JOINT SELECT COMMITTEE ON GAMBLING – PRE-COMMITMENT

FURTHER SUBMISSION

Charles Livingstone[1] PhD & Kevin Harrigan[2] PhD

Impacts of lowered bet limits on poker machines

Introduction

In previous submissions, Livingstone & Woolley proposed the introduction of a two-stream system for the implementation of universal pre-commitment for poker machines operated in Australia. This model would involve high-risk poker machines (i.e., machines currently available in Australia with high limits for bets and prizes) being accessible only in conjunction with use of a pre-commitment system. However, low-risk machines would be accessible without the necessity of utilisation of a pre-commitment system.

In order to provide some further insight into the practical effects of low-risk machines, we have undertaken some preliminary modelling of game outcomes using various parameters, and this submission provides the results of this modelling.

Description of modelling

We accessed game data for a popular Australian poker machine game which we have seen operated in all Australian states. The specific game we have utilised for this exercise has been available for a number of years, and variants of the game remain available. We obtained reel configurations and pay tables and were thus able to accurately simulate game outcomes. For the present exercise, we simulated 100,000 'spins' of the game and applied various bet levels to these outcomes, for the purpose of assessing the average session duration for an individual user with a stake of $40 available.

The purpose of estimating session duration is to determine the relative entertainment time afforded to users under various parameter settings, and thus to determine bet limits which are focused on providing entertainment at reasonable cost focussed on the needs of 'recreational', intermittent, or, as we prefer to call them, 'entertainment' players. As the Productivity Commission reported, a significant number of users experience a shorter than anticipated duration of play, resulting in relatively high average hourly expenditure.

The bet levels we utilised were $1.80. $0.90 and $0.45, using 9 lines of this game. The game's theoretical RTP is 87.87%, close to the 85.88% achieved by the simulations. We applied these to the outcome of 100,000 game simulations and were able to assess the distribution of session duration, using an average spin rate of 5 seconds per game. It should be noted that the maximum rewards available under these bet limits were, respectively, $2,200, $2,200 and $1,350.

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[1] Dept of Health Social Science, Monash University
[2] Digital Arts, University of Waterloo Canada

These are relatively modest maximum prizes but still exceed levels we regard as advisable for limitation of volatility of game outcomes. Nonetheless, the game simulated is set at relatively modest game parameters and modelling bet limits provides a reasonable basis for assessing the cost of entertainment of a relatively low-risk poker machine.

Results

We assessed the median and mean session duration for the $0.90 and $0.45 bet levels, and have graphed the distribution of session times as shown in Figs 1 and 2.

Table 1 sets out the mean and median session duration for each of the three bet limits we modelled. The mean session duration is the average of all sessions and is heavily skewed by a small number of relatively large sessions times associated with quite irregular large rewards. The median session duration is the mid-point of all outcomes, such that 50% of users would experience a shorter duration, and 50% a longer session duration. The closer the median and mean are, the more likely that the game outcomes are less skewed. However, poker machine game outcomes will always be skewed to some extent by the existence of a small number of relatively large rewards.

Table 1: Mean and median session duration at various bet levels – average 12 spins/minute - $40 stake

Bet level per spin	Mean session duration	Median session duration	Median as % of mean	Cost per hour using median
$1.80	12.7 min	4.0 min	31.5%	$600
$0.90	27.5 min	10.9 min	39.6%	$220
$0.45	55.3 min	27.0 min	48.8%	$89

Source: Actual game simulation by the authors

It will be noted that although both mean and median game duration change significantly across the three bet limits, median session duration changes are much greater as a proportion than are changes to the mean session duration. As graphs 1-2 indicate, this is related to a less concentrated 'spread' of game outcomes as bet levels decline. With bets at $1.80, average hourly cost is $600 based on median game outcomes – that is, the mid point of game outcomes. However, median outcomes improve dramatically as bet level reduces, such that the hourly cost for a $0.45 bet (a quarter of the $1.80 bet) is less than one-sixth of that of the $1.80 bet.

It is also noteworthy that at $0.90 bet level, 48% of users would experience a session time less than 10.4 minutes, including 34.7% who would experience a game duration of less than 8.3 minutes. However, at the $0.45 bet level, only 1.2% of users would experience session duration of between 10.4 and 12.5 minutes, and none would expect to spend their entire $40 stake in less than 10.4 minutes.

Discussion

Lowering maximum bets clearly produces a considerable benefit for poker machine users by spreading the distribution of session times towards a greater likelihood of closer to average returns, resulting in longer session time and, importantly, reduced volatility of outcomes. The hourly cost for the 50% of users who achieve at least the median session duration is considerably reduced and is much closer to what many would agree is a reasonable cost for an entertainment product, albeit one coming at much greater hourly cost than, for example, a movie or football game.

Importantly, benefits increase in a better than linear relationship as bet limit declines.

We believe that median outcomes would tend more strongly towards mean outcomes as prize limits were reduced, further reducing the difference between mean and median outcomes. We are continuing to model this aspect of game characteristics and will be happy to inform the committee of the outcome of this research.

For poker machine users who seek entertainment from their use of EGMs, reduced bet levels offer a significant benefit, both in terms of player safety (by reducing the potential for significant costs of use) and by increasing the entertainment time available for a relatively modest stake. In our submission, reducing bet limits is clearly an effective strategy to reduce harm and increase entertainment value.

