

6. Assessment of Gaming Statistics: Phase Two

In this section we seek to formally test through econometric analysis, the effects that government policies, and particularly the regional caps, may have had on gaming activity. The preceding discussion (Sections 4 and 5) raised a number of hypotheses regarding the behaviour of gamblers, gaming venues and gaming operators following the introduction of the cap. Specifically we test whether the regional caps reduced gaming machine expenditure in the capped regions by comparing the evolution of expenditure at venues in the capped regions with venues in matched comparison regions.

The results provide evidence that in some regions gaming machine expenditure may have fallen due to the regional caps, but in other regions there is no evidence that the regional caps had any effect. We find no evidence that falls in expenditure in specific venues in the cap regions were more significant than for those venues that did not lose machines.

We also test whether the regional caps had an effect on gaming machine expenditure at venues just outside of the capped regions by diverting gamers to these venues. We find no evidence to support this hypothesis.

We find evidence that two other policies, the banning of smoking in gaming areas and the reduction in gaming hours from 24 hours a day to a maximum of 20 hours a day reduced gaming expenditure in all regions we studied.

6.1 Review of Venue Level Gaming Data

In the following, we describe some features of the data we analysed and the construction of key variables used in the econometric analysis.

Gaming data were obtained for each venue in the capped and comparison regions for each month between November 1999 and July 2004. These data include the number of devices recorded at the end of each month, the total gaming expenditure at that venue (player loss), indicators of whether the venue is a hotel or club and whether the venue's machines are operated through Tattersall's or Tabcorp. In addition, data were obtained for a selection of venues bordering the three capped metropolitan regions to try and identify whether the regional caps caused gaming expenditure to flow out to neighbouring areas. Those venues which were closed prior to the implementation of the regional caps are excluded from the dataset. In total we used 10,655 monthly venue observations on 188 different venues. Key summary statistics are presented in Table 6.1.

Table 6.1
Key Summary Statistics

	Obs.	Number of Venues	Average EGMs per Venue	Average Player Loss per EGM	Number of Hotels and Clubs
Maribyrnong Plus	1,286	23	56	5,885	10
Hobsons Bay Minus	513	9	58	6,075	2
Maribyrnong Leakage	456	8	64	8,154	3
Greater Dandenong Plus	1,196	21	78	7,822	10
Monash Minus	741	13	71	7,885	8
Greater Dandenong Leakage	435	8	51	8,828	6
Darebin Plus	1,368	24	64	7,235	15
Moreland Minus	627	11	50	6,490	5
Darebin Leakage	285	5	57	7,231	3
Bass Coast	456	8	31	4,934	2
Greater Geelong	1,539	27	52	6,098	12
La Trobe	841	15	42	5,377	4
Ballarat	912	16	42	5,586	6
Total	10,655	188	56	6,637	86

Source: SACES from OGR data.

The purpose of our analysis was to look at the effect that the regional caps had on gaming expenditure within Victoria. Our timeframe permits an assessment of trends in gaming expenditure within the selected regions both before and after the introduction of the regional caps in April 2001 and the successive removal of machines on 14 February of 2002, 2003 and 2004. These dates naturally split the analysis into four phases: the phase prior to any required reduction in machine numbers; and three subsequent periods following each required reduction, which we refer to as Year 1, Year 2 and Year 3.

In addition we were able to assess the effects of two other Victorian policies:

- the reduction in gaming hours at some venues from 24 hours per day to a maximum of 20 hours per day; and
- the imposition of smoking bans in gaming areas.

Twenty-four hour gaming was progressively removed from venues outside of the Melbourne Statistical Division beginning in May 2000 as venues renewed their five-year liquor licences. All venues in our data set that had their hours reduced were affected by August 2003. Smoking was banned from all gaming areas in Victorian hotels and clubs from 1 September 2002 and, as discussed earlier, this appears to correspond to a sharp decline in State gaming expenditure.

In all but one of the capped regions — Darebin Plus — the Victorian Government required that the number of machines be reduced. The response to these requirements varied across the capped regions. Most machines were removed from the Maribyrnong Plus and Bass Coast regions only immediately prior to each of the prescribed dates. By contrast, the number of machines in the Greater Dandenong Plus and La Trobe regions fell well ahead of the Government's requirements. In the latter region, the number of

machines fell sharply soon after the implementation of the cap due to the permanent closure of one venue and the temporary closure of another. In Darebin Plus there was no requirement to reduce machine numbers and the number of machines has remained fairly steady since the announcement of the cap, albeit well below the designated cap.

Essential to the analysis is identifying when, and how, each individual gaming venue was affected by the regional caps. The simplest way of identifying the venues affected by the cap was to construct, for each of the three years following the required reductions in machine numbers, a dummy variable to indicate if a venue was in a capped region during this period. However, this is a fairly crude way of identifying the affected venues since in each region and each year of the caps only some of the venues reduced their machine numbers, and the percentage reduction in machine numbers varied considerably from venue to venue. To capture this information we constructed an additional two indicators.

First, we constructed three dummy variables for each venue in the capped regions to indicate whether the cap caused that venue to reduce their number of machines during each of the three years of the policy. In determining whether the regional cap caused the reduction in machines we count only those reductions that occurred in a region in which the Government required a reduction in total machine numbers during that period and where these reductions were maintained until mid 2004. Temporary closures or reductions in machine numbers were ignored. Second, we constructed a measure of the change in machine numbers in the capped regions since the caps were introduced in April 2001, where again we use the same criteria to determine whether a reduction was caused by the regional caps. Tables 6.2-6.5 identify where there have been permanent reductions in machine numbers within the capped regions.

Table 6.2
Permanent reductions and percentage change in machine numbers at each venue
in the capped regions: Greater Dandenong Plus

Number of machines permanently removed from venue during:	Year-ending February 2002	Year-ending February 2003	Year-ending February 2004	Total reduction since April 2001 (per cent)
Aces Town And Country Club	0	4	13	17
Albion Hotel	20	0	0	42
Dandenong Basketball Association	0	0	3	6
Dandenong Club	0	0	6	6
Dandenong RSL	0	0	5	7
Dandenong Workers Club	20	0	0	20
Hallam Taverner	0	0	0	0
Hawthorn Football Club - Waverley	0	0	6	6
Keysborough Hotel	0	0	0	0
Noble Park Football Club	0	0	3	6
Noble Park RSL	0	0	2	6
Nu Hotel Dandenong	0	3	0	9
Old Dandy Inn	0	0	3	9
Prince Mark Hotel	0	0	0	0
Sandown Greyhounds	0	0	5	5
Sandown Park Hotel	0	2	0	1
Sandown Racecourse	0	0	5	5
Springvale Hotel	10	20	0	30
Springvale RSL	0	0	3	6
Village Green Hotel	0	0	0	0
Waltzing Matilda Hotel	0	4	5	9
Total machines as at end:	February 2002	February 2003	February 2004	
Actual	1,631	1,598	1,540	
Cap	1,658	1,599	1,540	

