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ABB Code for Responsible Gambling and Player Protection

Evaluation of early impact among machine gamblers

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Executive summary

Introduction

- In September 2013, the Association of British Bookmakers (ABB) launched its new Code for Responsible Gambling and Practice ('the Code').

- The Code included a range of measures aimed at reducing gambling-related harm and increasing business responsibility and sustainability.

- New measures introduced by the Code included enhanced staff training on responsible gambling with emphasis on staff interaction with customers; technological changes to machines whereby players could set limits on how long they wanted to gamble for or how much money they wanted to spend; mandatory messages on machines alerting players if they had gambled for 30 minutes or more or inserted £250 or more into the machine; greater advertising of responsible gambling messages; and enhancements of existing practice around age-verification and self-exclusion.

- All aspects of the Code were implemented on 1st March 2014 in bookmakers which signed up to it (termed bookmakers in 'treated' areas). Bookmakers in the West Midlands (termed bookmakers in 'untreated' areas) implemented the Code one month later, on 1st April 2014. This early impact evaluation compared machine gambling sessions in treated bookmakers in March 2014 (that is, after the Code was introduced) with sessions played in untreated bookmakers over the same period. This was to explore whether the introduction of the Code had any impact on machine gamblers' behaviour during the first month of implementation (hence *early impact*).

- This evaluation was limited to analysis of data captured by bookmakers' machines. Therefore, this report assesses the early impact of the Code on machine gamblers, rather than all gamblers within bookmakers. Accordingly, more attention is given to the new machine tools (voluntary limits and mandatory alerts).

Use of voluntary limits and mandatory messages

- Since the implementation of the Code, the ABB has monitored the number of machine gambling sessions where gamblers set voluntary limits or gambled to the extent that one of the mandatory messages was triggered. Analysis of these data showed the following:

  - The use of new voluntary time and money limits on machines was low. Since March 2014, less than 0.5% of machine gambling sessions included a voluntary time or money limit;

  - The proportion of machine gambling sessions that included voluntary limit-setting declined from March 2014. In the first week of December

2014, fewer than 1400 machine gambling sessions out of 3.9 million included players setting a voluntary limit on the amount of money they wished to spend;

- o Mandatory messages alerting machine gamblers that they had played for 30 minutes or had inserted £250 or more into the machine were activated in less than 10% of all machine gambling sessions.

Methods and findings

- The West Midlands was used as a comparison area because this area did not introduce the changes immediately, thus allowing impact estimates to be calculated for March 2014 (when the West Midlands could serve as a comparison area).

- The early impact of the Code was assessed using transactional data recorded by machines for registered loyalty card users so that (potential) differences in previous gambling history could be taken into account. The analysis explored the impact of the Code on four outcomes:

    - o The length of time spent gambling on machines during a session of play;

    - o The amount of money gambled on machines during the session;

    - o The proportion of machine gambling sessions which lasted 30 minutes or more; and

    - o The proportion of machine gambling sessions in which individuals inserted £250 or more into the machine.

- These outcomes were chosen as the ABB and other industry operators anticipated that the Code would result in players gambling in a more controlled way. Spending more time and/or money gambling than intended is generally accepted as a consequence of uncontrolled gambling. Therefore, it was hypothesised that if the Code was to demonstrate any early impact with regard to machines it would be a reduction in the amount of time and/or money spent gambling.

- The analysis first assessed the impact of the Code on sessions played during the first day of its introduction (1st March 2014) to look at the immediate impact on outcomes. Then, the impact throughout March for the same groups of gamblers was explored to look at potential adaptation in behaviours over this month.

- Analysis showed no statistical evidence of any impact of the machine changes (voluntary limits and mandatory alerts), or indeed the broader Code, on session length, money gambled and the proportions of gamblers playing for 30 minutes or more and inserting £250 or more into machines during their session.

Conclusions

- We did not find any statistical evidence that the Code had an impact on the four outcomes considered. Failure to find this statistical evidence is not particularly surprising: less than 10% of sessions included some kind of interaction with the machine-based messages and very few sessions included any kind of voluntary limit-setting. When thinking about the machine-based measures, this means very few people had any exposure to this aspect of the Code.

- However, it is premature to conclude that the findings of this evaluation provide final evidence that the Code is ineffective or effective. Because of funding constraints, this study only looked at a very narrow range of outcomes and was limited to analysing data from machines. We did not consider the broader impact of staff interventions specifically or of responsible gambling messaging, nor the impact of these elements of the Code on non-machine gamblers.

- There are a number of recommendations for further evaluation. This includes research to understand why people do not set voluntary limits on machines, what the right level is at which mandatory messages on machines are triggered, as well as further evaluation of the impact of changes in staff training, and responsible gambling advertising across all gamblers in bookmakers.

Limitations

- This study has a number of limitations. First, analysis only looked at impact upon loyalty card holders who gambled on machines. This was because we needed to be able to take previous gambling history into account in the analysis. However, only around 10% of machine play in bookmakers is attributable to a player with a loyalty card, though loyalty card holders display relatively high levels of problem and at-risk gambling. Therefore looking at impact on those most likely to (potentially) benefit from the Code was useful.

- Second, we only assessed the impact of the Code during March 2014, when the comparison area of the West Midlands was available. There may be longer-term impacts, though assessing them is problematic because analysis cannot rely on the availability of a comparison area (from 1st April 2014 the Code reached national coverage).

- Third, lack of detailed data on gambling at the local level also meant that assessing whether the West Midlands provided an appropriate comparison group for the purpose of estimating impacts was not entirely possible, though some attempt was made to do this.

- Finally, we only analysed a narrow range of outcomes that could be measured through the machine data. Other evaluation methods and techniques could and should be used to explore changes further.

1 Introduction

1.1 The Association of British Bookmakers Code for Responsible Gambling

In September 2013, the Association of British Bookmakers (ABB) published a new voluntary code to promote responsible gambling. The stated aims of this code were to:

> *"create a step change in responsible gambling thinking based around informed choice by adult customers, implementing new consumer protection measures that will make a difference"*[1].

The Code for Responsible Gambling and Player Protection (hereafter referred to as 'the Code') was part of the ABB Harm Minimisation Strategy which focused on improving performance at four levels of harm minimisation. These were:

- Issuing clearer and more accessible information on how to gamble responsibly and highlighting the sources of help available;

- Providing customers with new tools such as mandatory time- and money-based reminders and the ability to set spend and time limits on gaming machines (sometimes known as FOBTs);

- Training staff to detect the signs of potential problem gambling more quickly and to interact more effectively with those customers identified;

- Undertaking more consistent central analysis of data to identify abnormal activity in specific bookmakers and, where possible, relating to individual customers.

To achieve this, a range of new measures were planned and implemented in bookmakers that had signed up to the Code in Spring 2014. These measures included:

- Window displays of responsible gambling messages, with 20% of window displays dedicated to these messages;

- Responsible gambling advertisements displayed within bookmakers' premises;

- Introduction of voluntary limits on machines in bookmakers allowing customers to set limits on how much money and/or time they want to spend on machines;

- Introduction of mandatory messages on machines, whereby a message is displayed to customers telling them when they have gambled for 30 minutes and/or have inserted £250 or more into the machine and asking them if they want to continue;

- Enhanced staff training around responsible gambling and the promotion of more direct intervention with customers;

- Enhancement of existing practice around self-exclusion and age verification through improved staff procedures and practices.

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[1] See Association of British Bookmakers (2013) *The ABB Code for Responsible and Player Protection in Licensed Betting Offices in Great Britain.* London: ABB.

The date of implementation for these new measures, for the majority of bookmakers adhering to the Code, was 1st March 2014. On this date, all staff were trained in the new measures, responsible gambling advertisements were displayed, the ability to set voluntary limits and the mandatory limits and pop-up messages on machines were enabled. The date of implementation for around 95% of bookmakers who signed up to the Code was 1st March 2014. However, in the West Midlands, the implementation date was 1st April 2014. This delay was specifically implemented so that the early impact of the Code could be assessed, using the West Midlands as a comparison group for the purpose of impact evaluation (see Section 2.1).

It is estimated that around 80% of bookmakers are members of the ABB, including the four biggest operators (William Hill, Ladbrokes, Coral and Paddy Power). All members signed up to the voluntary code and supported its implementation in March 2014. In addition, Betfred, which is not a member of the ABB, signed up to the Code. This means that over 80% of bookmakers in Great Britain instituted these changes, making this the largest single change in responsible gambling practice among bookmakers in recent years.

1.2 Understanding the logic of the ABB Code

As outlined above, the Code included changes to staff training, greater publicity of responsible gambling messages, new responsible gambling tools on machines and enhancement to existing practice around age-verification and self-exclusion. To understand the theory underpinning these changes and the anticipated outcomes from the implementation of the Code, a logic model was developed outlining exactly what the Code was intended to achieve and how stakeholders felt these outcomes would be realised. This process was facilitated by researchers at NatCen Social Research and the logic model process is documented in a separate report.[2]

A logic model approach holds that interventions, like those implemented as part of the Code, in almost all cases are based on an underlying logic or theory and are underpinned by a set of assumptions about how an intervention works. The logic model process seeks to understand and map how those responsible for designing and implementing the intervention think it will work. This then provides a framework for understanding the theory of the intervention and allows researchers to plan evaluation around different component parts, using this framework.

Appendix C shows the final logic model developed by those responsible for designing and implementing the Code. In the logic model, the ultimate objectives of the Code were to reduce gambling-related harm and to increase business responsibility and sustainability. This was to be achieved through three parallel streams of work: staff-based measures; machine-based measures; and enhancement to existing practice. For each stream, stakeholders stated how they thought change in behaviour would be achieved, what processes would need to happen to ensure this change occurred, and what risks were likely. With reference to machine-based measures, it was argued that

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[2] See Bridges, S., Hussain, F., Wardle, H. (2015) *Developing a logic model for the Association of British Bookmakers Code for Responsible Gambling and Player Protection.* London: Responsible Gambling Trust.

these ultimate objectives would be achieved through a range of short-term and medium-term outcomes. These included:

Short-term outcomes:

- Increased knowledge of tools available to control gaming behaviour;

- Increased player awareness of responsible gambling and what problem gambling is;

- Increased player awareness of time and money spent on machines;

- Increased player knowledge of how to set voluntary limits on the machine.

Medium-term outcomes:

- Increased player ability to stay in control of their gambling;

- Players increasingly sticking to the limits set;

- Players at risk of gambling-related harm increasingly in control of their machine play;

- Increased numbers of problem gamblers seeking help.

Achieving these outcomes was based on the assumption that players would first notice and second read both the broader responsible gambling messages and the mandatory messages on machines, if triggered. The assumption was also that players would choose to set limits on the amount of time and/or money they spent gambling and that mandatory messages would make them more aware of the amount of money/time they were spending gambling on machines. The fundamental logic underpinning this part of the intervention was that of rational consumers making an informed choice about what to do next when presented with information about their behaviour so far.

Once a logic model is developed, it becomes a framework for researchers seeking to evaluate the impact of an intervention. In this case, it helped us to understand which aspects of the Code could be evaluated using particular measures and helped us to assess how well the underlying 'theory of change' worked.

1.3 This evaluation

This evaluation focuses on the impact of the Code upon machine gamblers, using data collected by machines to explore what this tells us about changes in machine gambling behaviour. This means more attention is given to machine-based measures, which are:

- Use of voluntary time/money limits;

- Mandatory messages telling gamblers they have played for 30 minutes and/or inserted £250 (or more) into the machine, asking them if they want to continue.

However, it is also possible that broader changes within bookmakers as a result of the Code might also have affected machine players' behaviour. Recognising this, an

original and more expansive evaluation design, including focus on staff-based measures, impact of responsible gambling advertising, as well as machine tools, was submitted for consideration. However, funding was only made available to evaluate the early impact of the Code using data collected by machines and not using other methods of investigation. This means that this evaluation is limited to looking at the early impact of the Code on machine gamblers. 'Early impact' means the impact observed in March 2014, when the Code was first implemented in most areas. By 1st April 2014, the Code was implemented nationwide, so it is only March 2014 when data are also available from a comparison area (the West Midlands) to use in impact estimation. This means this evaluation is restricted in the following ways:

1) It only uses machine-based gambling data. Because of this, we can only consider a narrow range of outcome measures, mainly relating to changes in the length of time and money spent gambling, using these as proxies for 'controlled' gambling.

2) It is an evaluation of early impact, as the impact could only be estimated in the month of March 2014, where a comparison area was available. It does not provide evidence of sustained change over time.

The chapters that follow outline the methodology employed to estimate the early impact of the Code on selected gambling-related outcomes. Chapter 2 outlines the choice of the comparison area and presents some key trend data showing interaction with the machine-based measures. Chapter 3 provides an overview of the evaluation methodology. Chapter 4 presents the results of the early impact evaluation, and Chapter 5 discusses the results and makes recommendations for future work.

2 Choice of the comparison area

2.1 Identifying the comparison area

This early impact evaluation was possible because bookmakers in the West Midlands (5% of all bookmakers signing up to the Code) implemented the Code from the 1st April 2014, that is, one month later than the rest of the country. This was a voluntary delay implemented by the ABB to allow data to be collected for the early impact evaluation. Due to this time lag, it was possible to use the West Midlands as a comparison area (or 'untreated' area as it called in this report), and explore the differences between its outcomes and outcomes for the rest of the country (called the 'treated' area), where the Code was implemented from 1st March 2014.

The decision to use the West Midlands as the untreated area was made at a number of levels. First, in evaluation research it is generally ideal to implement the interventions at random to ensure that there are no differences (other than the intervention itself) between areas (or people) receiving the intervention and those that are not. However, for this research, there were significant concerns about possible contamination effects if the intervention was allocated at random at the shop-level. A random roll-out could have resulted in some bookmakers on the same high street implementing the Code and others not. Because regular players may visit a range of different bookmakers, this means we would not have been certain who was subject to the intervention and who was not (risking potential contamination between treated and untreated subjects). We could not be sure that, just because a person was gambling in an untreated shop, they had not previously been subject to the treatment in another shop. Therefore, it was agreed that the comparison area had to be a geographically defined region to help minimise the possibility of contamination effects.[3]

Second, having agreed that the untreated area had to be a geographically defined region, the next consideration was practical. The choice of comparison area was largely predicated based on the extent to which the industry could delay the implementation of the Code at short notice. There were very tight timescales between this project being commissioned (and designed) and the Code being implemented – less than two weeks. At the point at which this study was commissioned (mid-February 2014), all staff had already been trained about the Code and advised that it would start in March, new window displays had been ordered, and a schedule of changes to the machine technology planned. To delay the launch of the Code meant this work plan had to be changed, especially the machine technology, representing a logistical challenge. The industry advised this could be most easily achieved in the West Midlands. Furthermore, because of public commitments to implement the Code in March 2014, permission was only granted to delay the implementation in 5% of bookmakers for a one-month period (i.e., so that by the 1st April 2014 the Code would be fully implemented among all ABB members). This meant the comparison area of the West Midlands was only 'untreated' for one month and that this impact evaluation is in

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[3] We accept that these contamination effects may still have occurred in those shops on the boundary of the West Midlands and other areas.

the unusual position of having an untreated area which is significantly smaller than the 'treated' area.

