of what is called 'escape spending'. The process of considering the counterfactual leakage is appropriate but the selection of the value chosen is not. The recommended share is 20 percent. Little justification is provided for this choice. It provides a stark contrast with the leakage assumed for EGM spending in hotels (74 percent) and in clubs (67 percent). The main difference lies in the high level of taxation implicit in spending on EGMs and the zero level of taxation assumed for the counterfactual.

*Gambling out and gambling in*

In the absence of better data the PARK model assumes that the expenditure by locals on gambling outside their local area is balanced by the expenditure of non-locals within venues in their local area (gambling in). Consequently the effects on the local economy will be unchanged. In reality it is likely that in some local areas, gambling out will be larger than gambling in and in others the opposite. The obvious situation where gambling in will dominate is case is the City of Melbourne where the huge drawing power of the Casino is likely to attract more than its fair share of EGM gamblers. In the absence of detailed knowledge about the way gamblers travel to play EGMs, for most municipalities, the assumption of approximate balance is probably appropriate.

**4. Alternative methods**

The application of the PARK model suggested in Doughney (2001) appears to potentially have major deficiencies. It is helpful to consider alternative ways of measuring local economic impact. Several options are considered:

- use the existing PARK model but with alternative assumptions;
- use the PARK framework but modify various parameters and adopt alternative assumptions;
- develop a method around the consumer surplus approach; and
- take a composite approach drawing on consumer surplus methods as well as the framework used in PARK.

#### 4.1. PARK with alternative assumptions

The PARK model provides a framework for considering local economic effects. The model might be employed with other assumptions. For instance in an alternative use of the model a researcher could:

- not regard taxes paid to government as a leakage;
- not regard Community Support Fund payments as a leakage;
- not regard gross operating surplus as a leakage;
- choose more realistic values for consumption multipliers;
- choose more realistic values for the decomposition of pub, club and retail earnings into gross operating surplus, wages and intermediate goods; and.
- investigate the sensitivity of the model to different choices of escape spending.

The default treatment of all of these assumptions, most of which are hard-wired, leads to biases that ensure net losses from the introduction of EGMs. Relaxing these defaults will lead to much different results. NIEIR (2000) provide an accessible discussion of the Doughney and Kelleher methodology, and outline generally sensible choices for the above assumptions and recalculate the outcomes.

#### 4.2. Modify the PARK model

Given the highly aggregated nature of the multipliers and the subjectivity involved in their choice, the multiplier component appears to add nothing to the analysis and could well be dispensed with altogether.

Nevertheless it may be that more extensive research will produce better data to enable the modification of the model and the use of assumptions that are better justified. For instance it may well be the case that taxes are extracted and spent in different ways in local communities. It may be possible to associate household demographic and other characteristics with benefits of government spending.<sup>13</sup> A justification for assuming a

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<sup>13</sup> A number of studies have already developed ways of doing this, see for instance Johnson et al (1996), Schofield (2000) and so on.



particular pattern of revenue raising and spending requires careful research and may lead to more realistic assumptions than is used in the currently available form of the model.

Similarly it may be possible to establish the extent of local ownership of venues, of providers of EGMs and of the alternative sources of spending. NIEIR (2000) have made some useful suggestions for the estimation of local ownership of businesses.

#### 4.3. Consumer surplus approach

ACIL Consulting has suggested an alternative approach in which benefits to localities are derived from estimates of consumer and producer surplus. The estimates rely on a welfare analysis conducted by the Productivity Commission (the PC), 1999.