Table 6.3
Permanent reductions and percentage change in machine numbers at each venue
in the capped regions: Maribyrnong Plus

Number of machines permanently removed from venue during:	Year-ending February 2002	Year-ending February 2003	Year-ending February 2004	Total reduction since April 2001 (per cent)
Anglers Tavern	0	2	1	10
Ashley Hotel	10	0	0	11
Braybrook Taverner	0	12	0	18
Club Leeds	0	0	3	8
Court House Hotel (Footscray)	0	0	0	0
Derrimut Hotel	0	0	0	0
Flemington & Kensington RSL	0	5		100
Footscray Football Club	0	6	4	15
Footscray RSL	0	4	0	14
Highpoint Taverner	0	4	5	9
Italo Australian Social Club	0	0	2	5
Maribyrnong Maidstone RSL	5			100
Melbourne Cup Club - VRC Flemington	2	12	6	20
Newmarket Tavern	0	0	6	8
Newport Family Hotel	0	0	5	8
Powell Hotel	0	6	0	11
Sunshine Baseball Club	0	0	1	5
Sunshine City Club	0	5	2	23
Sunshine RSL	0	0	0	0
Victoria Hotel (Yarraville)	0	2	2	11
Westend Hotel	0	0	12	12
Yarraville & Seddon Bowling Club	0	4	2	15
Yarraville Club	10	0	5	14
Yarraville Cricket Club	0	0	7	7
Total machines as at end:	February 2002	February 2003	February 2004	
Actual	1,297	1,235	1,172	
Cap	1,297	1,235	1,172	

Table 6.4
Permanent reductions and percentage change in machine numbers at each venue
in the capped regions: Bass Coast Shire

Machines permanently removed from venue during:	Year-ending February 2002	Year-ending February 2003	Year-ending February 2004	Total reduction since April 2001 (per cent)
Cowes Golf Club	1	0	1	20
Esplanade Hotel	0	0	3	15
Isle Of Wight Hotel	1	0	1	17
Phillip Island RSL	1	5	4	16
Phillip Island Football Club	0	0	4	21
Wonthaggi Club	0	4	0	8
Wonthaggi Golf Club	3	3	0	29
Wonthaggi Workingmans Club	2	4	4	15
Total machines as at end:	February 2002	February 2003	February 2004	
Actual	253	237	220	
Cap	253	237	220	

Table 6.5
Permanent reductions and percentage change in machine numbers at each venue
in the capped regions: Shire of La Trobe

Number of machines (and per cent of machines) permanently removed from venue during:	Year-ending February 2002	Year-ending February 2003	Year-ending February 2004	Total reduction since April 2001 (per cent)
Churchill Hotel	28			100
Grand Junction Hotel Traralgon	0	0	0	0
Italian Australian Social Club	0	3	1	9
Moe Hotel	0	4	0	9
Moe Racing Club	0	0	0	0
Moe RSL	0	3	1	9
Morwell Bowling Club	0	0	0	0
Morwell Club Inc.	2	0	2	9
Morwell Hotel Motel	0	0	2	5
Morwell RSL	2	0	3	10
Royal Exchange Hotel	3	0	3	12
Skippers Tabaret	0	0	0	0
Traralgon Bowls Club	0	0	0	0
Traralgon Football Club	0	0	0	0
Traralgon RSL	0	3	1	9
Yallourn Bowls Club	0	0	0	0
Total machines as at end:	February 2002	February 2003	February 2004	
Actual	603	615	602	
Cap	650	626	602	

6.2 Methodology: Testing the Impact of the Caps

In the following discussion we outline conceptually the methodology that we used to analyse these data. We wish to test whether the regional caps have resulted in any significant reduction in gaming machine expenditure at venues in the capped regions and, if so, estimate the size of this effect. In order to do so effectively we need to have in mind a counterfactual: what gaming expenditure would have been at venues in the capped regions in the absence of the caps.

One way to estimate the effect of the regional caps might be to simply choose a venue in a capped region and a venue outside a capped region and compare the levels of expenditure at these two venues at some point in time following the implementation of the regional cap. That is, we might assume that the appropriate counterfactual is the level of gaming expenditure at a venue outside the capped region. The difference between the level of expenditure at these venues would give us an estimate of the effect of the regional cap. Further, we might try and choose the comparison venues so that the regions they are in have similar characteristics to the capped regions. But, despite these efforts, some venues might tend to have higher gaming expenditure than other venues because of characteristics such as location, goodwill and alternative recreational opportunities available nearby. Many of these characteristics cannot readily be observed, but they could bias this estimate of the effect of the regional caps on gaming expenditure.

A second way to estimate the effect of the regional caps might be to choose a venue in a capped region and compare the level of gaming expenditure at that venue during a period before the regional cap is implemented with expenditure during a period after the regional cap is implemented. That is, we might assume that the relevant counterfactual is the level of gaming expenditure that the chosen venue received prior to the implementation of the regional caps. The difference between the level of expenditure at these two points in time would give us another estimate of the effect of the regional cap. However, the popularity of gaming varies over time so that expenditure across most venues in Victoria will change over time. For example, gaming expenditure today is far higher than it was during the mid 1990s. These trends in gaming expenditure over time could bias this estimate of the effect of the regional cap on gaming expenditure.

A better way to estimate the effect of the regional caps is to use a combination of these two methods. Here we assume that, in the absence of the caps, gaming expenditure at the venue in the capped region would have been the expenditure that venue received before the caps, projected forward over time at the same rate of growth as at a comparable venue or benchmark. This is the so-called ‘differences-in-differences’ approach to policy analysis. It essentially amounts to comparing the difference in expenditure in the capped regions before and after the caps were introduced with the difference in expenditure in the matched comparison group before and after the caps.

The idea behind the differences-in-differences approach is to remove from the data: (i) unobserved venue-specific characteristics that might effect the level of gaming expenditure; and (ii) aspects of the evolution of gaming expenditure over time that are common to both the venues in the capped regions and venues in the matched comparison group. We briefly introduce the theory behind the so-called ‘differences-in-differences’ approach to policy analysis, based upon the discussion provided in Blundell and Costa Dias (2002) and Meyer (1994).