Whilst there were solid reasons for using the West Midlands as the comparison area, we acknowledge that there may also be limitations and problems. For example, this specific region might in fact exhibit very different gambling habits and patterns from the rest of the country, which would make it an unsuitable comparison to treated areas. To assess this, we analysed the similarity between treated and untreated areas with regard to some observable characteristics of the gamblers (data on individuals' historical gambling patterns) and the average income of areas where the bookmakers are located. This is discussed further in Section 3.4.

We then accounted for existing differences between the West Midlands and the rest of the country, by explicitly controlling for these differences in the impact regression analysis (see Chapter 4). However, we are limited by the data available to us. The extent to which we have successfully controlled for all differences will never be fully transparent as there may be some unobserved area-level characteristics which, due to data limitations, could not be included in this analysis.

2.2 Key machine metrics in treated and untreated areas

To help place the evaluation data in context, this section provides a brief overview of the number of instances when voluntary time limits and voluntary monetary limits on machines were set by gamblers. It also includes information about the number of times mandatory messages about the amount of time and/or the amount of money spent gambling on machines were displayed to players. These are presented for both treated and untreated areas. Trends start from the 1st March 2014 for the former and from the 1st April 2014 for the latter.

The information presented is taken from key performance metrics collected by the ABB which was provided to the research team for the period 1st March 2014 to December 2014. Figures were recorded on a weekly basis so trends week on week could be assessed. To smooth out random fluctuations in the data, the trends are presented as a three-week rolling average. They are also presented as a percentage of all machine gambling sessions[4] undertaken in the three-week rolling period. Further descriptive information about the use of voluntary limits and the display of mandatory messages is provided in Appendix B.

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[4] A session of machine gambling is typically defined as someone inserting cash into the machine, gambling for a period of time and then leaving the machine. This is identified in industry data through an algorithm which looks at characteristics such as the length of time the machine was dormant, gambling to extinction of funds and/or cashing out, to define the start and end of each unique session of play. This information is then used to identify how many discrete sessions of machine gambling have been conducted. People can have more than one session per day, therefore the number of sessions does not equate to the number of people – this is unknown.

Figure 2.1 shows the percentage of all machine gambling sessions where a player chose to set a voluntary limit on the amount of money they wished to gamble with. The percentage of sessions where a voluntary money limit was set was low; less than 0.5% of all machine gambling sessions included a voluntary limit on money (there are typically around four million machine gambling sessions per week). Figure 2.1 also shows that, in both treated and untreated areas, there is a clear declining trend over time. When the measure was first introduced (March for treated and April for untreated areas) a greater proportion of sessions included a voluntary limit on money than in subsequent months. This may be due to staff demonstrating to users how to set limits. By mid-June 2014, this had declined rapidly, and thereafter stabilised at under 0.1% of all sessions in treated areas and below 0.05% of all sessions in untreated areas. Whilst the trend of gradual decline is evident in both areas, the proportion of sessions which included a limit on the amount of money spent was consistently lower in untreated areas than treated areas.

Figure 2.1 Proportion of machine sessions where voluntary money limits set (three-week moving averages), by treated and untreated location

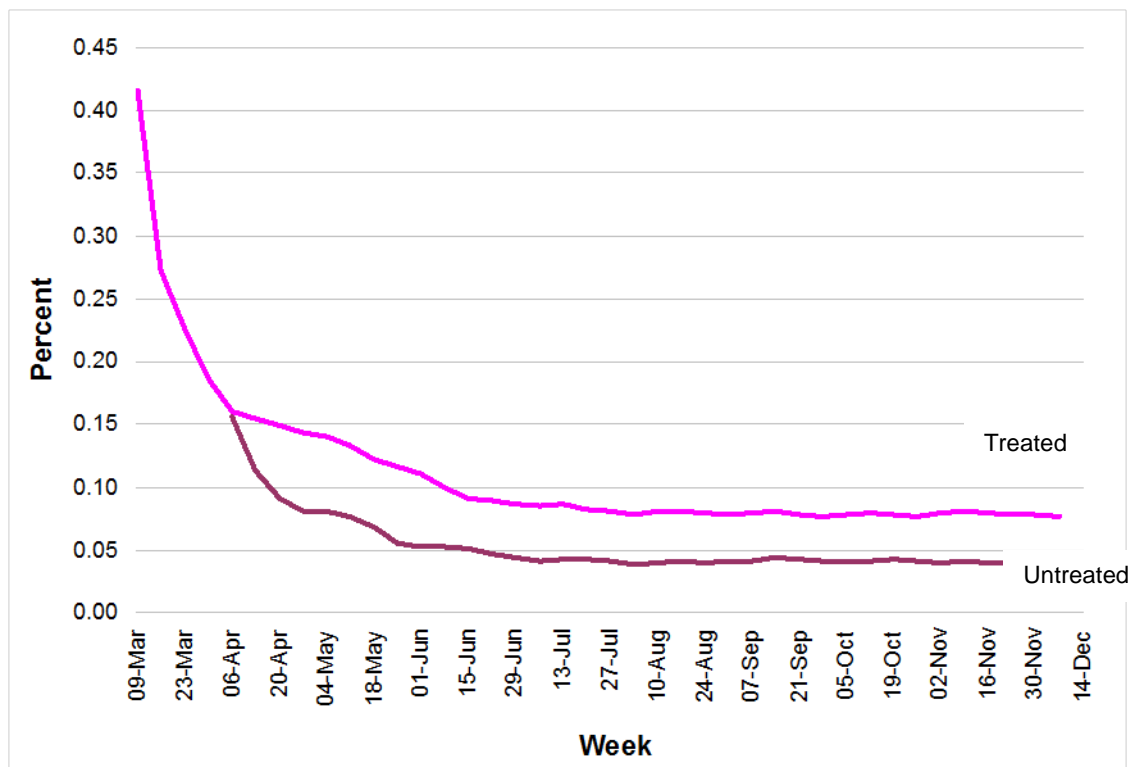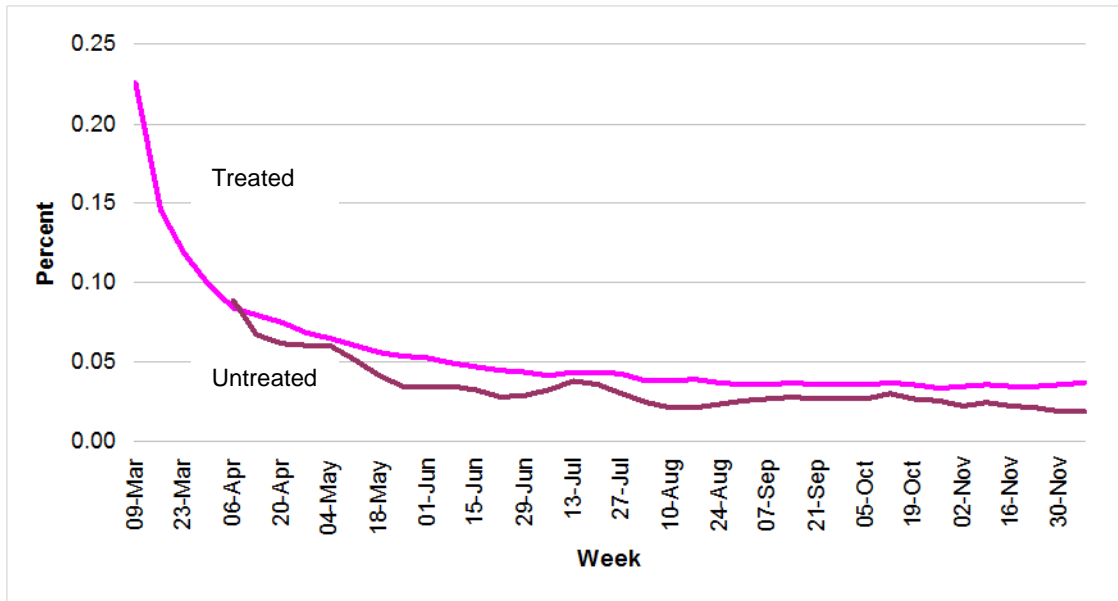Figure 2.2 shows the proportion of sessions which included voluntary limits on the amount of time spent gambling. The patterns are very similar to voluntarily setting monetary limits in that the percentage of sessions which included this is very low and decreased rapidly from when the Code was implemented. The proportion of sessions which included a time limit was also somewhat lower in untreated areas than treated areas.

Figures 2.3 and 2.4 show the percentage of sessions where a mandatory message was displayed because the player had gambled for 30 minutes, and the percentage of sessions where a mandatory message was displayed because the player had inserted £250 or more into the machine, respectively.

Comparing Figures 2.1 and 2.2 with 2.3 and 2.4, we can see that mandatory messages affect a greater proportion of sessions than voluntary limits. Between 2.5% and 3.5% of sessions included a mandatory message about the amount of money loaded into the machine in a single session. Rates were slightly higher in treated areas than untreated areas. In the former areas, the proportion of sessions displaying a mandatory money message appeared to increase by 0.5 percentage points (ppts) between April and December 2014, whereas the increase was stronger in untreated areas over the same period – around a 0.7ppt increase. With regards to mandatory time limits, around 6-7% of sessions displayed this message, with figures being similar between treated and untreated areas.

Figure 2.3 Proportion of machine sessions where mandatory money alert activated (three-week moving averages), by treated and untreated location
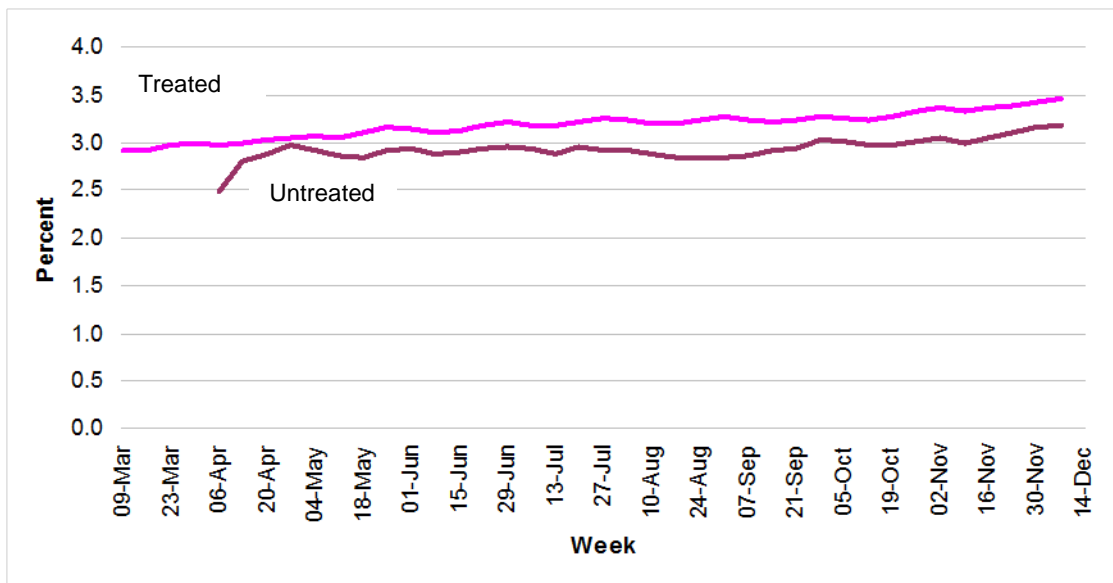
Figure 2.4 Proportion of machine sessions where mandatory time alert activated (three-week moving averages), by treated and untreated location
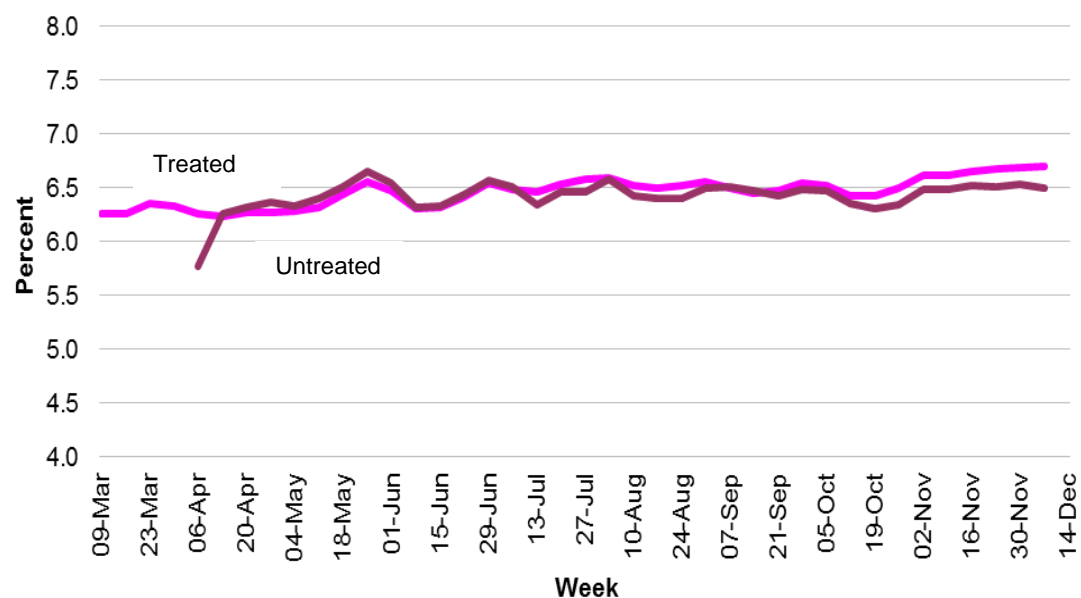
Overall, Figures 2.1 to 2.4 suggest that the voluntary limits and mandatory messages only affected a minority of machine gambling sessions, and are therefore likely to only have affected a minority of machine gamblers. This has implications for assessing the impact of machine-based measures. For example, by December 2014, voluntary limits on money were being set in less than 1400 gambling sessions per week, out of around 3.9 million machine gambling sessions overall, showing very low uptake of this function.

3 Empirical methodology

In the sections that follow we describe the data used to assess the early impact of the Code, outline how we define impact, and provide an overview of our methods.

3.1 Data used for early impact evaluation

The scope of the early impact evaluation was limited to analysing data collected directly from gambling machines in both treated and untreated areas. These data are essentially transactional information which tracks the money put into and paid out of machines in bookmakers. Algorithms are applied to this data to identify continuous periods of gambling that are likely to belong to a single session of play for one person. When a loyalty card is used, information about these gambling sessions can then be attributed to the same individual over time and their machine gambling history can be traced. However, only around 10% of sessions can be linked to a loyalty card – the majority of transactional data is anonymous, in that we do not know who was gambling at that time or how often they had gambled previously.[5]

For the early impact evaluation, the decision was made to analyse transactional data for registered loyalty card users only. This choice was mainly driven by the fact that it is only possible to produce individual-level analysis for this group as broader transactional data are not identifiable to a specific person. Using loyalty card data allowed us to control for individuals' past gambling behaviour in the estimation of impacts. Another reason for the focus on registered loyalty card users is that this group is thought to include a very high number of 'at-risk' players.[6] Therefore, from the perspective of evaluating the effectiveness of the Code on the ultimate objective of reducing gambling-related harm, exploring the impact of the changes on outcomes for this group is potentially more informative than focusing on all machine gamblers indiscriminately.