The welfare approach is appealing for several reasons but also has some important drawbacks. On the positive side it is well grounded in economic theory. The measure of consumer and producer surplus is well understood and the method is transparent. However a consequence of applying the PC's analysis to particular local areas, is that (lacking data) the same relationships are assumed for all localities. The only data specific to a particular municipality or locality in the ACIL analysis is the value of gaming expenditure in the locality. The assumption of common elasticities would seem implausible. NIEIR (2000) also discuss the consumer welfare approach employed by the PC and reject it.<sup>14</sup>

The welfare surplus approach considers only the response and potential responses of consumers. Implicitly, welfare is encapsulated only by gamblers preferences whereas the legislation is concerned with the local community as a whole. It does not seem that the measure of welfare surplus, on its own, goes to the heart of what is required in an impact statement. The PC appropriately used the method to identify the welfare benefits to

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<sup>14</sup> A potentially important problem with the consumer welfare approach is as follows. The elasticities are obtained from representative samples of the population. Included in the sample are some proportion of 'problem gamblers'. These are people deemed to have an addiction and for whom it is believed, the level of consumption of gambling is not a reasonable indicator of their welfare. Such people, since they are addicted, are likely to have very inelastic demand. However the reference to such people as problem gamblers is tacit recognition that their revealed preferences are not good representations of their welfare. It would therefore be important to discount their revealed preferences in some way. When the measure of demand for gambling is discounted for the preferences of such people, the consumer surplus is much reduced. In operationalising the consumer surplus methodology the PC effectively apportioned to problem gamblers the welfare preferences of non-problem gamblers and therefore estimated a much lower consumer surplus.

consumers. However the PC went on to estimate at least some of the broader costs of EGMs by estimating the externalities associated with problem gambling.

#### 4.4. Composite approaches

While it is not the place of this review to propose an alternative model it is appropriate to make some comments about what could be done to further knowledge of local economic effects of gaming.

The ACIL Consultants report makes the point that consumers reveal their preference for using EGMs and that the PARK model does not measure these benefits. It is certainly true that the benefit-cost framework employed in the PARK model focusses on the effect of the spending of gamblers elsewhere in the economy. In contrast the ACIL Consultants report focuses on the revealed preferences of consumers and ignores effects elsewhere in the economy. Essentially this is the view that the sovereignty of consumers is paramount and determines the total welfare experience of the community. However the clear intent of the legislation is to encompass matters outside the immediate experience of individual gamblers. Indeed some might argue that the welfare of gamblers is given. It is probably safer to take the view that since gamblers are part of the community in which they live, their experience is also part of the overall economic impact.

Both viewpoints have their merits and a thorough economic impact statement would acknowledge both. Unfortunately they derive from different economic paradigms and it is not clear how they may be reconciled. Ideally a model is needed that is comprehensive including all viewpoints but is also transparent so the trade-offs between revealed benefits for gamblers and (perhaps) social and economic losses for others. NIEIR (2000) present a method for calculating local economic impacts, which eschews the estimating of consumer surplus but adopts alternative assumptions about leakages.

Neither the Doughney and Kelleher (2000) or the ACIL Consultant studies treat the issue of externalities in detail. These are economic effects of activity that is imposed on those not party to the production or consumption of the activity. There may be both positive and negative externalities (some of these are discussed in DHSA, MIAESR and NIEIR, 1997). In particular the social distress arising from problem gambling is an externality. The PC (1999, xxxviii) has attempted to make some estimate of the economic costs of these externalities. They estimate problem gambling to cost between 1.1 and 5.4 billion in Australia (in the same

report the consumer surplus of EGMs is estimated to be between 5.4 and 6.3 billion for Australia).<sup>15</sup> The very large range indicates the level of error implicit in the calculations. NIEIR (2000) contest the estimation of the cost of problem gambling and outline alternative estimates.

There is another pervading issue with these calculations. In general estimates of benefit and gain are based on the total existing experience and, in effect, estimate the average situation. However the addition of more EGMs is incremental and what is really required is the marginal cost or benefit of an extra machine.

## **5. Discussion and concluding comments**

This paper has highlighted two major issues concerning the evaluation of local social and economic benefits. The first concerns the role of local evaluations and their place in the estimation of public policy. Given that such a role is valid, the second concerns the way in which the role is implemented.