For a given venue ‘ i ’ at a given point in time ‘ t ’, the level of gaming expenditure, Exp_{it} , is dependent upon a range of region-specific characteristics, which we denote X_i . However, expenditure may also be affected by a wide range of other factors, the cumulative effect of which we label U_{it} . We refer to this as the ‘error’ term because it is the component of gaming expenditure that we cannot predict from the observable characteristics of the venue, X_i . The assumed relationship between gaming expenditure, region-specific characteristics and the error term is expressed in the equation below.

$$Exp_{it}(X_i) = f_t(X_i) + U_{it}$$

In this framework, imposing a regional cap on gaming machine numbers will affect venue-level expenditure either through the function f or the error term U_{it} , which we indicate in the following equations.

$$Exp_{it}(X_i) = f_t^1(X_i) + U_{it}^1 \text{ if the venue is in a capped region}$$

$$Exp_{it}(X_i) = f_t^0(X_i) + U_{it}^0 \text{ if the venue is not in a capped region}$$

Then the effect of the regional cap on gaming expenditure at a venue can be written as the difference between observed gaming expenditure and what gaming expenditure would be had the venue not been subject to the regional cap.

$$Effect_{it}(X_i) = (f_t^1(X_i) - f_t^0(X_i)) + (U_{it}^1 - U_{it}^0)$$

The problem is that we cannot observe expenditure at a given gaming venue at a given point in time both inside and outside the capped regions. In order to estimate the effect of the caps we must at least observe one venue 'i' in the capped region and another venue 'j' in the comparison region, at two different periods of time 't=1' after the implementation of the caps and 't=0' before the implementation of the caps.

To help in the explanation, we can split the error term U_{it} into a part that is fixed for a given venue over time, ϕ_i , a part that is common to all venues but varies over time, θ_t , and a remaining part that is different for each venue at each point in time, ε_{it} . Defining a variable D_{it} to be 1 if the venue 'i' is subject to the regional caps at time 't' and 0 otherwise allows us to write the level of gaming expenditure at a venue as follows.

$$Exp_{it}(X_i) = f_t^0(X_i) + Effect_{it}(X_i) \cdot D_{it} + \phi_i + \theta_t + \varepsilon_{it}$$

Using this expression, we can calculate the difference in gaming expenditure at each venue before and after the implementation of the regional caps. By doing so we immediately remove from the expression the part of the error which is fixed for a given venue over time so that we can ignore unobserved venue-specific characteristics which are fixed over time. For the venue in the region subject to the cap we obtain the first expression below, while for the venue in the comparison region we obtain the second expression.

$$Exp_{i1}(X_i) - Exp_{i0}(X_i) = f_1^0(X_i) - f_0^0(X_i) + Effect_{i1}(X_i) + (\theta_1 - \theta_0) + (\varepsilon_{i1} - \varepsilon_{i0})$$

$$Exp_{j1}(X_j) - Exp_{j0}(X_j) = f_1^0(X_j) - f_0^0(X_j) + (\theta_1 - \theta_0) + (\varepsilon_{j1} - \varepsilon_{j0})$$

Now we can subtract the second of these equations from the first, and importantly note that we chose the comparison region so that it was matched on all relevant observable characteristics 'X' that influence the level of expenditure. We obtain the following expression for the effect of the regional caps on the level of gaming expenditure at the venue in the capped region at a point in time following the implementation of the cap.

$$Effect_{i1}(X_i) = (Exp_{i1}(X_i) - Exp_{i0}(X_i)) - (Exp_{j1}(X_j) - Exp_{j0}(X_j)) + ((\varepsilon_{j1} - \varepsilon_{j0}) - (\varepsilon_{i1} - \varepsilon_{i0}))$$

The first part of the right-hand side is the differences-in-differences expression. That is, it is the difference between venues in different regions of each venue's difference in gaming expenditure over time. The first expression that we gave above for the effect of the caps was of little use because we could not observe expenditure at a given gaming venue both in and outside the capped regions. By contrast, *given a pair of venues* the differences-in-differences expression can be readily calculated from the available data. Section 6.3 of the report on statistical analysis simply describes an efficient way of calculating this differences-in-differences expression using all of the available data, rather than just expenditure at two venues observed at two points in time.

The second part of the right-hand side is also important. Recall that ε_{it} is the part of the error in gaming expenditure that is different for each venue and each point in time. So long as this part of the error changes over time in a similar way for the venue chosen from the capped region and the venue chosen from the comparison region then on

average the second part of the right-hand side will vanish. In this case the first part of the right-hand side alone, the differences-in-differences expression, will provide an unbiased estimate of the effect of the cap.

However, this need not be the case. Venue-specific characteristics may influence the decision of the Government to impose a cap on the region in which the venue lies. We argue that in fact there does not appear to be any significant correlation between the characteristics on which the Government chose the capped regions and the subsequent evolution of regional gaming expenditure.

This suggests that our differences-in-differences expression will be able to provide an unbiased estimate of the impact of regional caps on gaming expenditure at venues in the capped regions. See Appendix 7 for further discussion on the selection of cap regions.

6.3 Statistical Analysis

In applying the differences-in-differences methodology, instead of comparing only a single venue in the capped region with a single venue in the comparison region we consider simultaneously all of the venues in the capped and comparison regions. This allows us to more accurately estimate the effect of the regional caps. We do so using ‘fixed-effects’ panel regression. In its simplest form this means running the following regression on data on gaming expenditure from venues in both the capped and comparison regions.

$$Exp_{it} = \beta_i^1 + \beta^2 D_t^1 + \beta^3 D_t^1 D_i^2 + \eta_{it}$$

Here: the left-hand side variable is the log of gaming expenditure at venue ‘*i*’ at period ‘*t*’; D_t^1 is a variable taking the value 1 if the regional caps have been implemented; D_i^2 is a variable taking the value 1 if the venue is in the capped region and 0 if the venue is in the comparison region; and η_{it} is the statistical error. The purpose of the regression is to find the coefficients, β_i^1 , β^2 and β^3 that best fit the data that we observe. In particular, the coefficients β_i^1 are different for each venue and, roughly, will be estimated to be the average level of expenditure at the venue prior to the implementation of the caps. These are also referred to as ‘fixed effects’ because they pick up the differences between venue-level expenditure that are fixed over time. The estimate of the coefficient β^2 will indicate the average change in the log of gaming expenditure after the implementation of the regional cap for venues in the comparison region. Of most interest is our estimate of the coefficient β^3 . This is our differences-in-differences estimate of the effect that the regional cap had on gaming expenditure at venues in the capped region.