Data on sessions played by registered loyalty card users were provided by Inspired Gaming (Inspired) and Scientific Games (SG), who between them supply all bookmakers in Great Britain with machines. These data were collected, combined and processed by Featurespace, a company specialising in behavioural analytics. Data from 1st September 2013 to 30th June 2014 were available from Inspired, while data from 1st March 2013 to 30th June 2014 were available from SG.

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[5] For more information about the use of loyalty cards in bookmakers, see Wardle et al, (2014) *Report 2: Identifying problem gambling: findings from a survey of loyalty card customers.* London: Responsible Gambling Trust.

[6] A survey of loyalty card holders who played machines in a bookmaker's showed that 23% were problem gamblers and a further 24% were at moderate risk from their gambling behaviour. See Wardle et al, (2014) *Report 2: Identifying problem gambling: findings from a survey of loyalty card customers.* London: Responsible Gambling Trust.

3.2 Defining outcomes and time period for analysis

We explored the impact of the Code on four outcomes observed following the implementation of the Code in March 2014. These were:

- The length of the sessions;

- The amount of money played during the session;

- The proportion of sessions which lasted 30 minutes or longer;

- The proportion of sessions in which individuals inserted £250 or more into the machine.

These outcomes were chosen as stakeholders developing the logic model stated that the Code's objectives included increasing customer ability to stay in control of their gambling, players sticking to the limits set, and at-risk gamblers increasingly staying in control of their machine play. The gambling studies literature recognises that loss of control often relates to spending more time and/or money than originally intended. Therefore, if players are gambling in a more controlled way, one would expect to see some small reductions in the amount of money and/or time spent gambling on machines.

The impact of the Code on the aforementioned four outcomes was assessed for the same cohort of gamblers (those who played their first machine gambling session on 1st March 2014) across different points in time within March 2014:

1) the first day of the month (to explore gamblers' immediate reaction to the Code); and

2) the middle and last day of the month (to explore gamblers' adaptation and further reaction to the Code).

Using the same cohort of gamblers allowed us to contrast the impact on gamblers' first, middle and last session of machine play for the same individuals, and assess changes within the first month of the implementation of the Code.[7] As not all those who played their first session on 1st March 2014 also had a session on 15th and 31st March, the middle session was calculated as the closest session to 15th March and the last session was the one closest to 31st March (See Appendix A for more detail on the distribution of these sessions).

This analytic strategy was developed as we recognised that analysis of the first session played on 1st March 2014 was not free of problems. Staff members were instructed to demonstrate to players how the new machine tools worked, which could have affected results; for example, individuals may have set a limit in this first session as they were encouraged to do so by staff, but may not have done this in later sessions.

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[7] If a gambler played only one other session after the first session on the 1st of the month (i.e., they played only two sessions within the month considered), this session was used as both the middle and last session. The distribution of dates for the middle and last sessions is provided in Appendix A.

3.3 Definition of impact

Following the evaluation literature[8] we estimated the impact of the Code (hereafter called the 'treatment') on the four specified outcomes for those who played machines in bookmakers located in areas where the Code was introduced.[9] The impact is defined as the difference between the average outcome (post-treatment) for gamblers who played in treated bookmakers and the average outcome that the same gamblers *would have* experienced had the Code not been introduced. As the latter outcome (known in the evaluation literature as the 'counterfactual') is unknown, the average (post-treatment) outcome observed for gamblers who played in untreated bookmakers (i.e., those located in the West Midlands) is used instead as an estimate of the counterfactual. The impact of the machine changes can then be calculated as:

$$\text{Impact} = Y_{Post-treatment}^{Treated} - Y_{Post-treatment}^{Untreated} \qquad (1)$$

where Y indicates the outcome under investigation.

3.4 The difference-in-differences (DID) approach to impact estimation

Calculating the impact of the Code as a simple post-treatment difference in average outcomes between gamblers in treated and untreated bookmakers (using equation (1) in Section 3.3) could, however, result in misleading conclusions. This is because there may be some pre-existing differences between areas that we need to take into account. We can clarify this with a simple example. First assume that, prior to the introduction of the Code, gamblers in treated bookmakers gambled for longer than those in untreated bookmakers (say six minutes in treated bookmakers vs two minutes in untreated bookmakers). If the introduction of the Code resulted in shorter sessions in treated areas (falling from six minutes to four minutes) whilst session length stayed the same in untreated bookmakers (at two minutes), simply comparing the differences post treatment of the Code using equation (1) would give the wrong estimate of impact. Using equation (1) to calculate the difference in session length, post intervention, between treated and untreated areas would in fact give a positive difference between them of two minutes, erroneously showing the impact of the Code to be a two-minute increase in session length (calculated as four minutes in treated areas post intervention minus two minutes for untreated areas post intervention).

Therefore, we need to take into account that, prior to treatment, session length differed between treated and untreated areas. This can be done using the DID approach to impact estimation and means we can estimate the true impact of the Code. Applying the DID approach in this example means we would observe a two-minute reduction in

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[8] See Blundell, R., Costa Dias, M. (2000) Evaluation methods for non-experimental data. *Fiscal Studies* (2000) 21, (4): 427–468.

[9] Technically, this impact is known as the Average Treatment effect on the Treated (ATT). In our case, it represents the effect that the treatment (machine changes brought about by the Code) had, on average, on treated individuals (gamblers in all UK regions except the West Midlands). This means that the impact explored here reflects the effect of the Code in all UK regions except the West Midlands, and therefore the results of this evaluation cannot be extended to the UK as a whole.

session length over time for treated bookmakers while no change was observed for untreated bookmakers.

This example shows the importance of taking pre-existing differences between treated and untreated bookmakers into account when assessing impact. Because of this, in this evaluation, the DID method was used to avoid miscalculating the impact of the Code.[10] In short, the DID approach estimates the impact of the Code in the period following the introduction of these changes, discounting initial differences in outcomes between gamblers in treated and untreated bookmakers. The formula used is as follows:

$$\text{Impact (DID)} = (Y^{Treated}_{Post-treatment} - Y^{Untreated}_{Post-treatment}) - (Y^{Treated}_{Pre-treatment} - Y^{Untreated}_{Pre-treatment}) \quad (2)$$

To use the DID equation, we first need to define four cohorts of machine gamblers in order to estimate the impact of the Code upon each outcome. These cohorts were:

– **Cohort A (Gamblers in treated bookmakers, observed pre-treatment)**: This cohort was identified as all registered loyalty card users who played at least one session in treated bookmakers on 1st February 2014;[11]
– **Cohort B (Gamblers in treated bookmakers, observed post-treatment)**: All registered loyalty card users who played at least one session in treated bookmakers on 1st March 2014;
– **Cohort C (Gamblers in untreated bookmakers, observed pre-treatment)**: All registered loyalty card users who played at least one session in untreated bookmakers on 1st February 2014;
– **Cohort D (Gamblers in untreated bookmakers, observed post-treatment)**: All registered loyalty card users who played at least one session in untreated bookmakers on 1st March 2014.

The use of four cohorts in the impact analysis (illustrated in Figure 3.1) means that the DID methodology employed a repeated cross section analytical approach.[12] Where multiple sessions were observed for the same player on the 1st of the month (within

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[10] The DID approach used here controls for unobserved individual fixed effects (individual characteristics affecting the outcomes which are constant over time) and unobserved common macro shocks (determinants of outcomes which affect those in treated and untreated areas in the same way at a specific point in time), as these effects are removed by double differencing the outcomes. However, the DID methodology is not able to control for effects varying simultaneously over time and across individuals.

[11] The choice of individuals who gambled on 1st February 2014 as the pre-treatment cohort was made because of our choice of 1st March 2014 as the post-treatment cohort. Both days were Saturdays and were days when those on monthly pay schedules would have been paid, reducing risk of introducing bias because of differences in the day of the week between the pre- and post-treatment cohorts.

[12] Using a repeated cross section approach implies that gamblers in the treated (or untreated) cohort observed pre-treatment are not necessarily the same gamblers included in the treated (or untreated) cohort observed post-treatment. This is because not all gamblers who played their first session on 1st March 2014 also played a session on 1st February 2014, meaning that a panel data approach to estimation was not feasible. The applicability of the repeated cross section approach relies on the assumption that the composition of a specific group (i.e., the characteristics of gamblers in treated or untreated areas) remains constant over time (i.e., before and after the Code was introduced).

each cohort, some people played more than one session), only the first session was considered.

Figure 3.1 DID impact analysis set-up

01-Feb-14	01-Mar-14	01-Apr-14		
A: Treated cohort (Pre-treatment)	B: Treated cohort (Post-treatment)			
C: Untreated cohort (Pre-treatment)	D: Untreated cohort (Post-treatment)			
	Treatment point			
	Changes to ABB code of conduct introduced in all areas except the West Midlands	Changes to ABB code of conduct extended to West Midlands		

The February cohorts (A and C) were chosen as the pre-treatment cohorts as this made it possible to include, for those who gambled in February, analysis of historical variables summarising their behaviour over the previous four months (from 1st October 2013 to 31st January 2014).[13]

The sample size available for analysis (19,494 individuals) was determined by the number of gamblers observed within each of the four cohorts, as shown in Table 3.1. All outcome and control data were available (i.e., non-missing) for these 19,494 individuals.

Table 3.1	Sample sizes (number of gamblers using loyalty cards), by treatment group	
	Pre-treatment (1st Feb 2014)	Post-treatment (1st March 2014)
Treated bookmakers	9,028 (Cohort A)	9,202 (Cohort B)
Untreated bookmakers	626 (Cohort C)	638 (Cohort D)

The number of gamblers included in the untreated cohorts (C and D) is almost 15 times higher than the number of gamblers included in the treated cohorts (A and B). This reflects the smaller untreated population (loyalty card machine gamblers who played in bookmakers located in the West Midlands) compared with the treated population (those who gambled on machines in bookmakers located in the rest of the country).

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[13] Data available for September 2013 were deliberately not used as they may have been needed to run pre-programme tests to assess the parallel trend assumption underlying the DID methodology. This being the case, historical variables for two additional cohorts (January 2014) would need to be constructed using data from 1st September 2013 to 31st December 2013.

Once the four cohorts were identified, and the average values within each cohort for each outcome calculated, the impact of the Code was calculated (using equation (2)) as follows:[14]

$$\text{Impact (DID)} = (Y_B - Y_A) - (Y_D - Y_C) \quad (3)$$

Finally, the DID methodology was implemented within a regression framework.[15] This made it possible to estimate the impact of the Code by simultaneously controlling for other initial (i.e., pre-treatment) differences between gamblers in treated and untreated bookmakers. These individual-specific characteristics were controlled for in the analysis to ensure that the estimated impacts reflected the effect of the Code *per se* rather than other pre-treatment differences between gamblers in treated and untreated bookmakers. The DID regression analysis used the following control variables:[16]

- The average length of the sessions played by the gambler in the previous four months (in minutes);[17]

- The average amount of money played by the gambler in sessions over the previous four months (in £s);

- The total time spent by the gambler playing sessions in the previous four months (in minutes);

- The average profit made by the gambler in sessions played over the previous four months (in £s);

- The average percentage of sessions, among those played over the previous four months, which lasted over 30 minutes;

[14] The DID methodology relies on two main assumptions. The first one is the 'parallel trend' assumption, and posits that in the absence of treatment the outcomes in the treated and untreated areas follow the same trend. This assumption justifies using the average outcome observed for untreated areas as a proxy for the counterfactual (as explained, the latter is the hypothetical outcome which would be observed in treated areas had the treatment not been implemented). The second assumption is the 'constant composition' assumption, and implies that the characteristics of gamblers in treated and untreated areas do not vary after the introduction of (and as a consequence of) the treatment. Whereas the 'constant composition' assumption is hard to test, due to the existence of unobserved gamblers' characteristics affecting the outcomes, the plausibility of the 'parallel trend' assumption can be explored conducting pre-programme tests. See Heckman, J.J., Hotz, V.J. (1989) Choosing among Alternative Nonexperimental Methods for Estimating the Impact of Social Programs: The Case of Manpower Training. *Journal of the American Statistical Association*. 84(408): 862-74.

[15] Initially, we anticipated using a propensity score matching approach to estimating impacts. However, after reviewing this, a regression analysis was considered more appropriate because we observe a very large treated group compared with the untreated group. Prior research suggests that propensity score matching is the most appropriate approach to estimate impacts when the control sample is large and the treated sample is relatively small (which is not our case). Using propensity score matching would have meant that a match (untreated gambler) was not available for most of treated gamblers. This would have reduced the sample to a small subset of treated gamblers, casting doubts about the estimation of the impact to the population of interest (all gamblers in treated areas).

[16] Each outcome regression used different control variables, i.e., not all the variables listed were used when estimating the impact on a specific outcome. Some variables were included in logarithms as this enhanced satisfaction of the assumptions underlying the OLS regression (linearity of the relationship between dependent and independent variables, homoscedasticity of the errors and normality of the error distribution).

[17] For a gambler playing their first session on 1st March 2014, this means calculating the average length of the sessions played between November 2013 and February 2014.

- The average percentage of sessions, among those played over the previous four months, where more than £250 was gambled;

- The average weekly income of people living in the area where the bookmaker's venue was located (in £s).[18]

The rationale for controlling the aforementioned variables is not clear-cut. Therefore, their inclusion in analysis constitutes an *attempt* to explore some possible determinants of the gambling-related outcomes considered by this evaluation. For example, it is plausible to assume that an individual is more likely to play short sessions today if they have played short sessions in the past. Similarly, it is possible that an individual is more likely to insert small amounts of money if they have a history of playing small sums. The total time spent in the past four months is used as a proxy for an individual's engagement in gambling, which is known to be related to increased likelihood of gambling-related harm. Finally, it is reasonable to believe that individuals who played in bookmakers located in areas of higher average income are more likely to play longer sessions or insert more money into machines compared with those who played in bookmakers located in low income areas (the implicit assumption made here, in order to use average weekly average income as a control, is that gamblers play in bookmakers located in the area where they live).

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[18] This was obtained from National Statistics data and merged onto data using the postcode details of the venue. See:
http://www.neighbourhood.statistics.gov.uk/dissemination/Info.do?m=0&s=1418656992505&enc=1&page=analysisandguidance/analysisarticles/income-small-area-model-based-estimates-200708.htm&nsjs=true&nsck=false&nssvg=false&nswid=1920

4 Results

4.1 Descriptive analysis

4.1.1 Differences in outcomes by cohort

In Table 4.1, descriptive analysis comparing median values for each of the four outcomes of interest is presented for each cohort. Understanding these differences is important for the DID analytical approach.

