

**Part II: The Cutting Edge of Dishonesty – *Ivey v Genting Casinos*
symposium**

**‘PURE CHANCE’, PROBABILITY AND THE
REGULATION OF GAMBLING**

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The judge’s conclusion, that Mr Ivey’s actions amounted to cheating, is unassailable. It is an essential element of Punto Banco that the game is one of pure chance, with cards delivered entirely at random and unknowable by the punters or the house.¹

1 Introduction

I often get asked why people find probability so unintuitive and difficult. After more than forty years working in the area, I have finally concluded that the answer to this question is simple: probability really *is* unintuitive and difficult. I find it very tricky. For a start, you cannot see it or measure it: scales measure weight, clocks measure time, rulers measure length, but there is no gauge that will tell you a probability. It can also be deeply unintuitive: in any football match, there is more than 50% probability that two people on the pitch share the same birthday.²

Probability lies at the heart of the *Ivey* case.³ Consider the quote at the beginning of this chapter taken from the UK Supreme Court (‘the Supreme

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¹ *Ivey v Genting Casinos (UK) Ltd* [2017] UKSC 67, [2018] AC 391, [50] (Lord Hughes (with whom Lord Neuberger, Lady Hale, Lord Kerr and Lord Thomas agreed)).

² There are 23 people (two teams and the referee), and a fairly basic use of mathematical theory reveals a 51% probability that at least two share a birthday in terms of month and day. This assumes birthdays are random throughout the year, whereas there is some clustering around the end of September, nine months after Christmas. In addition, those with sporting skills tend to have a small excess of autumn births, as this cohort will have been the older children in any school year. But these disturbances to pure randomness produce remarkably little change to probabilities of matching birthdays.

³ *Ivey v Genting Casinos (UK) Ltd* [2014] EWHC 3394 (QB), [2014] WLR(D) 504; *Ivey v Genting Casinos (UK) Ltd* [2016] EWCA Civ 1093, [2017] 1 WLR 679; *Ivey* (UKSC) (n 1).

Court') judgement in *Ivey v Genting Casinos (UK) Ltd.*⁴ Mr Ivey, although aligning cards according to their patterns on the edges, did not in any way interfere with the shuffle, so that cards were still delivered at random. So we might say that the objective chances of him being dealt particular cards were not altered. But his actions did change his *knowledge* of whether the next card might be high or low, and therefore his personal probability for what it might be: while the next card was still technically 'unknowable', he did know more about it than the casino, and the Supreme Court, felt was fair play. In other words, that what he did was in fact cheating.⁵

In this chapter, I will argue that using personal knowledge to alter one's probability for the next card to appear is a characteristic of all games played with a fixed shoe and cannot be considered as cheating – otherwise just looking at the cards you already have in your hand would be cheating. However, the difference in the *Ivey* case is that Mr Ivey's manipulation resulted in his knowledge being different from what is standard in the game of Punto Banco he was playing, and in particular was asymmetric between him and the casino.

I will also suggest that basic ideas around chance, odds and so on should be very carefully handled in a gambling context. In particular, it may be reasonable to distinguish 'chance', in the sense of an objective characteristic of the game, giving rise to the long-run odds of winning, from 'probability', in the sense of a personal judgement about a single gamble.

But we must first face a rather fundamental issue.

2 What does 'probability' mean, anyway?

It may come as a surprise that there is no consensus answer. While the mathematics of probability is (broadly) agreed, statisticians and philosophers have disputed for centuries about what probability actually is, and even whether it exists at all: indeed, as I have already pointed out in the introductory section above, it cannot be directly measured.

The *Ivey* case deals with three different ideas of probability.

- (a) The 'classical' idea: this is pure randomness, exemplified in a perfect shuffle of a pack of cards. For example, before a single shuffled pack is placed face down in a shoe, we could reasonably claim that the probability that the second card in the pack will be an ace is $4/52$

⁴ *Ivey* (UKSC) (n 1) [50] (Lord Hughes (with whom Lord Neuberger, Lady Hale, Lord Kerr and Lord Thomas agreed)).

⁵ Gambling Act 2005, s 42.

= $1/13$. This is the type of probability taught in school, based on the idea of picking ‘at random’ from equally likely events. In this context, the probabilities might be considered ‘objective chances’, in that they are based on symmetries in the set-up of a gamble.

- (b) The ‘frequency’ idea: these are the long-run odds, reflected in the winning margin in a casino. This depends on the form of the game, and could be obtained from the calculations based on the classical idea (a). But even without symmetries, say gambling on a flipped thumbtack landing point upwards, the long-run odds can be found by collecting a lot of data and finding the winning proportion. These might also be considered as ‘objective chances’, as they are a characteristic of the set-up of the gamble, and do not depend on an observer.
- (c) The ‘personal’ idea: these are judgements made in a specific case and can be thought of as a ‘degree of belief’. Suppose a deck has been shuffled and each of the cards is placed face down. There is now no randomness in the system – any uncertainty is due to our lack of knowledge, also known as *epistemic uncertainty*. We are in the realm of probability rather than true ‘chance’. Crucially, these probabilities are in the eye of the beholder, as further information can change those probabilities. To see this, let us consider the identity of the second card in the pack. We saw above that classical reasoning would lead me to a probability that this is an ace is $1/13$. The only condition is that we assume a perfectly shuffled full pack.

But suppose I turn over the first card, I alone look at it, and see it is the ace of spades. Then I know there are 51 cards left, only three of them are aces, and so my probability that the next is an ace is $3/51$. The second card has not changed, but my information has. Of course other observers, who have not seen the card I drew, would still have their own probability of $4/52$ that the second card is an ace. This demonstrates that personal probabilities for individual situations will quite reasonably differ from person to person depending on the knowledge they have – asymmetric knowledge will quite reasonably lead to different probabilities. There is no ‘true’ probability, and so the probabilities are said to be ‘subjective’,⁶ and would be expected to influence the bets different people might place when gambling on the turn of cards.