More generally, we construct appropriate variables to estimate the effect on gaming machine expenditure following *each* of the three rounds of reductions in gaming machine numbers. Further, the regression is extended in a straightforward manner to allow us to also assess the effect of the caps on gaming expenditure at venues in the leakage regions.

In these regressions, those venues that we think might be affected by the regional caps are simply indicated by a dummy variable (D_i^2 above) based on the location of the venues. In an attempt to better identify the effect of the caps we additionally run regressions in which we identify the venues that might be affected by the regional caps

using the other two variables we constructed above: a dummy variable indicating whether the caps have caused a reduction in the number of gaming machines at a particular venue; and the total change in gaming machine numbers since the introduction of the caps in April 2001.¹

The validity of the estimated effect of the regional cap depends critically upon the choice of the comparison regions. We use two different comparisons for our statistical analysis. First, we compare changes in expenditure in the capped regions with changes in the 'matched comparison' regions. As discussed earlier in this report, we chose these comparison regions carefully to be similar to the capped regions in a range of demographic characteristics that are key drivers of gaming expenditure. Second, as a check on the former method we compare changes in gaming expenditure in the capped regions with changes in expenditure in the whole of Victoria. We would expect that had no cap been implemented the level of expenditure in the capped and control regions would have moved closely over time, while the level of expenditure in the whole State is a cruder means of controlling for trends in tastes. Hence, the effects of the regional caps that we estimate by comparing with State expenditure should be considered less reliable.

All up then, with three different indicators of the venues affected by the cap and two different comparison groups we run a total of six regressions on data corresponding to each of the five capped regions (see Table 6.6).

Two problems were addressed in running these regressions. First, the level of gaming expenditure is seasonal with expenditure in some regions varying over the course of a calendar year in a different manner to other regions. For example, as illustrated above gaming expenditure in the Bass Coast Shire varies over the course of a calendar year in line with the ebb and flow of tourists. This is particularly problematic because we do not have a full-year of data following the third round of gaming machine reductions. In estimation we include a full set of seasonal dummy variables for each region included in the regression (for example, for regressions on data from the capped, comparison and leakage regions we include three full sets of seasonal dummy variables).

Second, even after controlling for seasonal differences in gaming expenditure within years and fixed differences between gaming expenditure at different venues, we found that, for individual venues, the residuals from these regressions were correlated over time. This is perhaps because the level of gaming expenditure at each venue moves in long, slow trends reflecting gradual changes in factors such as the popularity of the venue. Failing to take account of this problem would lead to incorrectly assessing the statistical significance of the estimated effects of the regional caps. To correct this problem, in estimation we allow venue level statistical 'errors' in the revenue data to be correlated with the immediately preceding month's data (an AR(1) error term in technical terminology).

¹ In constructing these two indicators we only take account of changes in gaming machine numbers that we believe were caused by the regional caps, rather than the normal shuffling of machines between venues over time. The Victorian Casino and Gaming Authority required that the operators ensure that the percentage reductions in gaming machine numbers were the same across venues in the capped regions 'as far as practicable'. With this in mind, we believe it is plausible that these two indicators might be exogenous to the level of gaming expenditure at these venues (that is, the level of gaming expenditure did not drive the reduction in machine numbers). Of course, if these two indicators are not exogenous to the level of gaming expenditure then our estimates of the effects that these reductions in machine numbers had on venue-level gaming expenditure will be biased.

Finally, it is important to note what this methodology does and does not provide. This methodology **does allow** us to reliably estimate the effect that the regional caps had on the level of gaming expenditure at venues in the chosen capped regions. However, these estimates do not necessarily indicate the effect that a similar regional cap might have on gaming expenditure at venues in other regions of Victoria, or indeed other regions of the country. To the extent that other regions differ in ways important to gaming patterns – such as in terms of demography, geography or economic characteristics – the effects of any regional cap in those areas may be quite different than the effects that we estimate here.

6.4 Results: the effects of regional caps on gaming expenditure at venues in the capped regions

Overall the results were mixed, with only a few conclusive findings on the effects that the caps had on gaming expenditure. We ran six regressions on data corresponding to each of the five capped regions, using different indicators of the venues affected by the cap, different comparison groups and, necessarily, different data sets.² The differences between these six regressions are summarised in Table 6.6.

Table 6.6
The six different regressions

Regression	Comparison group	Indicator of venues affected by the caps	Data used
I	Matched region	Dummy variables indicating the venue is located in the capped region.	Capped, matched and leakage regions.
II	Matched region	Dummy variables indicating the venue lost machines because of the regional caps.	Capped, matched and leakage regions.
III	Matched region	An indication of the number of machines the venue lost due to the caps.	Capped and matched regions.
IV	Victorian average	n.a.	Capped regions.
V	Victorian average	Dummy variables indicating the venue lost machines because of the regional caps.	Capped regions.
VI	Victorian average	The number of machines the venue lost due to the caps.	Capped regions.

Table 6.7 to 6.11 present the results of these regressions. Here the variables are defined as follows: Smoking Ban takes the value 1 after the ban on smoking in gaming areas was imposed, and the value 0 before; Year 1 takes the value 1 in or after February 2002 and 0 before; Year 2 takes the value 1 in or after February 2003 and 0 before; Year 3 takes the value 1 in or after February 2004 and 0 before; Cap takes the value 1 if the venue is in a capped region and 0 otherwise; Leakage takes the value 1 if the venue was identified as a potential leakage venue and 0 otherwise; Lost Machines in Year take the value 1 at a period in or following that year of the caps and the venue lost machines during that year of the caps; Change in Machines at Venue is the change in the number of machines at a venue that we attribute to the regional caps.

² The only exception was Darebin, where we ran only two regressions since the regional caps did not require reductions in machine numbers and hence it was not possible to identify machines removed from venues due to the caps.

The dependent variables are the natural logarithm of gaming expenditure at a venue in a particular month (or for regressions IV, V and VI the difference between the logarithm of gaming expenditure at that venue in a particular month and the logarithm of State gaming expenditure in the same month). The interpretation of the coefficients are in terms of the log of gaming expenditure, and we convert these into percentage changes in gaming expenditure in the discussion below.³

The methodology we use will *roughly* estimate the effects of the caps on gaming expenditure at venues in the capped regions as the average of the difference between the percentage change in expenditure at venues in the capped regions and the percentage change in expenditure at venues in the comparison regions. In this way, a 1 per cent fall in gaming expenditure at a small venue is weighted as heavily as a 1 per cent fall in gaming expenditure at a large venue, despite the difference in dollar amounts involved.