Table 4.1	Descriptive statistics on outcome variables (first sessions), by treatment group	
	Pre-treatment (1st Feb 2014)	Post-treatment (1st March 2014)
Treated bookmakers	(Cohort A)	(Cohort B)
Median session length (in minutes)	8.0	8.1
Median money inserted per session (£s)	20	20
Proportion of sessions lasting over 30 minutes	12.8%	13.1%
Proportion of sessions where more than £250 cash was inserted into the machine	3.9%	3.5%
Untreated bookmakers	(Cohort C)	(Cohort D)
Median session length (in minutes)	8.2	8.1
Median money inserted per session (£s)	20	20
Proportion of sessions lasting over 30 minutes	13.3%	14.3%
Proportion of sessions where more than £250 cash was inserted into the machine	3.4%	4.9%

As Table 4.1 shows, the central tendency for session length in treated bookmakers after the Code was implemented was 8.1 minutes (see cohort B).[19] This was also the median session length observed for untreated bookmakers in the post-treatment period (cohort D). In the period before the Code was implemented, the median session length was slightly lower in treated bookmakers (8.0 minutes; cohort A) than untreated bookmakers (8.2 minutes; cohort C). Looking at how these figures changed over time (i.e., comparing pre- and post-treatment medians), we can see that the median session length increased (by 0.1 minutes) in treated bookmakers but decreased (by 0.1 minutes) in untreated bookmakers.

[19] Medians are presented in this section rather than averages. In the distribution of sample or population data, the median is the value separating the higher half from the lower half of the data. It is a more appropriate measure of central tendency (meant to represent a typical value for the sample or population) than the mean when the distribution is skewed (i.e. not a bell-shape, normal distribution).

The median amount of money played per session was £20 in both treated and untreated areas. This was irrespective of whether this outcome variable was observed before or after the implementation of the Code. Essentially, the median amount of money gambled per session did not vary either over time (before and after treatment) or between areas (treated and untreated bookmakers).

Table 4.1 also shows the proportion of sessions which lasted over 30 minutes. This was higher in untreated areas than treated areas. This difference was observed both pre- and post-treatment, as shown in Figure 4.1. As can be seen from Figure 4.1, the increase in the proportion of sessions over 30 minutes between the pre- and post-treatment period was most marked in untreated bookmakers (a 1ppt increase) compared with treated bookmakers (a 0.3ppt increase).

Figure 4.1 Changes in the percentage of sessions which lasted over 30 minutes in treated and untreated bookmakers

Base: All respondents
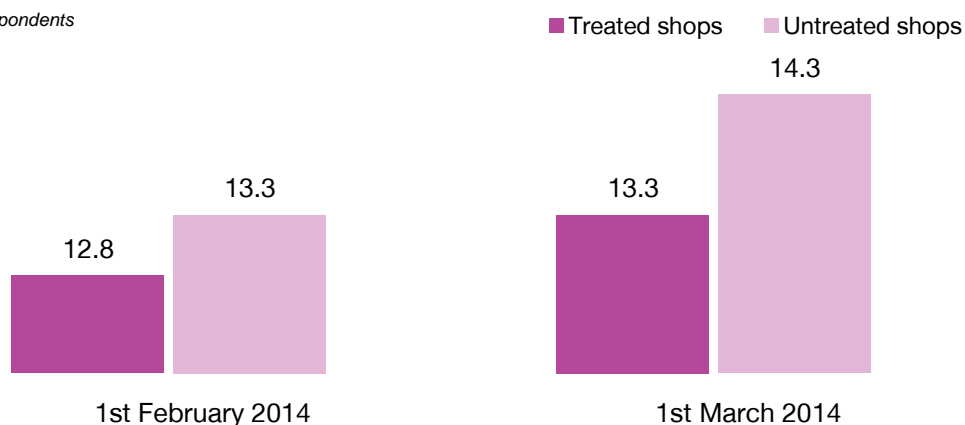
Finally, Table 4.1 shows that in the pre-treatment period the proportion of sessions where £250 or more was inserted into the machine was higher in treated areas than untreated areas (3.9% and 3.4%, respectively). However, the situation was reversed in the post-treatment period: 4.9% of machine players in untreated bookmakers gambled £250 or more in their first monthly session of gambling, compared with 3.5% in treated bookmakers. Between the pre- and post-treatment period, the proportion of sessions where £250 or more was inserted into machines reduced by 0.4ppts in treated bookmakers but increased by 1.5ppts in untreated bookmakers.

Using equation (3) we can calculate the DID impacts based on the descriptive statistics reported above. The results of these calculations suggest that in treated bookmakers the introduction of the Code resulted in an increase in session length (by 0.2 minutes), produced no impact on the amount of money played, and reduced both the proportion of gamblers playing over 30 minutes (by 0.7ppts) and the proportion of gamblers playing more than £250 (by 1.9ppts). However, it is important to remember that while these impacts account for baseline (pre-treatment) differences in outcomes between treated and untreated areas, they do not take into account other characteristics that could have potentially influenced these outcomes. These differences are considered in the section that follows.

4.1.2 Differing characteristics between cohorts

Table 4.2 shows the extent to which gamblers in treated and untreated areas varied by a range of characteristics. The characteristics presented are those identified as control variables to be used in the regression analysis (see Section 4.2). This analysis uses the historical gambling behaviour observed in the prior four months for individuals belonging to each cohort.

Looking first at the post-treatment cohorts (B and D), we can see that the (median of the) average session length of those in treated bookmakers was similar to the (median of the) average session length of those in untreated bookmakers (the medians were 11.3 and 11.1 minutes, respectively). Historically, gamblers in treated bookmakers (cohort B) gambled a similar amount of money to those in untreated bookmakers (cohort D; medians were £35.6 and £35.5, respectively). Similarly, the median (of the average) percentage of sessions which lasted for 30 minutes or longer was the same for gamblers in treated (cohort B) and untreated (cohort D) bookmakers (5.5%) as was the median (of the average) percentage of sessions where gamblers played with £250 or more (0.0%). However, the history of gamblers in treated bookmakers was characterised by a shorter total amount of time spent on machines than that of gamblers in untreated bookmakers (approximately 480 and 520 minutes, respectively). Net expenditure for a typical session played in the previous four months was also slightly lower for gamblers in treated bookmakers than those in untreated bookmakers (we observe a median loss of £7.5 for the former and of £7.2 for the latter). Finally, treated bookmakers were located in areas with higher weekly average income than untreated bookmakers (approximately £390 for cohort B and £340 for cohort D).

Comparing the two cohorts observed in the pre-treatment period (cohorts A and C), there are some similarities to the patterns noted above. On the typical session played over the previous four months, gamblers in treated bookmakers suffered higher losses than gamblers in untreated bookmakers. They also spent less time overall gambling on machines than their untreated counterparts. The percentage of sessions where gamblers played more than £250 was the same for treated and untreated bookmakers (again 0.0%), and the proportion of gamblers with sessions lasting 30 minutes or longer was similar (5.8% and 6.0% respectively). Treated bookmakers were located in areas with higher weekly average income than untreated bookmakers. However, there were also some differences in patterns. Gamblers in treated bookmakers (cohort A) had slightly shorter individual gambling sessions than gamblers in untreated bookmakers (cohort C; 11.4 minutes vs 11.7 minutes, respectively) and they bet slightly higher amounts of money per session (£35.7 vs £34.2).

As reported above, either before or after the Code was introduced, it appears as though there were some differences between gamblers in treated and untreated areas. However, when explicitly tested, these differences were not statistically significant, with the exception of differences relating to weekly average income.[20] Overall, this suggests that gamblers who played in bookmakers located in the West Midlands and those who gambled in the rest of the country showed similar historical patterns of gambling. In this respect, the composition of treated and untreated bookmakers was very similar, which provides some reassurance that the West Midlands is a suitable comparison area for

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[20] Differences between medians of treated and untreated areas at a specific point in time (either before or after the introduction of the Code) were tested using the Wilcoxon rank-sum test.

the purpose of this impact evaluation (still bearing in mind that some unobserved/unobservable characteristics of gamblers may have not been controlled for in the analysis due to limits on data availability). However, what did seem to differ between treated and untreated bookmakers was that the former included geographical areas characterised by a population with a higher weekly average income than the latter. All control variables (including those which were not found to be statistically different between treated and treated areas) were included in the regression analysis in order to improve the efficiency of the impact estimates (i.e., reduce their standard errors).

Table 4.2 Descriptive statistics on control variables, by treatment group		
	Pre-treatment (1st Feb 2014)	Post-treatment (1st March 2014)
Treated bookmakers	(Cohort A)	(Cohort B)
Median of the average session length over sessions in the four past months (in minutes)	11.4	11.3
Median of the average money played over sessions in the past four months (in £s)	35.7	35.6
Median of the total time spent playing sessions in the past four months (in minutes)	517.7	477.2
Median of the average profit gained over sessions in the past four months (in £s)	-7.7	-7.5
Median of the average weekly disposable income in shop area (in £s)	390.5	390.8
Median of the average percentage of sessions over 30 minutes in the past four months	5.8%	5.5%
Median of the average percentage of sessions over £250 in the past four months	0.0%	0.0%
Untreated bookmakers	(Cohort C)	(Cohort D)
Median of the average session length over sessions in the past four months (in minutes)	11.7	11.1
Median of the average money played over sessions in the past four months (in £s)	34.2	33.5
Median of the total time spent playing sessions in the past four months (in minutes)	556.9	522.9
Median of the average profit gained over sessions in the past four months (in £s)	-6.8	-7.2
Median of the average weekly disposable income in shop area (in £s)	345.1	342.5
Median of the average percentage of sessions over 30 minutes in the past four months	6.0%	5.5%
Median of the average percentage of sessions over £250 in the past four months	0.0%	0.0%

4.2 Results from the impact regression analysis

In this section, results from the regression analysis conducted to estimate the impact of the Code are presented. This analysis used the DID methodology discussed in Section

3.4, and includes the control variables listed in Section 4.1.2, which takes into account differences between the treated and untreated areas/gamblers.

We first present the impact of the Code on the first gambling sessions played on 1st March 2014. This looks at the immediate impact of the Code. This is followed by the analysis of impact on mid-month sessions and final sessions within the month for those who had gambled on 1st March 2014, to examine possible adaptations to the Code throughout March 2014.

Table 4.3 shows the estimated impact of the Code on the four outcomes relating to gamblers' first sessions (that is, the first session of machine play among those who gambled on 1st March 2014). The outcomes considered were: the length of the session; the amount of money played; the proportion of sessions which lasted for 30 minutes or longer; and the proportion of sessions where gamblers played with £250 or more.

The impact estimates reported in Table 4.3 suggest that, as a result of introducing the Code, the length of a session increased by 0.1 per cent, the amount of money gambled increased by 2.6 per cent, the proportion of gamblers playing sessions longer than 30 minutes decreased by 1.2ppts, and the proportion of gamblers inserting £250 or more into machines decreased by 2.0ppts.[21] However, none of the impact estimates reported in the table were found to be statistically significant (statistical significance at the 5% level was considered). This means that, regardless of the size and direction of the estimates presented in Table 4.3, the analysis does not provide statistical evidence that the Code had an impact on the outcomes explored when looking at the first session of machine gambling.

Table 4.3	Impact of the Code on the four outcomes explored: First machine gambling session on 1st March 2014		
Average session length (percentage)	Average amount of money inserted during the session (percentage)	Proportion of gamblers with sessions lasting over 30 minutes (percentage points)	Proportion of gamblers who inserted more than £250 during their session (percentage points)
0.1	2.6	-1.2	-2.0
Sample size: 19,494 machine gamblers using a loyalty card			

[21] The impact estimate reported in the first column of Table 4.3 is to be interpreted in the following way: on average, the length of the sessions played by gamblers in treated shops was 0.1 per cent higher than it would have been had the Code not been introduced in these shops. The hypothetical outcome which would have been experienced by treated shops in the absence of the code cannot be observed in reality and therefore the average length of sessions played in untreated shops on 1st March (i.e. post-treatment) is used in its stead in the estimation of the impact. Put simply, the impact of the code on session length is the difference between the average session length observed in treated and untreated shops after the implementation of the code. Similarly, the impact reported in the second column means that average amount of money played by gamblers in treated shops was 2.6 per cent higher compared to what it would have been in the absence of treatment; the proportion of gamblers playing sessions longer than 30 minutes is 1.2 percentage points lower (and the proportion of gamblers playing over £250 is 2.0 percentage points lower) than it would have been had the changes to the Code not been introduced.

In order to assess whether change in behaviour required longer exposure to the Code (i.e., whether more than one session was required for gamblers to adapt to the Code), we explored the impact of machine changes on the same outcomes for gamblers' middle and last session of play in March. Impact estimates are showed in Table 4.4. Once again none of the estimates were found to be statistically significant, which means that the impact analysis did not find evidence suggesting a positive (or negative) impact of the Code later in time. The implication of this is that available data do not empirically support the hypothesis that gamblers reacted to the Code later in time, gradually modifying their behaviour. (Fuller details on these analyses, including p-values, are given in Appendix A.)

Table 4.4	Impact of the Code on the four outcomes explored: First machine gambling session on 1st March 2014			
	Average session length (percentage)	Average amount of money inserted during the session (percentage)	Proportion of gamblers with sessions lasting over 30 minutes (percentage points)	Proportion of gamblers who inserted more than £250 during their session (percentage points)
Mid-month session	-0.6	2.2	-0.0	-0.7
Last session of the month	5.4	11.1	1.0	0.0
Sample size: 18,224 machine gamblers using a loyalty card				

5 Discussion

5.1 Summary of results

The Code includes a number of different elements. In the logic model, this was summarised under three areas: staff actions, machine tools and enhancing existing practice. Whilst this report looks at the early impact of the Code, more attention is given to the new responsible gambling tools embedded within the machines (namely, the setting of voluntary money and time limits and the display of mandatory time and money alerts). This is because resource constraints meant that only transactional data from machines were available for analysis, meaning this evaluation was therefore limited to examining impact upon machine gamblers. Furthermore, because we needed to account for differences in previous gambling history, we focused on registered loyalty card users who played machines. Therefore, the results presented here pertain only to this subset of gamblers.

The analysis showed no statistical evidence of any impact of the machine changes, (voluntary limits and mandatory alerts), or indeed the broader Code, on session length, money played, the proportion of machine players gambling for 30 minutes or longer and the proportion inserting £250 or more into machines during their session. The differences in these outcomes between treated and untreated bookmakers were not statistically significant.

In terms of outcome measures, the length of time and amount of money spent on machines were used as proxy indicators for harm and of loss of control; the assumption being that those who lose control of their machine gambling may spend more money or gamble for longer than they intended. Therefore, a potentially positive outcome would have been to witness reductions in these behaviours. This links to the logic underpinning this intervention, where desired outcomes were for players to gamble in a more controlled way, particularly as a result of the machine-based measures. This has not been observed, and therefore we would suggest that the ABB re-evaluate the underlying logic of how they think the machine-based measures change behaviour. That said, it should be noted that these are blunt measures of harm and of control. For example, evidence has shown that machine players can experience harm gambling at what might be viewed as comparatively low levels of expenditure.[22] In terms of measuring harm, understanding the context of the individual and what harm means to them is of paramount importance. It is not possible to capture this through analysis of industry data alone. This is a noted limitation of this evaluation.

Failing to find statistical evidence of an impact is not particularly surprising: industry data showed that less than 10% of sessions included some kind of interaction with the machine-based messages. Furthermore, very few sessions included any kind of voluntary limit-setting; the main interaction was when players received a mandatory message because they had gambled for 30 minutes or longer. This means very few machine gambling sessions (and therefore few players) had any exposure to the new

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[22] See Wardle et al. (2014). *Report 2: Identifying problem gambling: findings from a survey of loyalty card customers*. London: Responsible Gambling Trust.

machine tools; it is difficult for these tools to have impact if players are not exposed to them.