Figures

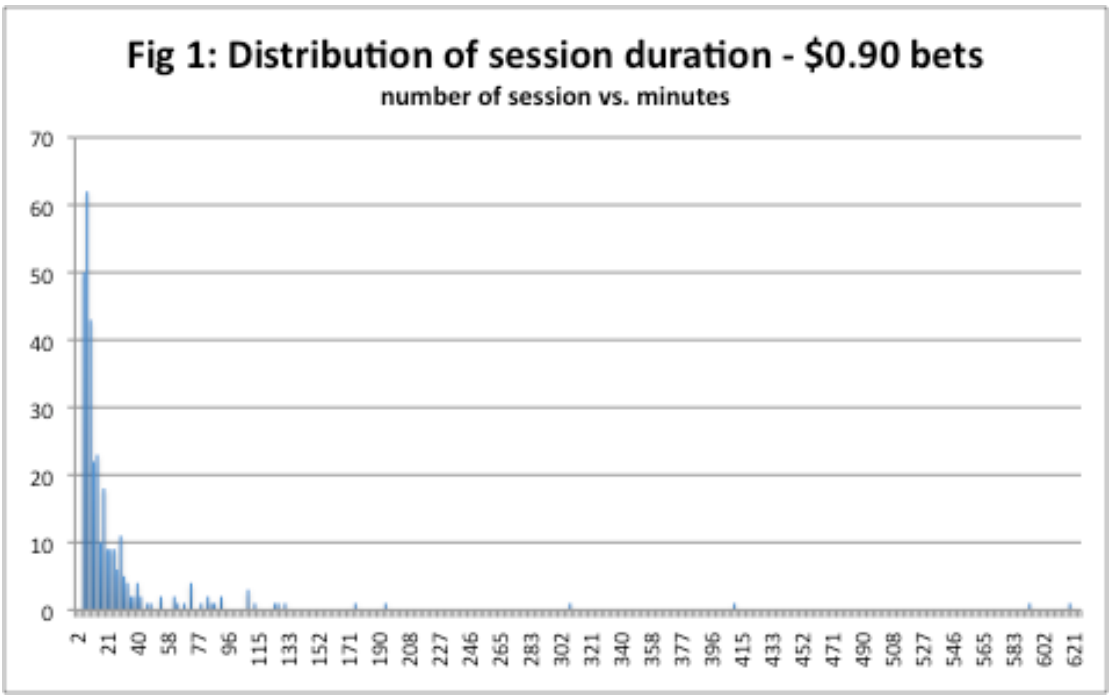
Fig 1: Distribution of session duration - $0.90 bets
number of session vs. minutes
70
60
50
40
30
20
10
0
2
21
40
58
77
96
115
133
152
171
190
208
227
246
265
283
302
321
340
358
377
396
415
433
452
471
490
508
527
546
565
583
602
621

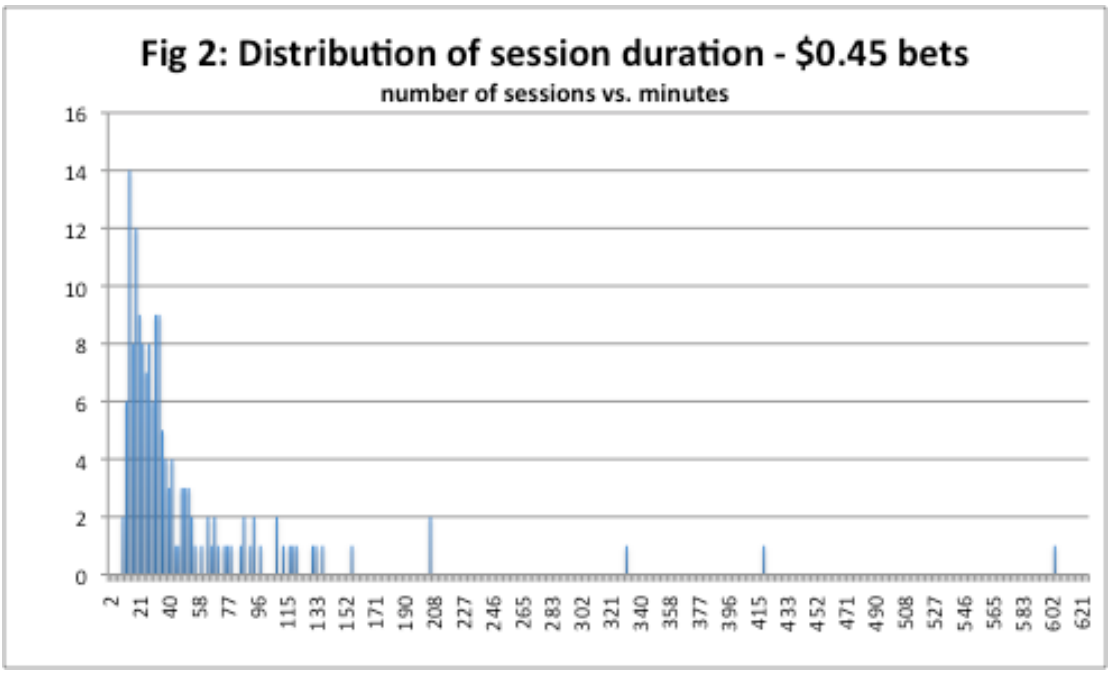
Fig 2: Distribution of session duration - $0.45 bets
number of sessions vs. minutes
16
14
12
10
8
6
4
2
0
2
21
40
58
77
96
115
133
152
171
190
208
227
246
265
283
302
321
340
358
377
396
415
433
452
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490
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527
546
565
583
602
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