³ Given an effect on the logarithm of gaming expenditure α we can calculate a percentage effect on gaming expenditure as $e^\alpha - 1$. It can be shown that if the effect on the logarithm of gaming expenditure, α , is very small then it is approximately the same as the percentage effect on gaming expenditure.

Table 6.7
Regression results: Maribyrnong Plus

Regression	I	II	III	IV	V	VI
Dependent Variable	Log Gaming Expenditure			Log Gaming Expenditure - Log State Gaming Expenditure		
Smoking Ban	-0.211a (-10.11)	-0.211a (-10.12)	-0.212a (-8.53)	-0.040 (-1.25)	-0.040 (-1.24)	-0.040 (-1.25)
Year1	0.105a (3.27)	0.105a (3.29)	0.107a (3.16)	-0.040 (-1.57)	-0.031 (-1.17)	-0.040 (-1.56)
Year2	0.039 (1.14)	0.039 (1.14)	0.039 (1.06)	0.008 (0.28)	0.003 (0.09)	0.008 (0.26)
Year3	0.081b (2.10)	0.080b (2.11)	0.080b (1.98)	0.004 (0.15)	-0.007 (-0.16)	0.004 (0.14)
Year1*Cap	-0.060 (-1.64)	-0.051 (-1.38)	-0.061 (-1.60)			
Year2*Cap	0.001 (0.02)	-0.007 (-0.17)	-0.001 (-0.02)			
Year3*Cap	-0.033 (-0.72)	-0.042 (-0.76)	-0.034 (-0.69)			
Year1*Leakage	-0.004 (-0.09)	-0.004 (-0.09)				
Year2*Leakage	-0.016 (-0.34)	-0.016 (-0.34)				
Year3*Leakage	0.002 (0.04)	0.002 (0.04)				
Lost Machines in Year 1		-0.067 (-1.34)			-0.071 (-1.27)	
Lost Machines in Year 2		0.018 (0.51)			0.012 (0.29)	
Lost Machines in Year 3		0.014 (0.30)			0.017 (0.32)	
Log Change in Machines at Venue			-0.046 (-0.19)			0.003 (0.01)
Venues	40	40	32	23	23	23
Observations	2215	2215	1767	1263	1263	1263

Note: In Column III, Row titled "Log Change in Machines at Venue", it was our expectation was that the coefficients would be positive, so that a coefficient of +1 would imply that expenditure fell in step with gaming machine numbers and a coefficient of 0 would suggest that EGM numbers may have no effect on EGM expenditure. In reading Column III, this reads that a 1 per cent change (fall) in the number of gaming machines is associated with a 0.0046 per cent fall in the level of gaming expenditure.

Table 6.8
Regression results: Bass Coast Shire

Regression	I	II	III	IV	V	VI
Dependent Variable	Log Player Loss			Log Player Loss - Log State Player Loss per EGM		
Smoking Ban	-0.157a (-8.07)	-0.157a (-8.29)	-0.157a (-8.06)	-0.015 (-0.29)	-0.017 (-0.34)	-0.015 (-0.29)
Year1	0.088a (5.14)	0.093a (5.60)	0.088a (5.12)	-0.063 (-1.46)	-0.112b (-2.07)	-0.049 (-1.05)
Year2	0.053a (2.82)	0.052a (2.85)	0.053a (2.82)	-0.029 (-0.63)	-0.158a (-2.97)	-0.014 (-0.28)
Year3	0.050b (2.58)	0.050a (2.66)	0.050b (2.58)	-0.074 (-1.55)	0.083 (1.04)	-0.049 (-0.85)
Year1*Cap	-0.076b (-2.38)	-0.130a (-3.02)	-0.064c (-1.85)			
Year2*Cap	-0.064c (-1.86)	-0.191a (-4.64)	-0.051 (-1.37)			
Year3*Cap	-0.085b (-2.13)	0.075 (1.14)	-0.063 (-1.35)			
Year1*Leakage						
Year2*Leakage						
Year3*Leakage						
Lost Machines in Year 1		0.087c (1.80)			0.089 (1.48)	
Lost Machines in Year 2		0.249a (5.06)			0.251a (4.09)	
Lost Machines in Year 3		-0.210a (-2.95)			-0.204b (-2.28)	
Log Change in Machines at Venue			0.246 (0.94)			0.281 (0.79)
Venues	35	35	35	8	8	8
Observations	1960	1960	1960	448	448	448

t-statistics in parentheses; a, b, c denote significance at 1, 5 and 10 per cent levels

Table 6.9
Regression results: Greater Dandenong Plus

Regression	I	II	III	IV	V	VI
Dependent Variable	Log Player Loss			Log Player Loss - Log State Player Loss per EGM		
Smoking Ban	-0.189a (-14.91)	-0.189a (-14.95)	-0.189a (-13.53)	-0.010 (-0.62)	-0.010 (-0.62)	-0.009 (-0.57)
Year1	0.070a (3.76)	0.071a (3.84)	0.073a (3.98)	-0.002 (-0.13)	0.005 (0.36)	0.000 (0.02)
Year2	0.031 (1.63)	0.031 (1.63)	0.031 (1.64)	-0.017 (-1.14)	-0.032b (-2.01)	-0.011 (-0.77)
Year3	0.053b (2.53)	0.053b (2.55)	0.054b (2.59)	-0.014 (-0.94)	-0.008 (-0.36)	-0.005 (-0.35)
Year1*Cap	0.002 (0.09)	0.007 (0.31)	0.002 (0.08)			
Year2*Cap	-0.007 (-0.32)	-0.024 (-0.96)	-0.005 (-0.21)			
Year3*Cap	-0.027 (-1.02)	-0.019 (-0.60)	-0.023 (-0.87)			
Year1*Leakage	0.034 (1.14)	0.034 (1.15)				
Year2*Leakage	0.019 (0.64)	0.019 (0.65)				
Year3*Leakage	-0.015 (-0.44)	-0.015 (-0.44)				
Lost Machines in Year 1		-0.041 (-1.11)			-0.065b (-2.11)	
Lost Machines in Year 2		0.068b (2.22)			0.066b (2.57)	
Lost Machines in Year 3		-0.014 (-0.46)			-0.010 (-0.39)	
Log Change in Machines at Venue			0.095 (0.99)			0.212a (2.64)
Venues	42	42	34	21	21	21
Observations	2330	2330	1903	1175	1175	1175

t-statistics in parentheses; a, b, c denote significance at 1, 5 and 10 per cent levels