Furthermore, it is clear that setting voluntary limits on machines is not a popular choice among machine players; less than 0.5% of machine play sessions included a voluntarily set time or money limit, and use of these tools declined throughout 2014. Part of the logic underpinning the Code was that player awareness of the voluntary limits should increase, and that players should increasingly use them to set and stick to limits. However, it is clear that players are not using this function, although it is unclear whether this is because they do not know about them or because they do not wish to use them (or a combination of the two). In the logic model process, stakeholders responsible for designing and implementing the Code were asked to consider various risks to achieving their objectives; players simply not using the voluntary limit setting tools was not an acknowledged risk. This is one area where it is clear that the theory of behaviour change underpinning the logic model is not working as planned and requires further refinement. This again suggests that the logic underpinning the Code needs to be reassessed. Often responsible gambling interventions are predicated on the assumption that the gambler is 'rational' and needs simply to be given the tools to help manage their behaviour.[23] This evaluation highlights that, when given the option to manage their machine play through voluntary limit setting tools, most gamblers chose not to do so. This may not be a critical failing of the Code, but rather of the understanding of gambling behaviour that underpins the Code and thus how the Code was intended to change behaviour.

Finally, the lack of observed impact may also, in part, be related to the methodology used to assess this. Because of the need to control for previous gambling behaviour, we could only base this early impact evaluation on data from registered loyalty card users – a subset of all machine gamblers. Therefore, when we say that no evidence of impact was found, this should be qualified to state that no impact was found among loyalty card customers. This too is not surprising. Research published in December 2014 suggested that the mandatory messaging thresholds of £250 and 30 minutes were set too high, and did not intervene with as many problem gamblers as might have been expected.[24] That research showed that only 1.3% of loyalty card customers spending £250 or more per session were problem gamblers, meaning that most problem gamblers spend less than this. If the intention of the Code is to intercede with problem gamblers, and the mandatory messages are the primary way to do this, then the thresholds at which these messages are displayed needs to be lowered so that more gamblers, and more gamblers with problems, are exposed to them. However, there is a real need to consider what the 'right' level is at which these messages are activated. A noted risk outlined in the logic model was that if messages are displayed too frequently gamblers may ignore them, potentially rendering the messages ineffective (of course, gamblers may ignore the content of the message when triggered at any level, and this also needs to be explored).

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[23] Blaszczynski, A., Ladouceur, R., Shaffer, H.J. (2004) A Science Based Framework for Responsible Gambling: the Reno Model. *Journal of Gambling Studies*, 20 (3): 301-317.
[24] This study looked at problem gambling rather than gambling-related harm which we acknowledge is not the same thing. See Excell et al. (2014) *Report 3: Predicting problem gambling: analysis of industry data.* London: Responsible Gambling Trust.

5.2 Future research directions

This initial study focused on developing a logic model for the Code, and exploring the very earliest impacts on player behaviour. There are potential limitations to the findings presented here. For example:

- The extent to which the West Midlands represents a suitable comparison group is not entirely clear. Our analysis suggested that some differences may exist in the composition of these geographic areas (we found differences in the income composition of treated and untreated areas). Nevertheless, player characteristics appeared to be broadly similar in the treated and untreated areas, providing some reassurance about the choice of the West Midlands as a comparison area.

- We only analysed impact observed in March 2014. It may take some time for players to notice the changes and alter their behaviour as a result. We conducted analysis to explore the impact of the Code on the middle and last sessions played in March 2014 by those who played their first session on 1st March. This was done in order to provide a broad assessment of the existence of an impact over the month subsequent to the Code's introduction, and to test this hypothesis. Results did not show any further behaviour changes as March progressed, though longer terms adaptations may have occurred.

- The DID estimation strategy has a number of features in its favour, but its validity also rests on some assumptions, notably the common trend and constant composition of treated and untreated bookmakers over time. It is worth considering running pre-programme tests to assess the degree to which the common trend, and to some extent the constant composition, assumptions hold.

Future research should attempt to address these limitations. In addition, it would be worth, for example, extracting further data to undertake an analysis of changes in behaviour pre and post the Code's introduction more generally, using an interrupted time series approach. Such a strategy seeks to use trends in pre-implementation behaviour among players to predict what would have happened had the Code not been put in place, comparing these predictions to the post-Code behaviours observed in the data. This approach could potentially allow us to look at longer-term impacts beyond those experienced in March 2014, though is not without limitations.

Given the partial and provisional nature of the evidence presented here it would clearly be premature to conclude that the Code is either effective or ineffective. One strategy that is worthy of consideration in addressing the issue of effectiveness is to develop a data collection strategy that could enable a number of the key elements of the logic model to be tested. The logic model sets out a number of pathways to change that were hypothesised by stakeholders to lead to the longer-term impacts that the Code sought to achieve. A mixed methods programme of research drawing on secondary analysis of industry data, together with primary qualitative fieldwork, could be used to explore the degree to which there is evidence of these pathways operating as supposed. This enables a range of different aspects of the Code to be explored, alongside the effect of changes to machine software. If further evidence suggests that

the Code did not lead to the effects that were intended, such an approach would help explain why, and suggest how the Code might be reformed.

5.3 Recommendations

A number of recommendations can be made from this report. These are:

- A fuller data and research strategy should be developed to evaluate all aspects of the Code. This includes looking more deeply at aspects relating to both staff actions and enhancement of existing practice and further unpicking the anticipated processes of change around the machine tools.

- Findings emerging from this study should be explored. For example, why do players not set voluntary limits (crucial if this is to be retained as a core component of machine-based tools)? What reaction (if any) do players have when they see the mandatory message about time/money spent gambling? How does this affect what gamblers view as 'normal' patterns of behaviour?

- The logic model should be reviewed and refined based on the findings within this study. For example, the theory of change around providing tools to allow customers to control their own gambling is flawed when customers do not engage with these tools. In the logic model workshops, stakeholders stated that they wanted to learn from this evaluation and refine their thinking. We would encourage the ABB to reflect critically on these findings and reassess how they think the Code works.

- If mandatory messages are to be retained, the thresholds at which they are displayed to customers should be lowered. However, research should be conducted to assess what the most appropriate level is at which mandatory messages are displayed. This should be coupled with research into players' views and reactions to the messages – if people do not notice them or process the information provided, the messages are unlikely to have an impact at any level.

Appendix A: Further information on impact analysis

This appendix provides further statistical information relating to the impact analysis presented in Chapter 4.

Table A1	Regression analysis: Impact of the Code on the length of the first session					
Dependent variable: Length of the first session (log)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.028	0.044	-0.640	0.523	-0.114	0.058
Post (dummy)	0.007	0.059	0.130	0.900	-0.108	0.123
Treated*Post (dummy)	0.001	0.061	0.020	0.988	-0.119	0.120
Average session length in the past four months (log)	0.838	0.012	67.140	0.000	0.814	0.863
Time spent playing sessions in the past four months (log)	-0.016	0.006	-2.830	0.005	-0.026	-0.005
Average profit in the past four months	0.001	0.000	2.870	0.004	0.000	0.001
Average weekly disposable income in 2-digit shop area (log)	0.104	0.038	2.770	0.006	0.031	0.178
Constant	-0.489	0.223	-2.190	0.029	-0.927	-0.051
Number of observations	*19,494*					
Adjusted R-square	*0.259*					

Table A2	Regression analysis: Impact of the Code on the amount of money played in the first session					
Dependent variable: Money played in the first session (log)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.032	0.048	-0.660	0.512	-0.126	0.063
Post (dummy)	-0.029	0.065	-0.450	0.655	-0.156	0.098
Treated*Post (dummy)	0.026	0.067	0.380	0.702	-0.106	0.157
Average money played in the past four months (log)	0.808	0.010	82.200	0.000	0.789	0.827
Time spent playing sessions in the past four months (log)	-0.026	0.005	-4.860	0.000	-0.037	-0.016
Average profit in the past four months	0.002	0.000	9.400	0.000	0.002	0.003
Average weekly disposable income in 2-digit shop area (log)	0.101	0.041	2.440	0.015	0.020	0.182

Table A2	Regression analysis: Impact of the Code on the amount of money played in the first session					
Constant	-0.193	0.246	-0.790	0.432	-0.674	0.288
Number of observations	*19,494*					
Adjusted R-square	*0.302*					

Table A3	Regression analysis: Impact of the Code on the proportion of first sessions which lasted over 30 minutes					
Dependent variable: Length of the first session was over 30 minutes (dummy)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.004	0.013	-0.280	0.781	-0.028	0.021
Post (dummy)	0.016	0.017	0.910	0.363	-0.018	0.049
Treated*Post (dummy)	-0.012	0.018	-0.660	0.507	-0.046	0.023
Average percentage of sessions over 30 minutes in the past four months	0.794	0.014	57.100	0.000	0.767	0.821
Time spent playing sessions in the past four months (log)	0.007	0.001	4.850	0.000	0.004	0.010
Average profit in the past four months	0.000	0.000	1.050	0.292	0.000	0.000
Average weekly disposable income in 2-digit shop area (log)	0.015	0.011	1.370	0.172	-0.006	0.036
Constant	-0.099	0.065	-1.530	0.127	-0.227	0.028
Number of observations	*19,494*					
Adjusted R-square	*0.184*					

Table A4	Regression analysis: Impact of the Code on the proportion of first sessions where the amount of money played was more than £250					
Dependent variable: Money played in the first session was more than £250 (dummy)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	0.001	0.007	0.200	0.842	-0.013	0.016
Post (dummy)	0.015	0.010	1.550	0.122	-0.004	0.035
Treated*Post (dummy)	-0.020	0.010	-1.910	0.057	-0.040	0.001
Average percentage of sessions over £250 in the past four months	0.746	0.015	50.950	0.000	0.718	0.775

Table A4	Regression analysis: Impact of the Code on the proportion of first sessions where the amount of money played was more than £250					
Time spent playing sessions in the past four months (log)	0.002	0.001	2.490	0.013	0.000	0.003
Average profit in the past four months	0.000	0.000	10.790	0.000	0.000	0.000
Average weekly disposable income in 2-digit shop area (log)	0.005	0.006	0.850	0.396	-0.007	0.018
Constant	-0.030	0.038	-0.790	0.430	-0.104	0.044
Number of observations	*19,494*					
Adjusted R-square	*0.129*					

Table A5	Regression analysis: Impact of the Code on the length of the middle session					
Dependent variable: Length of the middle session (log)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.026	0.046	-0.560	0.572	-0.116	0.064
Post (dummy)	-0.015	0.062	-0.240	0.813	-0.135	0.106
Treated*Post (dummy)	-0.006	0.064	-0.100	0.921	-0.131	0.118
Average session length in the past four months (log)	0.858	0.013	64.900	0.000	0.832	0.884
Time spent playing sessions in the past four months (log)	-0.024	0.006	-3.920	0.000	-0.036	-0.012
Average profit in the past four months	0.000	0.000	2.160	0.030	0.000	0.001
Average weekly disposable income in 2-digit shop area (log)	0.021	0.039	0.520	0.601	-0.057	0.098
Constant	0.010	0.234	0.040	0.964	-0.448	0.469
Number of observations	*18,224*					
Adjusted R-square	*0.252*					

Table A6 — Regression analysis: Impact of the Code on the amount of money played in the middle session

Dependent variable: Money played in the middle session (log)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.049	0.051	-0.960	0.336	-0.150	0.051
Post (dummy)	-0.022	0.069	-0.320	0.747	-0.157	0.113
Treated*Post (dummy)	0.022	0.071	0.310	0.758	-0.117	0.161
Average money played in the past four months (log)	0.807	0.011	76.400	0.000	0.786	0.828
Time spent playing sessions in the past four months (log)	-0.028	0.006	-4.540	0.000	-0.040	-0.016
Average profit in the past four months	0.001	0.000	5.350	0.000	0.001	0.002
Average weekly disposable income in 2-digit shop area (log)	-0.004	0.044	-0.100	0.919	-0.091	0.082
Constant	0.427	0.261	1.630	0.103	-0.086	0.939
Number of observations	18,224					
Adjusted R-square	0.286					

Table A7 — Regression analysis: Impact of the Code on the proportion of middle sessions which lasted over 30 minutes

Dependent variable: Length of the middle session was over 30 minutes (dummy)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.014	0.013	-1.030	0.302	-0.039	0.012
Post (dummy)	-0.004	0.018	-0.200	0.840	-0.038	0.031
Treated*Post (dummy)	0.000	0.018	-0.020	0.985	-0.036	0.035
Average percentage of sessions over 30 minutes in the past four months	0.834	0.014	57.620	0.000	0.805	0.862
Time spent playing sessions in the past four months (log)	0.006	0.002	3.830	0.000	0.003	0.009
Average profit in the past four months	0.000	0.000	0.940	0.346	0.000	0.000
Average weekly disposable income in 2-digit shop area (log)	0.007	0.011	0.610	0.543	-0.015	0.029
Constant	-0.038	0.067	-0.560	0.573	-0.170	0.094
Number of observations	18,224					
Adjusted R-square	0.195					

Table A8	Regression analysis: Impact of the Code on the proportion of middle sessions where the amount of money played was more than £250					
Dependent variable: **Money played in the middle session was more than £250 (dummy)**	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.002	0.008	-0.300	0.761	-0.017	0.012
Post (dummy)	0.004	0.010	0.360	0.721	-0.016	0.023
Treated*Post (dummy)	-0.006	0.010	-0.610	0.541	-0.027	0.014
Average percentage of sessions over £250 in the past four months	0.776	0.015	51.980	0.000	0.747	0.805
Time spent playing sessions in the past four months (log)	0.002	0.001	2.120	0.034	0.000	0.003
Average profit in the past four months	0.000	0.000	7.470	0.000	0.000	0.000
Average weekly disposable income in 2-digit shop area (log)	0.009	0.006	1.350	0.176	-0.004	0.021
Constant	-0.049	0.038	-1.290	0.199	-0.125	0.026
Number of observations	*18,224*					
Adjusted R-square	*0.146*					

Table A9	Regression analysis: Impact of the Code on the length of the last session					
Dependent variable: **Length of the last session (log)**	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.100	0.047	-2.120	0.034	-0.192	-0.007
Post (dummy)	-0.074	0.063	-1.160	0.245	-0.197	0.050
Treated*Post (dummy)	0.054	0.065	0.820	0.412	-0.074	0.182
Average session length in the past four months (log)	0.826	0.014	60.870	0.000	0.800	0.853
Time spent playing sessions in the past four months (log)	-0.015	0.006	-2.460	0.014	-0.027	-0.003
Average profit in the past four months	0.001	0.000	2.880	0.004	0.000	0.001
Average weekly disposable income in 2-digit shop area (log)	0.056	0.040	1.390	0.164	-0.023	0.136
Constant	-0.081	0.240	-0.340	0.736	-0.552	0.390
Number of observations	*18,224*					

Table A9	Regression analysis: Impact of the Code on the length of the last session
Adjusted R-square	*0.232*

Table A10 Regression analysis: Impact of the Code on the amount of money played in the last session