### **5.1. Choice set for local government**

The choice of assumptions facing those representing local communities, generally taken to be local government, may well be different from those of other jurisdictions. The legislation refers to the economic and social wellbeing of the community and to the role of the ‘relevant responsible authority’ in making submission to the regulatory authority. One plausible interpretation of the ‘community’ is of the local residents and the relevant responsible authority is the local government that represents them. It follows that local government acting for their constituency which might be existing residents, need not consider the welfare of other (neighbouring) constituencies, nor of the larger society.

It is unlikely that individual taxes or taxation as a whole will fall evenly across local government jurisdictions; indeed some taxes are designed not to. Hence there will always be an incentive for self-interested representatives of local constituencies to undertake actions to minimise the impost on their residents. The best strategy for particular local governments will vary according to the characteristics of its residents. The legislation provides local

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<sup>15</sup> The ACIL Consultants report quotes a figure of 1.2 billion for Victoria. Since the Victorian population is around 25% of the Australian population, this is consistent with the PC figure, assuming Victorians gamble at much the same rate as Australians.

government with a medium to attempt to minimise its tax burden in a way that is generally unavailable.<sup>16</sup> Of course the actions of particular local governments may induce rival actions by other jurisdictions and mitigate any benefit.

The choice set facing state government is quite different. It has a responsibility to all Victorians. Any shortfall in tax revenue from one area must be made up with increased revenues from others or provision of services must fall. In using a model like PARK a state government would have a responsibility to estimate not the effect on particular local governments but on all local governments. In setting assumptions, there would need to be aggregation conditions that estimate the economy wide effects. In particular a state government might wish to make any estimation revenue neutral across all jurisdictions so that a gain in any particular constituency is matched by falls elsewhere.

## 5.2. The use of the PARK model

The PARK model is a facility for estimating the local economic effects of the introduction of additional EGMs. The model compares the economic activity generated by the new machines with that which would have been generated in the absence of the machines. This is a reasonable approach for estimating economic effect, however many of the social problems emanating from EGMs may be quantified in an economic way and could have been included in the analysis.

The greatest problem with the model is with the way in which it is used. The model is not well explained and many crucial assumptions are disguised. Others are made with little or no empirical support and few have adequate theoretical justification. The assumptions are important. Different but plausible choices, produce radically different results.

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<sup>16</sup> Although in principle the aim by municipalities to limit poker machines is no different from that implicit in particular local areas where for instance, the sale and/or consumption of alcohol is severely limited, or where municipalities impose controls on the sex industry.

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### **Appendix A: A more sophisticated gambling distress index**

A major problem with the ‘pokie severity distress index’ used in LAPIST (but not in PARK) is that it is necessary to attribute all of the expenditures of gamblers to the residents of the area in which the venue is located. In situations like Crown Casino this is clearly a false assumption since the very large expenditures at that establishment would be attributed to the relatively small resident population of the City area. Suburban venues are likely to attract a much higher proportion of local residents, however there are some areas with few venues and others with many. Many gamblers may travel outside their local area to play EGMs.

The problem of not knowing the travel pattern of gamblers can be avoided by developing an index of distress related to the characteristics of the local population. A two-step procedure is envisaged.

In the first step the vulnerability to distress from gambling is estimated over the entire Victorian population using data from the national household expenditure survey. The measure of vulnerability might be the proportion of income spent on gambling. While the HES is known to underestimate spending on gambling by a very large amount, this poses no problem for the method. The aim is not predict the size of gambling losses, but rather to draw an association between gambling and socio-economic characteristics. Such an association might be:

$$V = F(\mathbf{X})$$

Where  $V$  is Vulnerability,  $\mathbf{X}$  is a vector of socio-demographic characteristics such as age, household structure, income, education, gender, religion, etc, and  $F$  is the functional form.