Table 6.10
Regression results: Darebin Plus

Regression	I	II	III	IV	V	VI
Dependent Variable	Log Player Loss			Log Player Loss - Log State Player Loss per EGM		
Smoking Ban	-0.191a (-13.23)			-0.007 (-0.46)		
Year1	0.096a (4.81)			-0.040a (-3.17)		
Year2	0.024 (1.13)			-0.013 (-0.93)		
Year3	0.035 (1.47)			0.004 (0.27)		
Year1*Cap	-0.046b (-2.00)					
Year2*Cap	0.002 (0.10)					
Year3*Cap	0.015 (0.53)					
Year1*Leakage	-0.058c (-1.70)					
Year2*Leakage	0.045 (1.24)					
Year3*Leakage	-0.009 (-0.22)					
Lost Machines in Year 1						
Lost Machines in Year 2						
Lost Machines in Year 3						
Log Change in Machines at Venue						
Venues	40			24		
Observations	2240			1344		
t-statistics in parentheses; a, b, c denote significance at 1, 5 and 10 per cent levels						

Table 6.11
Regression results: Shire of La Trobe

Regression	I	II	III	IV	V	VI
Dependent Variable	Log Player Loss			Log Player Loss - Log State Player Loss per EGM		
Smoking Ban	-0.143a (-5.03)	-0.144a (-5.03)	-0.143a (-5.03)	-0.083c (-1.94)	-0.082c (-1.93)	-0.083c (-1.94)
Year1	0.085a (2.66)	0.086a (2.67)	0.085a (2.67)	-0.026 (-0.67)	-0.057 (-1.34)	-0.026 (-0.66)
Year2	0.065c (1.94)	0.065c (1.95)	0.065c (1.95)	0.054 (1.39)	0.071 (1.63)	0.055 (1.31)
Year3	0.009 (0.25)	0.009 (0.26)	0.009 (0.26)	0.009 (0.23)	0.015 (0.29)	0.01 (0.23)
Year1*Cap	0.133a (3.03)	0.146a (3.16)	0.131a (2.97)			
Year2*Cap	-0.090b (-1.99)	-0.090c (-1.86)	-0.096b (-2.04)			
Year3*Cap	0.012 (0.24)	-0.013 (-0.22)	0.006 (0.12)			
Year1*Leakage						
Year2*Leakage						
Year3*Leakage						
Lost Machines in Year 1		-0.065 (-0.89)			0.147c (1.76)	
Lost Machines in Year 2		-0.003 (-0.05)			-0.061 (-0.81)	
Lost Machines in Year 3		0.054 (0.80)			-0.012 (-0.16)	
Log Change in Machines at Venue			-0.271 (-0.42)			0.015 (0.02)
Venues	31	31	31	15	15	15
Observations	1722	1722	1722	826	826	826

t-statistics in parentheses; a, b, c denote significance at 1, 5 and 10 per cent levels

6.4.1 Effect of the regional caps on gaming expenditure

The expected effect of the regional caps was to reduce the level of gaming expenditure at venues in the capped regions following the sequential removal of machines. The regional caps were also expected to increase the level of gaming expenditure at venues in the identified leakage areas.

In fact, in only a few cases can we find evidence that the regional caps reduced the level of gaming expenditure at venues in the capped regions, and no evidence that the caps affected gaming expenditure in the leakage regions. This results holds throughout the range of different specifications attempted.

Regressions I-III: Comparing venue-level gaming expenditure in the cap regions with venues in the matched comparison regions

In **Regression I**, the coefficients on the variable Year 1*Cap provide our estimates of the effect of the regional caps on gaming expenditure at venues in the capped regions following the first year in which machines were removed, and similarly for Year 2 and Year 3. These coefficients are generally not found to be statistically significant, which means that we cannot reliably reject the possibility that our estimated coefficients are different from zero simply due to random fluctuations in the data, rather than deeper causes such as the imposition of the regional caps. The exception is in the Bass Coast Shire where there is some evidence that the regional cap actually did lead to a reduction in venue-level gaming expenditure in the Bass Coast Shire. Our analysis suggests that venue-level gaming expenditure tended to fall in the Bass Coast Shire (relative to the comparison region of Greater Geelong) following each round of required reductions in machine numbers.

Since the full number of machines had been removed by Year 3 of the caps, looking at the cumulative effect of the caps by this time gives us the best chance of detecting significant effects on gaming expenditure. Table 6.12 summarises our estimates of these effects. In two of the regions, Maribyrnong Plus and Bass Coast Shire, the estimated falls were quite large (8.7 per cent and 20.1 per cent respectively)⁴ and statistically significant. These were also the regions in which the reduction in gaming machines were the largest. By February 2004 the average venue in Maribyrnong Plus had lost 9.9 per cent of its gaming machines while the average venue in Bass Coast Shire had lost 17.5 per cent of its gaming machines. These two results suggests that the reduction in gaming machine expenditure in these regions was of a similar magnitude to the reduction in gaming machines. Estimates of the changes in the other regions are too unreliable, statistically, to be able to infer that the regional caps had any effect on gaming expenditure.

Table 6.12
Regression I: Cumulative estimated effects of caps on venue-level gaming machine expenditure by Year 3 relative to comparison region (per cent)

Region	Maribyrnong Plus	Bass Coast Shire	Greater Dandenong Plus	Darebin Plus	Shire of La Trobe
Capped	-8.7c	-20.1a	-3.2	-2.8	+5.7
Leakage	-1.8	n.a.	3.9	-2.2	n.a.

a, b, c denote significance at 1, 5 and 10 per cent levels

However, the interpretation that the regional caps were responsible for falls in gaming expenditure at venues in some of these regions **would be more compelling** if we were able to show that gaming expenditure fell particularly sharply at the venues from which machines were removed.

⁴ In an earlier section (5.3.1), we reported approximate aggregate change in revenue for Maribyrnong Plus was -8.1 per cent and Bass Coast Shire was -23.7 per cent. The difference is due to the time period chosen in the earlier analysis (March 2002 - June 2004), whereas here we consider February 2002 to February 2004 and base calculations on the average venue.

For this reason, **Regression II** seeks to extend the results by allowing the effects of the regional caps on venue-level gaming expenditure to be different for venues from which machines were removed compared to venues that suffered no loss of machines. Our expectation was that venues from which machines were removed would have experienced greater falls in gaming machine expenditure. If this were the case then we would expect the estimated coefficients on the variables 'Lost machines in Year' to be negative. The results do not support this expectation. Only six of the twelve estimated coefficients are negative and they are generally insignificant. **Statistical tests do not find significant evidence that by Year 3 of the caps the venues from which machines were removed suffered larger falls in gaming machine expenditure than other venues in any of the capped regions.**

Similarly, **Regression III** attempts to analyse the effects that the percentage removal of gaming machines had on individual venues' gaming expenditure. Our expectation was that the estimated coefficients on the variable 'Log Change in Gaming Machines' should be positive, so that a fall in gaming machines due to the regional caps resulted in a fall in gaming expenditure (i.e., less than 1, but positive). In fact, only two of our four estimated coefficients are positive, and in all cases we are unable to rule out the possibility that these coefficients were different from zero simply due to random variation in the data rather than due to the effect of the caps. Thus we cannot conclude that within the capped regions those venues that lost a larger share of their machines suffered larger falls in EGM expenditure than those that lost a smaller share of their machines.