Dependent variable: **Money played in the last session (log)**	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.114	0.053	-2.160	0.031	-0.218	-0.011
Post (dummy)	-0.122	0.071	-1.720	0.086	-0.262	0.017
Treated*Post (dummy)	0.111	0.074	1.500	0.133	-0.034	0.255
Average money played in the past four months (log)	0.766	0.011	70.010	0.000	0.745	0.788
Time spent playing sessions in the past four months (log)	-0.016	0.006	-2.520	0.012	-0.028	-0.004
Average profit in the past four months	0.001	0.000	5.210	0.000	0.001	0.002
Average weekly disposable income in 2-digit shop area (log)	0.061	0.046	1.340	0.179	-0.028	0.151
Constant	0.217	0.271	0.800	0.422	-0.313	0.748
Number of observations	*18,224*					
Adjusted R-square	*0.255*					

Table A11 Regression analysis: Impact of the Code on the proportion of last sessions which lasted over 30 minutes

Dependent variable: **Length of the last session was over 30 minutes (dummy)**	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.027	0.014	-2.020	0.044	-0.054	-0.001
Post (dummy)	-0.011	0.018	-0.590	0.554	-0.046	0.025
Treated*Post (dummy)	0.010	0.019	0.540	0.590	-0.027	0.047
Average percentage of sessions over 30 minutes in the past four months	0.796	0.015	53.150	0.000	0.766	0.825
Time spent playing sessions in the past four months (log)	0.007	0.002	4.250	0.000	0.004	0.010
Average profit in the past four months	0.000	0.000	0.720	0.471	0.000	0.000

Table A11	Regression analysis: Impact of the Code on the proportion of last sessions which lasted over 30 minutes					
Average weekly disposable income in 2-digit shop area (log)	0.003	0.012	0.290	0.769	-0.019	0.026
Constant	0.000	0.069	0.000	0.998	-0.136	0.136
Number of observations	18,224					
Adjusted R-square	0.173					

Table A12	Regression analysis: Impact of the Code on the proportion of last sessions where the amount of money played was more than £250					
Dependent variable: Money played in the last session was more than £250 (dummy)	Coeff.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Treated (dummy)	-0.009	0.008	-1.160	0.246	-0.025	0.006
Post (dummy)	-0.001	0.011	-0.140	0.889	-0.022	0.020
Treated*Post (dummy)	0.000	0.011	0.030	0.973	-0.021	0.022
Average percentage of sessions over £250 in the past four months	0.758	0.016	47.780	0.000	0.727	0.789
Time spent playing sessions in the past four months (log)	0.003	0.001	3.410	0.001	0.001	0.005
Average profit in the past four months	0.000	0.000	6.350	0.000	0.000	0.000
Average weekly disposable income in 2-digit shop area (log)	0.009	0.007	1.310	0.189	-0.004	0.022
Constant	-0.048	0.041	-1.180	0.237	-0.128	0.032
Number of observations	18,224					
Adjusted R-square	0.128					

The charts that follow show the date distributions on which the mid-month and last gambling sessions were conducted, by cohort type.

Figure A1: Day middle sessions took place (treated cohort, cohort C, post-treatment)
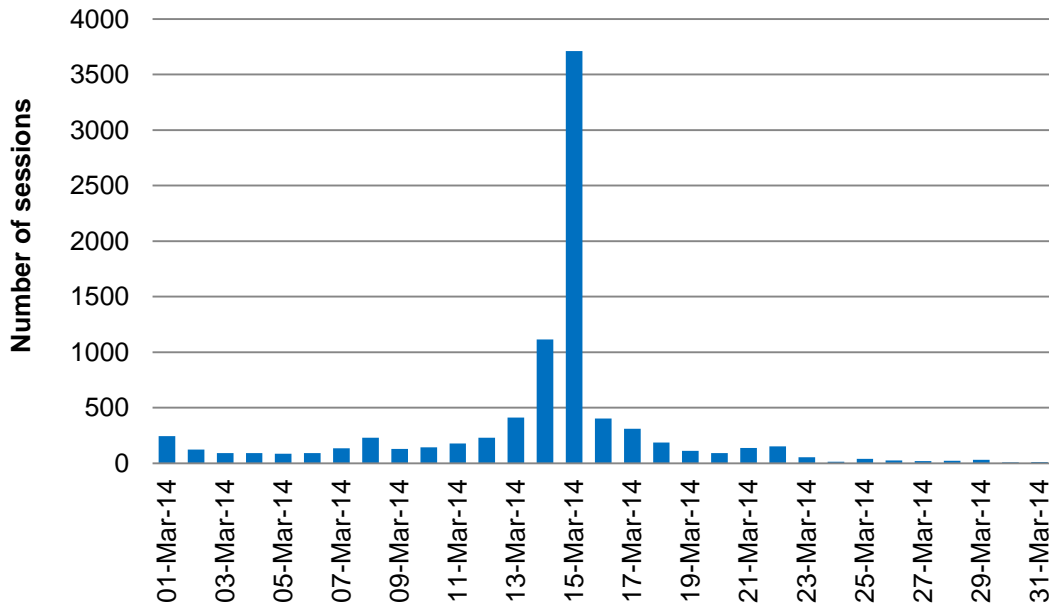
Figure A2: Day middle sessions took place (treated cohort, cohort A, pre-treatment)
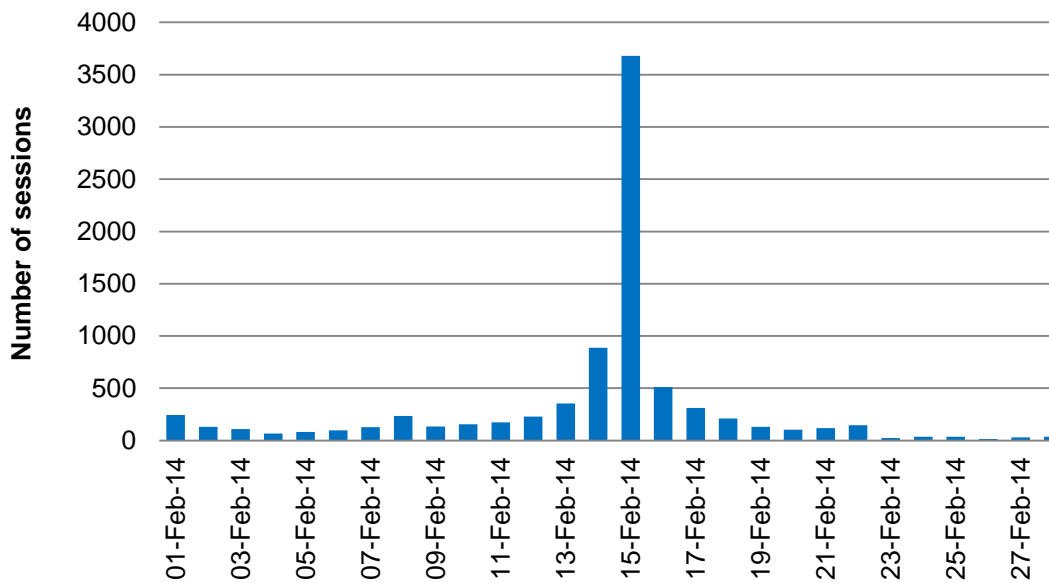
Figure A3: Day middle sessions took place (untreated cohort, cohort D, post-treatment)
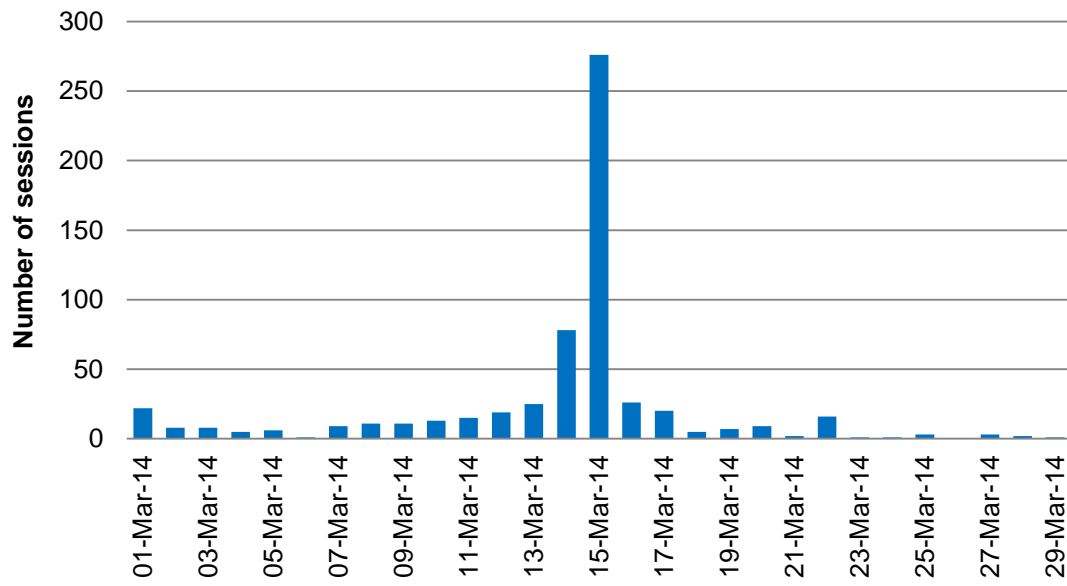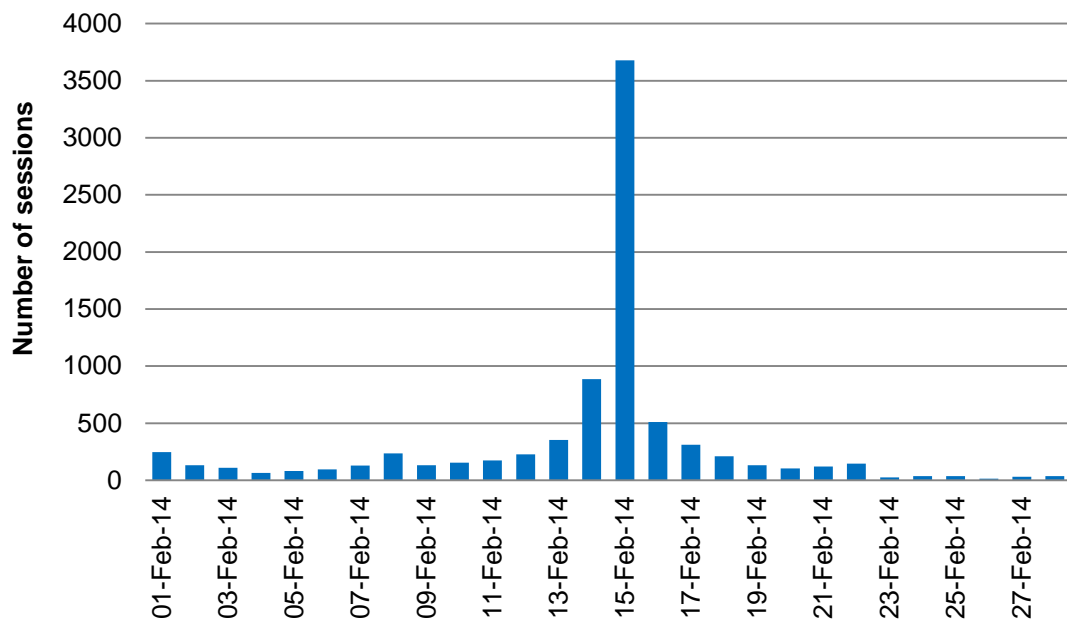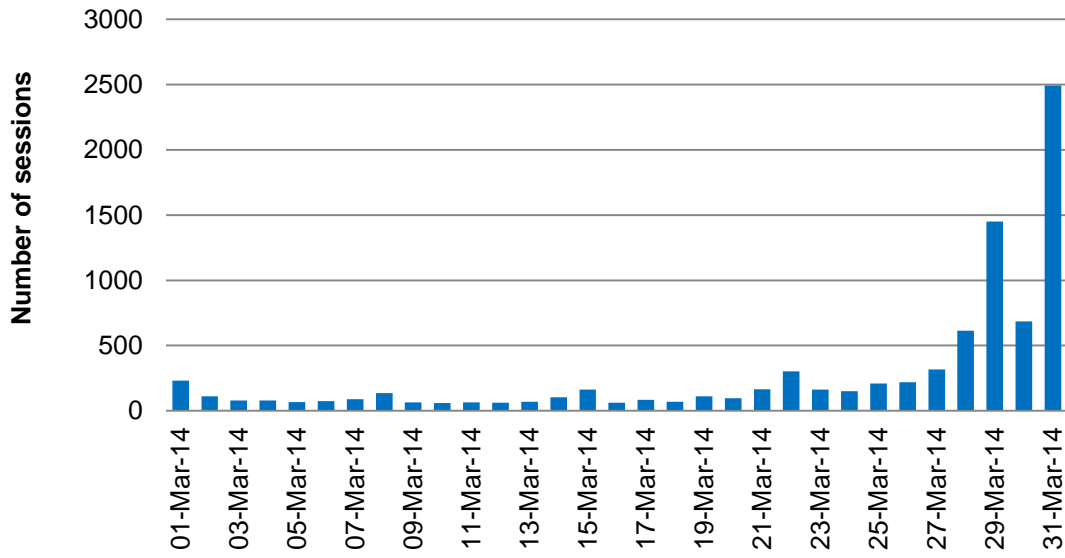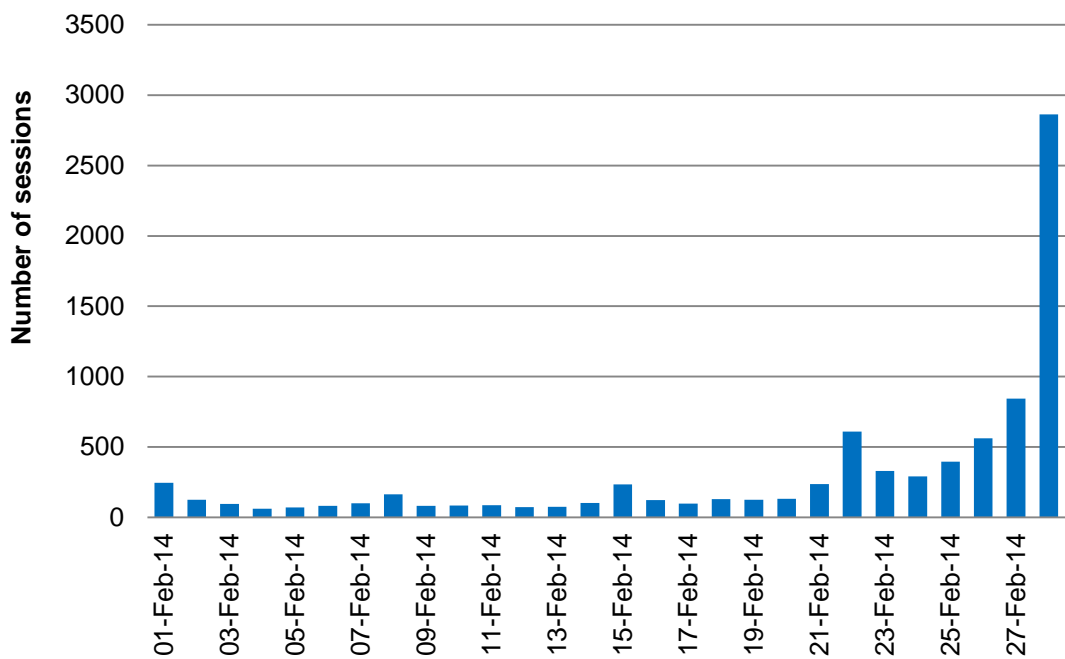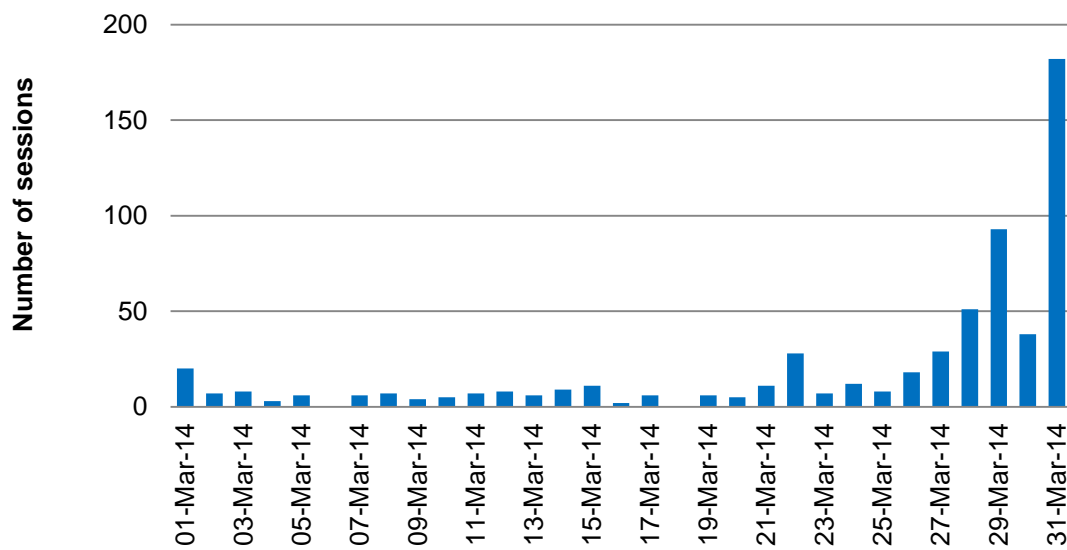