The second step is to use the vulnerability equation to define a measure of potential distress for a local community using local area socio-demographic data from the Census and access to EGMs from VCGA data:

$$D_i = G(V_i, A_i)$$

Where  $D_i$  is an Index of potential distress for area  $i$  and  $A$  is a measure of access to EGMs,  $G$  is a function.  $A_i$  could be measured by the number of EGMs per resident population.

## Appendix B. An algebraic representation of the PARK model

The comparison of the benefits to the local economy with additional EGMs to the benefits that would arise in the absence of the additional EGMs can be depicted as a benefit-cost analysis. Here the costs are the net benefits in the counterfactual situation. The net benefit is therefore denoted by the following benefit-cost relationship:

$$Netbenefit = \sum_{k=1}^K B_k - \sum_{l=1}^L C_l \quad (1.1)$$

where  $B_k$  is the value of benefit  $k$  and there are  $K$  types of benefit; similarly  $C_l$  represents cost  $l$  of the set of costs  $L$ . The benefits used in the PARK model are:

- Expenditures in hotels less leakages and including induced production and consumption multiplier effects; and
- Expenditures in clubs (gambling losses) less leakages including induced production and consumption multiplier effects.

After apportionment of leakages and accreditation of multiplier affects, the benefits are known respectively as the resident share of local value added from expenditures in hotels and in clubs.

The costs in the PARK model and in equation 1.1 are expenditures in the local area foregone less ‘escape spending and leakages. These expenditures foregone are assumed to be spent on local retail activity. Escape spending is that proportion of expenditures foregone that would have been spent outside the area. After apportionment of leakages and accreditation of multiplier affects, the costs are known respectively as the resident share of local value added from expenditures in alternative retail activity.

A series of identities show how these components of the benefit cost identity are calculated.

### *Benefits to local area*

The benefit to the local area is the resident share of local value added. This is calculated by starting with punter expenditures in clubs and pubs, deducting amounts deemed to be leakages to the local area and applying a multiplier to estimate consumption benefits from second round effects to the remainder. Leakages comprise spending that is assumed to be lost to the local area and for which no benefits are received in the local area. They are:

- Government taxes;



- Payments to the Community Support Fund;
- Revenue for providers of EGMs (Tattersalls and Tabcorp); and
- The gross operating surplus of owners of hotels.

Total EGM spending is the net loss of punters (amount staked less winnings) and (presumably) is estimated from data about the losses in particular locations from VCGA data. The first step is to divide losses between clubs and pubs. The PARK model documentation states that based on statewide averages 60 percent of losses will occur in pubs and 40 percent in clubs. The actual share appears to vary between areas and may be extracted from VCGA data.

### *Benefits from spending in pubs*

Benefits are given by:

$$B_p = E_p - L_{tax,p} - L_{csf,p} - L_{EGM,p} \quad (1.2)$$

where  $B_p$  is the potential benefit of expenditure in pubs which remains after leakages have been deducted. It is equal to total losses by punters in pubs,  $E_p$  less revenue to government in the form of tax,  $L_{tax,p}$ , community support fund contributions,  $L_{csf,p}$ , and revenue to the EGM providers (Tattersalls or Tabcorp),  $L_{EGM,p}$ . These leakages are distributed according to formulae in the legislation.

$$L_{tax,p} = E_p \cdot 0.333, \quad L_{csf,p} = E_p \cdot 0.08, \quad \text{and} \quad L_{EGM,p} = E_p \cdot 0.333 \quad (1.3)$$

Potential benefits from expenditure in pubs is further decomposed into

- gross operating surplus to proprietors,
- wages and salaries of staff working in hotels, and
- material inputs to hotels.