Regressions IV-VI: Comparing venue-level gaming expenditure in the cap regions with State level gaming expenditure

While in the first three regressions we compared movements in venue-level gaming expenditure in the capped regions with venues in the matched comparison region, in **Regression IV** we compare movements in venue-level gaming expenditure with movements in State level gaming expenditure. As discussed above, since the capped regions systematically differ from the State as a whole these estimates of the effects of the caps could potentially be biased. With that qualification in mind, in this regression the coefficients on the variables Year 1, Year 2 and Year 3 are our estimates of the effects of the caps on gaming expenditure in venues in the capped regions. These coefficients are generally not found to be statistically significant, which means that we cannot reliably reject the possibility that our estimated coefficients are different from zero simply due to random fluctuations in the data, rather than deeper causes such as the imposition of the regional caps.

Table 6.13 summarises the estimated cumulative effect that the caps had on gaming machine expenditure at venues in the capped regions by Year 3 of the caps. Our analysis reveals that in four of the five regions venue-level gaming expenditure fell by more than the State average. In two of the regions these regions, Bass Coast Shire and Darebin Plus, the differences were large (15.3 per cent and 4.8 per cent respectively) and statistically significant. The latter of these is perhaps surprising since the regional caps required no reduction in machine numbers in the Darebin Plus region.

Table 6.13
Regression IV: Cumulative estimated effects of caps on venue-level gaming machine expenditure by Year 3 relative to State gaming expenditure (per cent)

Region	Maribyrnong Plus	Bass Coast Shire	Greater Dandenong Plus	Darebin Plus	Shire of La Trobe
Capped	-2.8	-15.3 ^b	-3.2	-4.8 ^b	+3.8
a, b, c denote significance at 1, 5 and 10 per cent levels					

Again we investigate whether we can link these estimated effects more closely to reductions in machine numbers at particular venues in the capped regions. **Regression V** extends these results by including indicators of which venues in the capped regions suffered reductions in machine numbers. A minority of the coefficients on these variables are found to be statistically significant and in two cases where they are significant, Bass Coast Shire and Greater Dandenong Plus, the signs of the coefficients are reversed from one year to the next. Statistical tests **do not find significant evidence** that by Year 3 of the caps the venues from which machines were removed suffered larger falls in gaming machine expenditure than other venues in any of the capped regions.

Similarly, **Regression VI** attempts to analyse the effects that the percentage removal of gaming machines had on individual venues' gaming expenditure. In three of the capped regions the estimated coefficients on the logarithm of changes in gaming machine numbers are not statistically significant. Only in Greater Dandenong Plus is the change in venue-level gaming expenditure found to be linked to the change in gaming machine numbers. But even in this case the coefficient is quite small, just 0.2, suggesting that at venues in that region a 1 per cent reduction in gaming machine numbers due to the cap was associated with a 0.2 per cent reduction in gaming expenditure.

6.4.2 Smoking bans

The effect of the bans on smoking in gaming areas was quite clearly apparent in the data. Table 6.14 summarises the estimated effects on gaming machine expenditure based on pooled data from the capped, comparison and leakage regions. The effect of the smoking bans varied from around 19.0 per cent in Maribyrnong Plus (including comparison and leakage regions) to 13.4 per cent in the Shire of La Trobe (including the comparison region). In particular, the effect appears to have been larger in the metropolitan areas compared to the non-metropolitan areas.

Table 6.14
Regression I: Estimated effect of the smoking bans on venue-level gaming machine expenditure (per cent)

Maribyrnong Plus	Bass Coast Shire	Greater Dandenong Plus	Darebin Plus	Shire of La Trobe
-19.0 ^a	-14.5 ^a	-17.2 ^a	-17.4 ^a	-13.4 ^a
a, b, c denote significance at 1, 5 and 10 per cent levels				

There was little evidence that the effects of the smoking bans on gaming expenditure were different in the capped regions compared with the effects on gaming expenditure in either the comparison regions or the State as a whole. In Regressions IV, V and VI the coefficient on the variable 'Smoking Bans' is an estimate of the different effect the smoking bans had on expenditure in the capped regions compared to the State as a whole. These coefficients are found generally not to be statistically significant. The exception is for the Shire of La Trobe, where there is some statistical evidence that the smoking bans may have caused expenditure to fall further than in the State as a whole.

6.4.3 Twenty-four hour gaming

The reduction in maximum gaming hours from 24 to 20 hours per day appears to have reduced gaming expenditure at the affected venues. The results of a regression on all five pairs of capped and comparison regions (not shown) suggested that in those venues that lost 24 hour gaming the level of gaming expenditure subsequently fell by around 3.3 per cent, and this estimated effect was statistically significant at the 5 per cent level of significance. This was mainly due to an observed fall in gaming expenditure at hotels from which 24 hour gaming was removed; it was difficult to estimate the effect on clubs due to the small number of venues affected. That said, we were not able to assess whether this resulted in a reduction in total gaming expenditure or simply a movement between venues.

6.5 Confounding factors: size of venues and population growth

In this section we briefly discuss two issues that could have caused gaming expenditure to evolve differently over time at venues in the capped and comparison regions. In general we find little evidence that these factors could qualitatively affect the results we presented in the previous section.

6.5.1 Size of venues

While our comparison regions were chosen to match the capped regions as closely as possible in terms of a range of demographic characteristics, nevertheless individual venues in these areas may differ in a number of ways. One difference that we can quantify is the average size of the venue, which we measure by the number of electronic gaming machines. Table 6.1 illustrated the average number of machines per venue in the capped and comparison regions. Maribyrnong Plus and the Shire of La Trobe have quite similar average venue size to their respective comparison regions. However, Bass Coast Shire has considerably smaller venues on average than the Shire of Greater Geelong, while the average size of venues in Darebin Plus and Greater Dandenong Plus are somewhat larger than the average size of venues in their respective comparison regions.