Figure A4: Day middle sessions took place (untreated cohort, cohort C, pre-treatment)

Figure A5: Day last sessions took place (treated cohort, Cohort B, post-treatment)

Figure A6: Day last sessions took place (treated cohort, Cohort A, pre-treatment)

Figure A7: Day last sessions took place (untreated cohort, Cohort D, post-treatment)

Figure A8: Day last sessions took place (untreated cohort, Cohort C pre-treatment)
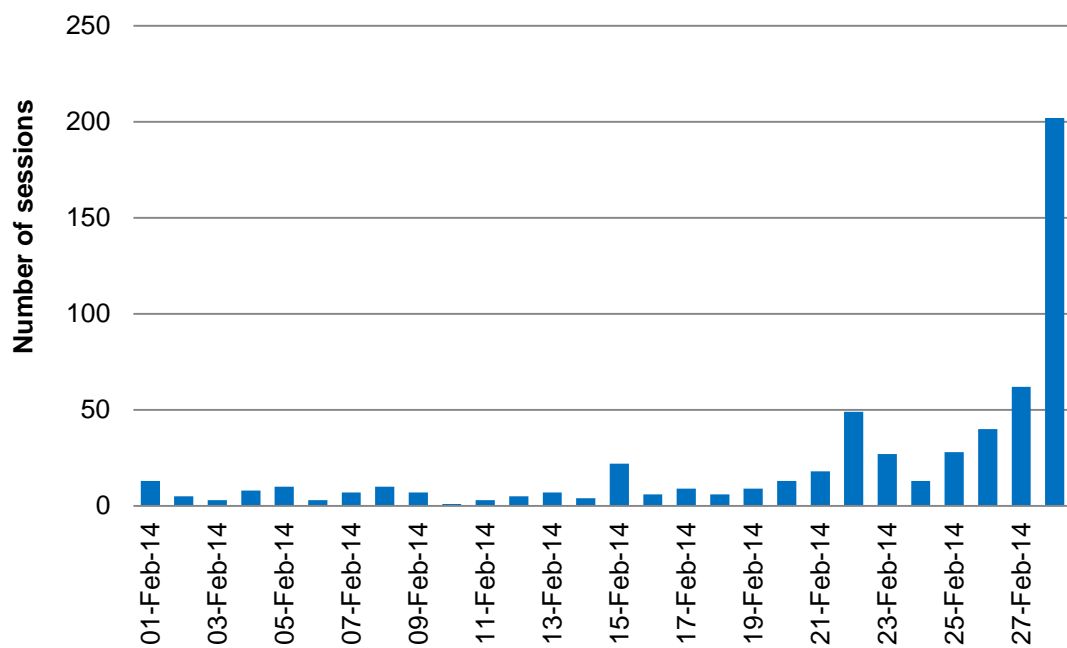
Appendix B: Overview of data on the Code: machine measures

By April 2014, all bookmakers subscribing to the Code had implemented both voluntary limits and mandatory messages on machines: this took the form of alerts, or pop-up messages, when the player hit a time or monetary limit. This appendix provides an overview of how many times these 'alerts' were activated and what happened afterwards, as a baseline against which to understand the early impact information provided in Chapter 4. First, a brief explanation of the characteristics of the 'alert' system is given and baseline information explained in order to give a framework to all the figures included in this appendix (see Sections B1 and B2 for this overview). Section B3 gives an overview of all sessions where any type of interaction with the alert system was invoked. Section B4 focuses on those sessions where any limit was hit and describes these sessions. Section B5 focuses on the setting of voluntary limits and explores this further. Finally, Section B6 explores the behaviour of a player once an alert (either voluntary or mandatory) was raised.

B1 Introduction

By April 2014, the Code was implemented in all subscribing bookmakers. This included a responsible gambling initiative where an alert message was displayed on the machine screen when a limit in time or expenditure was hit. These alerts were displayed either based on the player setting voluntary limits or based on mandatory limits. The mandatory limits were set to display a message for:

- Sessions lasting 30 minutes; and/or
- Sessions where net cash loaded into the machine was £250 or greater.

After the mandatory limit had been hit, the limit was reset so that a player (if they chose to continue gambling) would receive a second alert after 60 minutes or £500 of net cash in. This report used data from machines provided from both Inspired Gaming (Inspired) and Scientific Games (SG) (the two suppliers of machines in bookmakers in Great Britain). The data from Inspired and SG were stored in different proprietary formats and had to be converted into a common, single dataset for analysis.

The raw data about the new alert system provided to Featurespace covered the time period from March 2014 to June 2014. In order to generate baseline information prior to the alert system being introduced, data were also provided from September 2013. These data were managed, checked and converted into common formats by Featurespace.

This appendix provides background information about use of the new alert system. To analyse this, the raw data had to be split into discrete sessions of play (so we could see how many sessions included setting voluntary limits, for example). This was done

following the session definitions set out by the ABB which were programmed into the machines for the mandatory alert system.

The information that follows gives an overview of the general characteristics of the alert system. It does not compare treated and untreated areas (an overview of this is provided in Chapter 2). Table B1 shows an overview of sessions between 1st March 2014 and 3rd May 2014 and interaction with the different alert messages

Table B1: Key metrics between 1st March and 3rd May 2014

Total Number of sessions played	38,504,300
Total Sessions with any limit event	2,973,557
Total Voluntary Time Limit Set	33,723
Total Voluntary Spend Limit Set	61,581
Total Voluntary Time Limit Hit	3,102
Total Voluntary Spend Limit Hit	11,543
Total Mandatory Time Limits Hit	3,240,526
Total Mandatory Spend Limits Hit	1,765,731

B2 The alert system in context of all machine activity

As mentioned previously, machines were programmed with a set of mandatory messages that were displayed if individuals gambled for a certain time or with a certain amount of money. In addition, individuals could also set voluntary alerts on duration of play and amount spent, although, as Chapter 2 shows, only a minority of sessions included this.

In this appendix, information is presented regarding interactions with these alert systems. These include:

- Whether set voluntary limits;
- Whether exceeded any limit set (either voluntary or mandatory);
- Actions taken after the player hit any limit.

Figure B1 shows the number and percentage of sessions that include some kind of interaction with the alert system. Around 7% of sessions had any interaction with the alert system (see blue columns). In addition to this, the total number of sessions per day is displayed (green line). The peak in numbers at the beginning of April will likely be a result of the comparison area (the West Midlands) implementing the Code on that date.
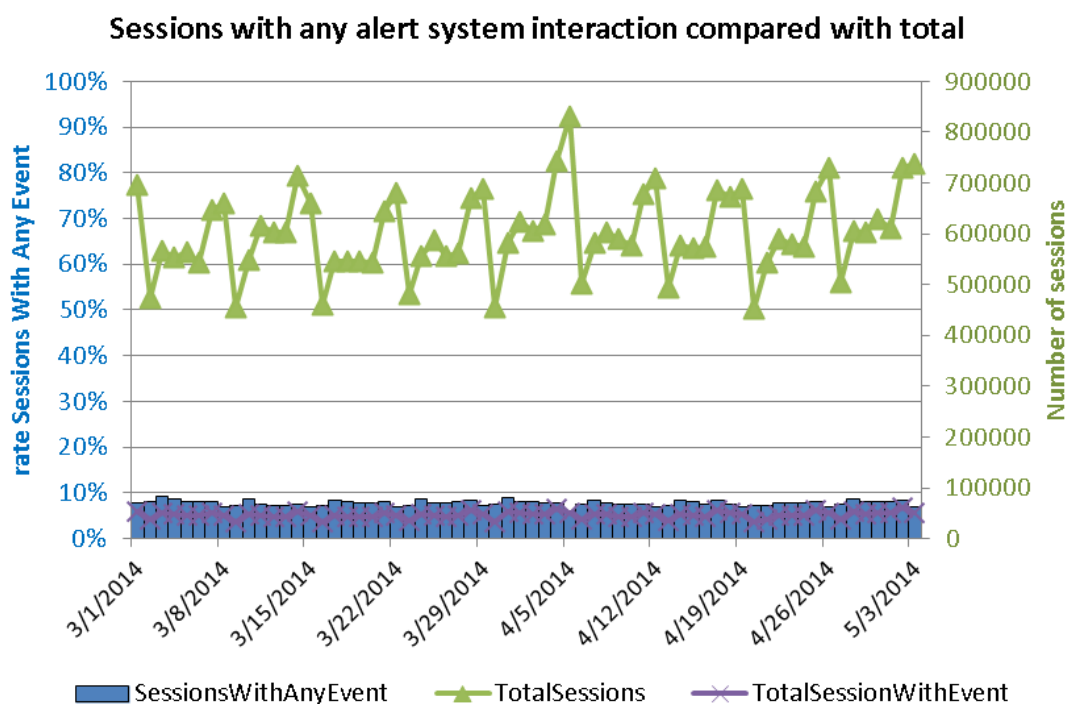

Figure B1: Baseline information The blue column represents the proportion of sessions with an event related to the alert system. The green line shows the total number of sessions per day and the purple line shows the total number of sessions per day which interacted with the alert system.

B3 Sessions with any interaction with the alert system

In this section we only consider those sessions with any interaction with the alert system between 1st March 2014 and 3rd May 2014. As mentioned previously, we consider three basic types of interactions:

- Whether a session hit any limit (either mandatory or voluntary);
- Whether a voluntary limit (either time or monetary) was set;
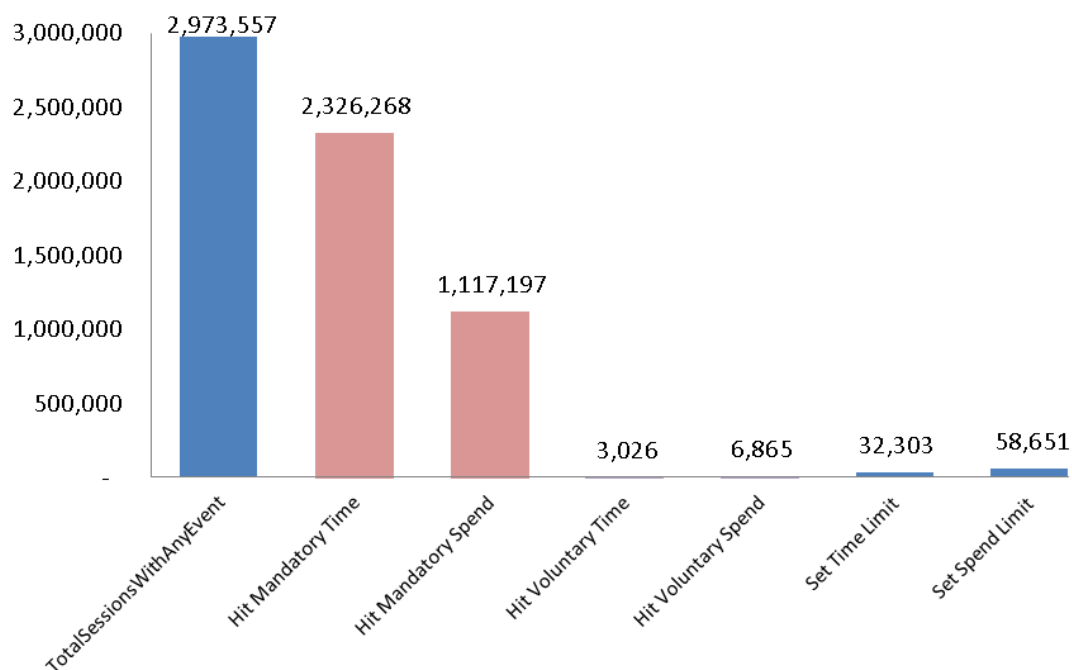- Action after an alert was raised.

Figure B2: Distribution of sessions per type of interaction

Figure B2 shows the breakdown of what type of alert messages or interactions were observed. As can be seen, the most common interaction was gambling for longer than 30 minutes and thus triggering a mandatory message warning of long duration of play. We must remember that in a session there can be many different events repeated (for example, several set and hit limits). The first column in the figure is the total number of sessions with any interaction and should be used as a baseline.

Figure B2 also shows that whilst setting a voluntary time or money limit was not popular, when they were used, only a minority of sessions actually exceeded the limits set.

Furthermore, Table B2 shows that of all alerts displayed to gamblers, the vast majority were because the player exceeded the time and/or money limit set by the mandatory messages (around 6,000 sessions hit the voluntary money limit set, out of 58,000 sessions where this was used). Understanding the processes around this requires further investigation; it may be that players set time and money limits longer than they actually intend to play.

Table B2: Number of limit hits by type

Limit Type	Number of limit hits	Percentage of Total
Mandatory	5,006,257	99.7%
Voluntary	14,645	0. 3%

When comparing the type of mandatory and voluntary alert messages most frequently displayed, there was also difference between the two types. Of the mandatory messages displayed, 65% related to a warning about the amount of time played. Of the messages displayed relating to voluntary limits, the converse was true: only 21% related to the amount of time played.

B4 Sessions that hit any limit

We will now consider those sessions where any limit was hit (either voluntary or mandatory). As previously noted, around 7% of sessions included the display of either a mandatory or voluntary message.