However the operation of the hotels induce spending on material inputs some of which are locally sourced and which provide local benefits. The share of local content of the material inputs to hotels, and the share of these inputs to local value added are estimated and the product of the two shares and the amount of material inputs provides an estimate of the net benefit of this component of the punter losses in hotels. This is added to the gross operating surplus of hotel proprietors and the wages and salaries paid to hotel staff to estimate the total initial value added of punter losses in hotels,  $V_p$ . Hence,

$$\begin{aligned} B_p &= L_{GOS,p} + W_p + M_p, \text{ and} \\ V_p &= L_{GOS,p} + W_p + M_p \cdot s_l \cdot s_v \end{aligned} \quad (1.4)$$

where,  $L_{GOS,p}$  is the gross operating surplus of pubs,  $W_p$  are the wages of those working in pubs,  $M_p$  are material inputs to the pubs production function,  $s_l$  is the local share of material inputs and  $s_v$  is the share of local value added in the material inputs.

Note that the shares of gross operating surplus, wages and salaries and material inputs for pubs and clubs can be defined from information in the ABS input-output tables. These shares are denoted by  $s_{GOS}$ ,  $s_w$  and  $s_m$  respectively and therefore,

$$L_{GOS,p} = B_p \cdot s_{GOS}, \quad W_p = B_p \cdot s_w, \quad \text{and} \quad M_p = B_p \cdot s_m \quad (1.5)$$

Local value added induces consumption benefits,  $C_p$ , which are calculated next. These are estimated by multiplying the total initial local value added by a consumption multiplier,  $s_c$ , to estimate the value added of the induced consumption arising from the second round effects of spending of wages and that component of material inputs to pubs sourced locally.

$$C_p = V_p \cdot s_c \cdot s_l \quad (1.6)$$

The gross operating surplus of the hotel is regarded as a leakage providing no benefit to local people and needs to be deducted. Total local value added is then the sum of the initial and second round effects less the gross operating surplus of pubs.

$$T_p = V_p + C_p - L_{GOS,p} \quad (1.7)$$

The resident share of local value added is the product of the total local value added and the share assumed to accrue to locals.

$$R_p = T_p \cdot s_l \quad (1.8)$$

### *Benefits in clubs*

Similarly the expenditures in clubs and the associated leakages of government tax, and revenue to the EGM providers can be identified (note that clubs do not have to make community support fund contributions):

$$B_c = E_c - L_{tax,c} - L_{EGM,c} \quad (1.9)$$

where the terms are as before with c subscripts to denote they refer to losses in clubs. These leakages are distributed according to formulae in the legislation.

$$L_{tax,c} = E_c \cdot 0.333, \text{ and } L_{EGM,c} = E_c \cdot 0.333 \quad (1.10)$$

Punter losses in clubs are decomposed:

$$\begin{aligned} B_c &= L_{GOS,c} + W_c + M_c, \text{ and} \\ V_c &= L_{GOS,c} + W_c + M_c \cdot s_l \cdot s_v \end{aligned} \quad (1.11)$$

As before the shares of gross operating surplus, wages and salaries and material inputs for clubs can be identified from information in the ABS input-output tables. Since the data are too aggregated to distinguish pubs from clubs, the same shares are used as for pubs.

$$L_{GOS,c} = B_c \cdot s_{GOS}, \quad W_c = B_c \cdot s_w, \quad \text{and } M_c = B_c \cdot s_m \quad (1.12)$$

As with pubs, consumption induced effects of local value added,  $C_c$ , are then calculated. The value added of the punter losses is then multiplied by a consumption multiplier to estimate the value added of the induced consumption arising from the second round effects of spending of wages and that component of material inputs to clubs sourced locally.

$$C_c = V_c \cdot s_c \cdot s_l \quad (1.13)$$

Total local value added is then the sum of the initial and second round effects, but, unlike with pubs, it is assumed that there are local benefits from punter losses that add to the gross operating surplus of clubs. These are not deducted.

$$T_c = V_c + C_c \quad (1.14)$$

The resident share of local value added is the product of the total local value added and the share assumed to accrue to locals.