If gaming expenditure had evolved at different rates in different sized venues over the duration of the regional caps then this could be causing some distortion of our estimated effects of the caps. To explore this possibility, we include in the Regression 'I' specification an additional set of three variables defined to be the number of machines at a venue at a point in times multiplied by the indicators of Year 1, Year 2 or Year 3 of the caps.

Our analysis suggests that in fact gaming expenditure has tended to grow a little faster over this period in larger venues, though these variables only appear to significantly improve the explanatory power of the regression on data for the Bass Coast Shire (results not shown). In this case, the regression results suggest that by Year 3 of the regional caps the level of gaming expenditure might have been around 4 per cent higher had venues in the Bass Coast Shire been as large as those in the Shire of Greater Geelong.

Overall, though the average size of venues does differ between some of our capped regions and their chosen comparison regions, this difference does not appear to qualitatively affect our results.

6.5.2 Population growth

In most areas, a significant portion of gaming expenditure comes from people who live close to the gaming venues. For this reason, regional growth in the adult population is expected to increase gaming machine expenditure.

This could potentially distort our estimates of the effects of the regional caps on gaming expenditure if the population grew at a different rate in the capped regions compared to the comparison regions. In particular, if the adult population grew faster in the comparison region than in the capped region then our estimates above would be biased towards finding that the regional caps reduced gaming expenditure. Conversely, if the adult population grew faster in the capped region than our estimates above would be biased towards finding that the regional caps did not reduce gaming expenditure. However, the difference in population growth rates would need to be quite large to markedly distort our estimates of the effects of the regional caps. This is because some gaming expenditure comes from people living outside of the region in which a venue is located. As a result, we would expect that a 1 per cent increase in the adult population would increase gaming expenditure at venues in the region by less than 1 per cent.

Table 6.15 presents estimated growth in adult populations in the corresponding Local Government Areas over the duration of the regional caps. The data suggest that over the three years of the caps, in Maribyrnong, Greater Dandenong and Darebin the adult populations grew at quite similar rates to the adult populations in their respective comparison regions. These differences are probably too small to affect our estimates of the effect of the regional caps.

However, in the Bass Coast Shire the adult population grew around 6 per cent more over these three years than in the Shire of Greater Geelong. By stimulating growth in gaming machine expenditure, we expect that this might have biased our estimates towards a finding that the regional cap had no effect on gaming expenditure in the Bass Coast Shire. This only adds strength to our previous finding that the regional caps likely caused a fall in gaming expenditure in the Bass Coast Shire. By contrast, in the Shire of La Trobe the adult population grew much less rapidly than the adult population in the Shire of Ballarat. We would expect that this would have biased our estimates towards finding that the regional caps caused gaming machine expenditure to fall in the Shire of La Trobe. This adds weight to our finding above that the regional caps had little effect on gaming machine expenditure in the Shire of La Trobe.

Table 6.15
Estimated Adult Populations and Growth Rates by Local Government Area

	30-Jun-01	30-Jun-02	30-Jun-03	30-Jun-04	Growth from 2001 to 2004
Maribyrnong	49,252	49,377 0.3%	49,814 0.9%	50,385 1.1%	2.3%
Hobsons Bay	63,837	64,065 0.4%	64,319 0.4%	64,744 0.7%	1.4%
Greater Dandenong	98,785	98,527 -0.3%	98,800 0.3%	98,830 0.0%	0.0%
Monash	131,417	130,870 -0.4%	130,825 0.0%	131,909 0.8%	0.4%
Darebin	103,556	103,420 -0.1%	103,718 0.3%	104,845 1.1%	1.2%
Moreland	109,918	109,903 0.0%	110,192 0.3%	111,425 1.1%	1.4%
Bass Coast	19,982	20,955 4.9%	21,759 3.8%	22,279 2.4%	11.5%
Greater Geelong	147,311	150,665 2.3%	152,800 1.4%	155,072 1.5%	5.3%
La Trobe	51,266	51,607 0.7%	51,747 0.3%	52,073 0.6%	1.6%
Ballarat	61,913	63,165 2.0%	64,317 1.8%	65,210 1.4%	5.3%
Total	3,649,313	3,701,964 1.4%	3,762,463 1.6%	3,816,850 1.4%	4.6%

Source: *Victoria in Future 2004* unpublished data supplied by the Victorian Department of Sustainability and the Environment; SACES calculations.

6.6 Conclusions

The results of our analysis are mixed. There is some evidence that the regional caps could have caused gaming expenditure to fall in the Bass Coast Shire, and some evidence of falls in Maribyrnong Plus and Darebin Plus. Though there remains significant uncertainty over the size of this effect, in the first two cases the fall in gaming expenditure may have been of the same order as the reduction in gaming machine numbers required by the regional caps. These results appear not to be the result of other differences in the regions such as the average size of the venues and the rate of population growth.

However, if the falls in gaming expenditure in the Bass Coast Shire and Maribyrnong Plus were a result of the regional caps, which required the number of machines in these regions to be reduced, then the falls in expenditure should have been greater in the specific venues that lost machines. That we could not find any consistent evidence of this linkage raises question marks about the interpretation of these results.

In the other two regions, Greater Dandenong Plus and the Shire of La Trobe, we are unable to find solid evidence that the regional caps had any effect on gaming machine expenditure.

The regional caps were introduced with the intention of reducing the harm caused by problem gambling, rather than specifically reducing the level of gaming expenditure.

Testing these hypotheses relating to gaming expenditure is only a first step in the analysis. Despite evidence that gaming expenditure fell in some of the capped regions it remains to conclude whether this resulted — to some extent — from a reduction in expenditure by problem gamblers. In regions where we were unable to identify a significant fall in gaming expenditure this would suggest that either there has been no significant decline in expenditure by problem gamblers or the (highly) unlikely circumstance, that the change in expenditure by problem gamblers was balanced by an opposing change in the expenditure of recreational gamblers.

On balance, we find no evidence that regional caps had any positive influence on problem gamblers or problem gambling. In venues (and regions) that lost machines and did not experience significant change in population, the evidence is that machine utilisation rates (and NGR per machine) increased following machine reductions. The numbers of “gamblers in counselling” do not indicate any positive impact; most importantly, the experience of venue owners/local managers is that the removal of machines left problem gamblers largely unaffected because previously idle machines were taken up.

The experience and insights of venue owners/local managers is that the smoking ban and the reduction in 24 hour trading did result in a decline in participation and expenditure (observations, again, supported by the data).

Our findings, then, on the effects of the other two policies are clearer. The ban on smoking in gaming areas markedly reduced gaming expenditure in all regions we studied. The successive removal of 24 hour gaming also appears to have reduced gaming expenditure at the affected venues, though by a smaller amount.