In a single session it is possible to have more than one message displayed: Figure B3 shows how many sessions had more than one message displayed. More than a third of players receive two or more messages in their session, whereas around two thirds only received a single message.
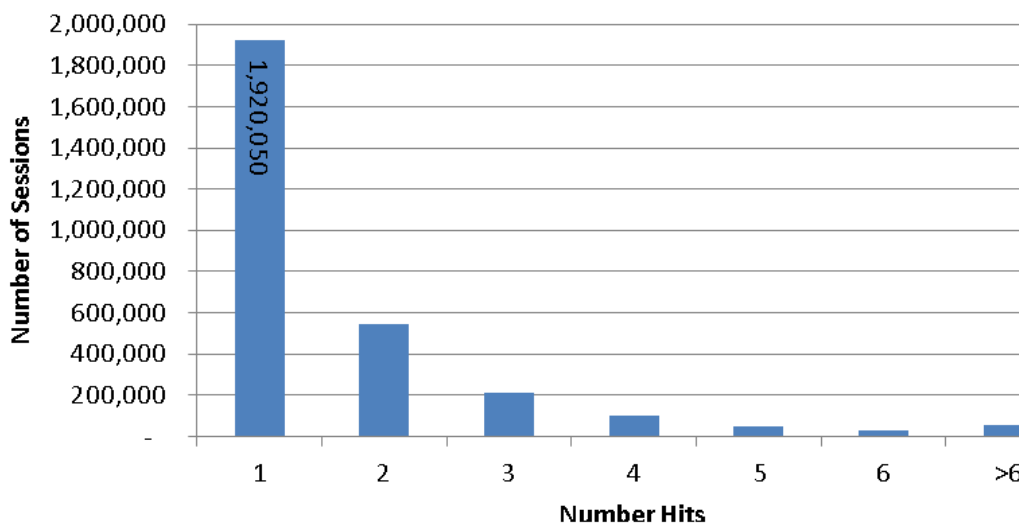

Figure B3: Number of messages displayed per session

Another interesting aspect is the type of hits in a session (mandatory-time, mandatory-spend, voluntary-time or voluntary-spend). Figure B4 shows the number of sessions by different hit types. Between March and May 2014, there were 2.4 million sessions (see column 1 in Figure B4) where only one type of limit was hit. However, there were 1.9 million sessions where only one hit occurred (see column 1 in Figure B3), meaning that there were around 500,000 sessions where more than one message was displayed but it was of the same type. This tells us that these players were warned with the same type of message more than once.
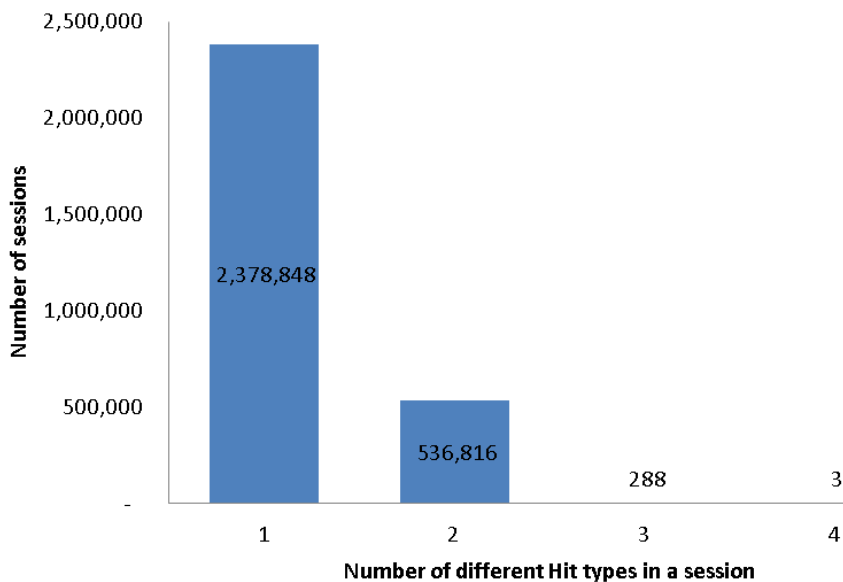
Figure B4: Number of different messaging types in a session

B5   Sessions where any voluntary limit set

Although reduced in number, the voluntary limits are interesting to analyse separately, because they require a direct input from the player. This section focuses on sessions where any voluntary limit was set. When dealing with the voluntary limits set we must take into account that players might be exploring the system, setting and clearing limits.

In Figure B5 we have displayed the number of voluntary limits set per session. Although the majority of sessions only have one limit set, there are over 21,000 sessions (21,102) where more than one limit was set (it must be remembered that these multiple limits can be of the same type).
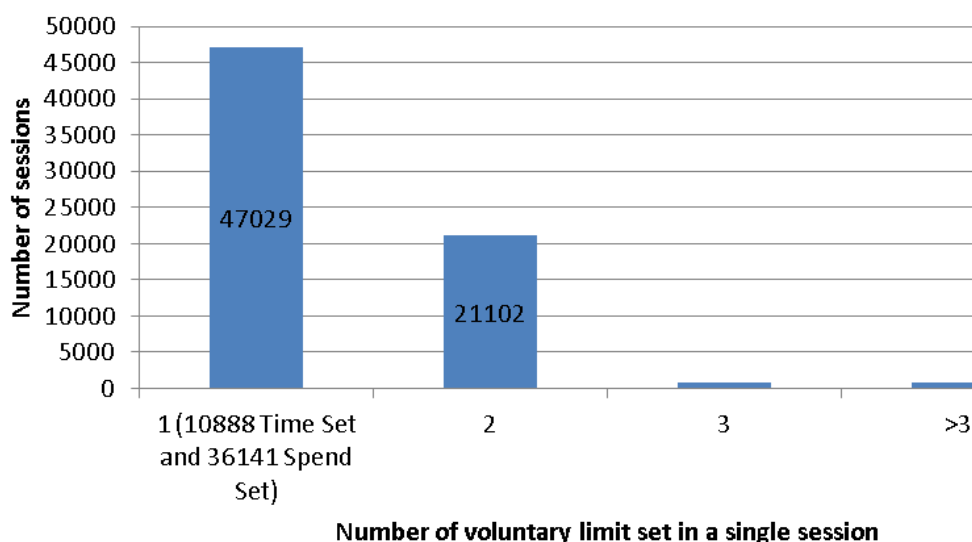

Figure B5: Distribution of the number of voluntary limits set in a session

Looking at sessions where a voluntary time limit was set, Figure B6 shows what time limits were chosen, with 10-20 minutes being the typical length. There is, however, a

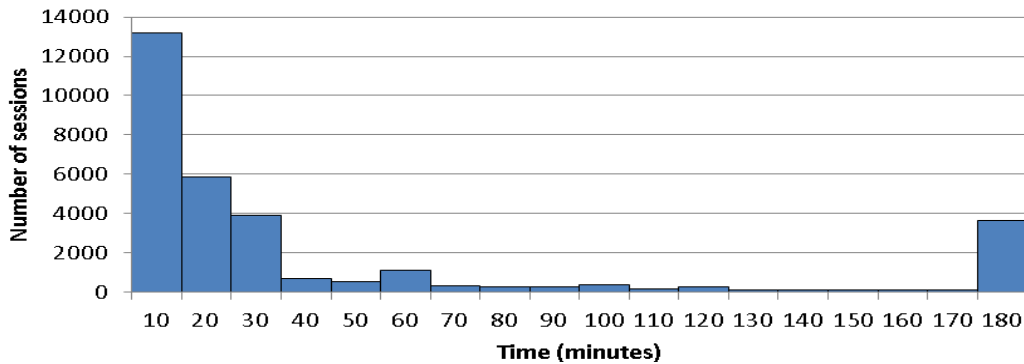peak at 180 minutes which appears to be the maximum value that can be set on the machines.

Figure B6: Amount of time limit set

Figure B7 shows the distribution of the monetary voluntary limits set (in pence) and Table B3 shows this data in percentiles. Where money limits were chosen, the median monetary limit was £50, though the value at the 90th percentile was £10,000 or more.
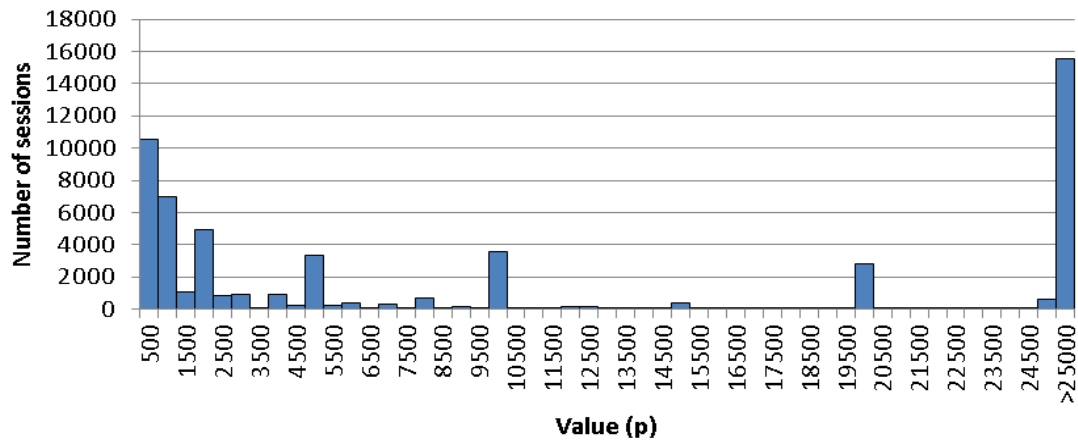

Figure B7: amount of money limit set

Table B3: Percentiles of the expenditure value of the voluntary limits

Percentile	Voluntary Monetary Limit
5	£1.00
10	£3.00
20	£7.00
30	£10.00
40	£20.00
50	£50.00
60	£100.00
70	£200.00
80	£1,000.00
90	£10,000.00

B6 Actions after any alert displayed

Once an alert has been triggered, gamblers can take a number of subsequent actions. The table below summarises the different types of actions they could theoretically take. Based on the event types, we have classified the events into two categories: Action or No-Action. Action indicates that a player either stopped or took some money out of the machine; No-Action indicates the player ignored the alert and continued to gamble.

EVENT	DESCRIPTION	ACTION TAKEN?
Alert closed by player (continue playing)	The player closes the alert and keeps playing.	No
Alert closed by player (cash out)	The player cashed money out of the machine. This does not mean that the player ended the session.	Yes
Alert closed with session end	The player closes the alert and stops playing.	Yes
Alert closed with timeout	The alert is closed because of a timeout. This event has been excluded from the analysis as it is likely the player is no longer at the machine.	N/A

Figure B8 compares the volume of sessions where any message was displayed and the number of sessions where the action taken was simply to 'close the message alert and continue playing'. In the majority of sessions the player elected to continue playing.
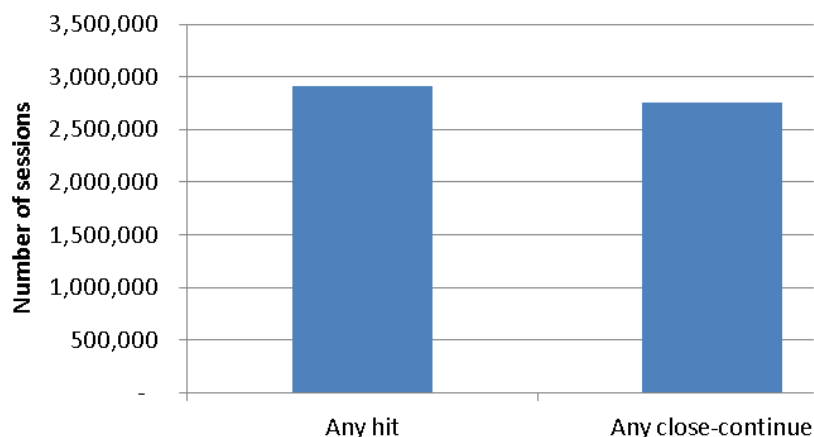

Figure B8: Number of sessions where the player chooses to close alert and continue playing

Another point of interest is to compare the number of 'No-Action' events in sessions where an 'Action' event appears. This is to understand how many interactions a player needs before reacting. Figure B9 is based on sessions where the player took action at some point after seeing a message (a reduced group of 9,813 sessions representing 0.33% of the sessions where there was any limit hit). Within this subgroup, the number of 'No-Action' events per session are shown. According to Figure B9, the majority of users (those sessions in the first column) who were affected by an alert only needed one message before taking action (zero number of 'No-Action' events). However, it should be remembered that only a minority of players took action when the limit was reached.
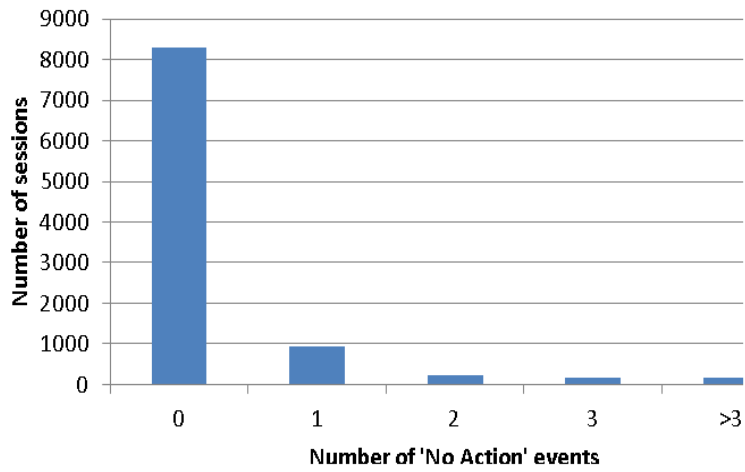
Figure B9: Sessions distribution of the number of 'No-Action' events in sessions with any 'Action' event

Appendix C: The Logic Model

Short-term Outcomes

Medium-term outcomes

Impact (Longer-term outcomes)

Ultimate Goals

Staff

Increase awareness of:
- a wider range of problem gambling indicators
- the responsible gambling help and information they are expected to promote

Increase knowledge among staff of machine tools

Increase staff skills:
- communication
- conflict management
- dealing with problem gambling

Increase confidence to address potential problem gambling

Staff better able to communicate:
- responsible gambling messages
- tools to players

Increase opportunity to spend time with customers

Increase quality staff interactions with customers

Increase staff commitment to responsible gambling

Maintain betting shops as a safe environment

Become an even more sustainable and responsible business

Machine tools

Increase player knowledge of tools available to control gaming behaviour

Increase awareness of:
- time spent on machines
- money spent on machines

Increase player knowledge of how to set voluntary time/spend limits

Increase player awareness of:
- responsible gambling
- what problem gambling is

Players increasingly stick to the limits set

Increase customer ability to stay in control of their gambling

At risk players increasingly in control of their machine play

Increase in numbers of problem gamblers seeking help

Gambling within betting shops is a safe leisure activity

Achieve a sensible level of regulatory involvement from Government in a free, fair and transparent market place

Reduction in number of at risk gamblers who become problem gamblers

Reduce gambling related harm

Enhancements of existing practice

Increase staff skills to complete self exclusions

Increase customer awareness of responsible gambling including self exclusion

Decrease in underage players

Improved access to and process of self exclusion

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