$$R_c = T_c \cdot s_l \quad (1.15)$$

### *Costs to local area*

The costs of the introduction of EGMs is the activity foregone less the leakages which would have resulted in punter losses being removed from the local economy. Potential spending in the area is the sum of the punter losses in clubs and pubs. Some part of this spending would have come from savings, say  $s_s$ . Of the remainder available for consumption, it is estimated that a proportion of this spending, ‘escape spending’,  $s_e$ , would have been spent outside the

local area. The remaining expenditure,  $B_a$  is available for the benefit of the local economy. Thus

$$B_a = (E_p + E_c) \cdot (1 - s_s - s_e \cdot (1 - s_s)) \quad (1.16)$$

As with the pubs and clubs this spending can be divided between the gross operating surplus of the alternative organisations (lets call them retailers), the wages of those employed by the retailers and the material inputs to the activities run by the retailers. Using an 'a' subscript to denote the alternative to spending on EGMs in pubs and clubs, we decompose  $B_a$  and define the value added in the same manner as for pubs and clubs.

$$\begin{aligned} B_a &= L_{GOS,a} + W_a + M_a, \text{ and} \\ V_a &= L_{GOS,a} + W_a + M_a \cdot s_l \cdot s_v \end{aligned} \quad (1.17)$$

The shares of gross operating surplus, wages and salaries and material inputs for retailers are determined from information in the ABS input-output tables. These shares are denoted by  $s_{GOS,a}$ ,  $s_{w,a}$  and  $s_{m,a}$  respectively and therefore

$$L_{GOS,a} = B_a \cdot s_{GOS,a}, \quad W_a = B_a \cdot s_{w,a}, \quad \text{and} \quad M_a = B_a \cdot s_{m,a} \quad (1.18)$$

As with pubs and clubs, consumption induced effects of local value added,  $C_a$ , are then calculated. The value added of the punter losses is then multiplied by a consumption multiplier for retailers,  $s_{c,a}$  to estimate the value added of the induced consumption arising from the second round effects of spending of wages and that component of material inputs to retailers sourced locally.

$$C_a = V_a \cdot s_{c,a} \cdot s_l \quad (1.19)$$

Total local value added is then the sum of the initial and second round effects, but, unlike with pubs, it is assumed that there are local benefits from punter losses which add to the gross operating surplus of clubs and these are not deducted.

$$T_a = V_a + C_a \quad (1.20)$$

The resident share of local value added is the product of the total local value added and the share assumed to accrue to locals.

$$R_a = T_a \cdot s_l \quad (1.21)$$

*Net benefit*

All of the equations above are drawn together and intermediate terms substituted out to arrive at an expression for net revenue that is a function of EGM punter losses and all of the share terms. First the benefits are the resident share of local value added for hotels and clubs are given by:

$$\begin{aligned} R_p &= E_p \cdot 0.254 \cdot ((s_{GOS} + s_w + s_m \cdot s_v \cdot s_l) \cdot (1 + s_c \cdot s_l) - s_{GOS}) \cdot s_l, \text{ and} \\ R_c &= E_c \cdot 0.333 \cdot (s_{GOS} + s_w + s_m \cdot s_v \cdot s_l) \cdot (1 + s_c \cdot s_l) \cdot s_l \end{aligned} \quad (1.22)$$

Similarly the cost terms (or spending in the counterfactual situation) are gathered, substituting out intermediate terms to express the costs as a function of expenditure in clubs and hotels and shares.

$$R_a = (E_p + E_c) \cdot (1 - s_s - s_e \cdot (1 - s_s)) \cdot (s_{GOS,a} + s_{w,a} + s_{m,a} \cdot s_v \cdot s_l) \cdot (1 + s_{c,a} \cdot s_l) \cdot s_l \quad (1.23)$$

The net benefit is simply the difference between the revenue and the costs, hence:

$$Netbenefit = R_p + R_c - R_a. \quad (1.24)$$



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