⁶ This is also known as the Bayesian approach, after the Reverend Thomas Bayes (c 1701-1761), a Presbyterian minister who developed the idea of probability as reasonable betting odds.

'Pure chance', Probability and the Regulation of Gambling

In practice, except in well-controlled, repeatable gambling situations such as practiced in casinos, the idea of a 'chance', in the sense of a true, objective probability, is a rarity, even in gambling. There is no 'chance', in the technical sense used here, in a specific horse race – the betting odds quoted by bookies are judgements or derived from crowd behaviour, and each punter has to assess his own subjective probabilities and decide whether to bet or not.

Some brief conclusions may be drawn from the discussion in this section:

- (a) probabilities assessed for specific events are always conditional on knowledge, and so may reasonably vary from person to person;
- (b) they are not a property of the event alone, but rather an expression of a relationship between the assessor and the event;
- (c) they only 'exist' to the extent that there may be a sound basis for a consensus on what to assume they are.⁷

3 What, then, do 'pure chance' and 'probability' mean for the regulation of gambling?

There is a crucial difference between games such as roulette, which in a sense start from scratch at each throw of the ball, and card games. In roulette, the last number thrown has no effect on the current one,⁸ nothing you know or do can change your probability of what might occur. This is 'pure chance'. In contrast, in card games the simple knowledge of what is in your hand changes your probability of what might be drawn next, even if only to a small extent. This is the most basic form of card-counting, and is available to everyone, even if casinos may try to discourage it.

In the Court of Appeal's judgment in *Ivey v Genting Casinos*, Arden LJ had the following to say about the difference between (legitimate) card-counting and (illegitimate) edge-sorting:

Edge-sorting bears no similarity to legitimate card-counting, which some mathematically skilled players can do in other

⁷ It might be claimed that the only 'objective', unconditional probabilities for individual events concern sub-atomic particles.

⁸ It is bizarre that Crockfords (and many gambling machines) show trend screens for roulette, providing spurious information that has no predictive ability. This is as idiotic as saying there are 'hot numbers' in lotteries. What would be truly useful to the gambler would be to show a record of all the cards drawn from a fixed-shoe game, but casinos are unlikely to provide this aid to card-counters.

games, which are not games of pure chance but games of chance and skill. There, the advantage is obtained by innate skill which is an accepted determinant of success in the game. It is quite otherwise with a game of pure chance, such as Punto Banco.⁹

The first part of this passage in Arden LJ's speech could be disputed. As I have argued above, even knowing what is already in your hand or exposed on the table is a form of card-counting, and can be used in any card game, including Punto Banco, although the yield in this case has been shown to be miniscule and makes the technique redundant.¹⁰ So Punto Banco is not quite a game of pure chance, in the sense of there being no opportunity to use any skill whatever to revise one's probabilities, although it is very close to it.

Lady Justice Arden goes on to say in *Ivey*:

The concept of advantage play precludes cheating in the case of card-counting in so far as it means bringing innate mathematical skill to bear.¹¹

I interpret this as meaning that card-counting is a form of advantage play, but that such play involves no interference with the game and hence cannot be considered cheating. It seems as honest to card count as it is to use past form in horse racing, and it seems entirely reasonable that it is permitted, as it is simply taking advantage of your current knowledge, just like using the cards that are currently visible on the table or in your hand. Since players may not have seen the cards in each other's hands, that knowledge may be asymmetric, and so players might quite reasonably have different probabilities for the successive cards.

In a similar vein, the Supreme Court observed that it was the active intervention, rather than passive observation, that tipped the balance into cheating:

It may be that it would not be cheating if a player spotted that some cards had a detectably different back from others,

⁹ *Ivey* (CA) (n 3) [90].

¹⁰ See Casino Guru, 'Strategy for playing Baccarat Punto Banco' (*Casino Guru*, 13 July 2016) <<https://casino.guru/Strategy-for-playing-Baccarat-Punto-Banco>> accessed 27 December 2018.

¹¹ *Ivey* (CA) (n 3) [90].

and took advantage of that observation, but Mr Ivey did much more than observe; he took positive steps to fix the deck.¹²

4 Conclusion

Let us return to the passage from the Supreme Court judgement quoted at the beginning of this chapter, in which the Supreme Court stated that:

It is an essential element of Punto Banco that the game is one of pure chance, with cards delivered entirely at random and unknowable by the punters or the house.¹³

This statement appears to identify the idea of 'pure chance' with two elements: first, that the cards be delivered at random and, second, that they be unknowable by the punters or the house. This chapter has identified that these two elements are distinct and should be treated as such.

Mr Ivey's actions did not in any way change the randomness of the shuffle, and hence the objective 'chances' of subsequent cards. But he did change his knowledge of what the next card might be, and hence his personal probabilities that he could use to bet. While subsequent cards were still, strictly speaking, 'unknowable', they were slightly less unknowable to him, as his interference produced a greater asymmetry in knowledge between the punter and the house than would be available, say, by card-counting.

The regulation of gambling, including judicial proceeding in which the Court is asked to determine whether certain conduct constitutes cheating, might benefit from a clearer understanding and terminology of ideas of probability and chance. My suggestion for subsequent gambling cases, especially those in which cheating is in issue,¹⁴ would be to use the terms as follows:

- (a) *Pure chance*: restricted to situations where each game proceeds entirely from scratch, such a roulette, and so everyone's probabilities are (and should be) the same;
- (b) *Chance and odds*: to refer to classical symmetries or long-run frequencies, which can be considered fairly objective; and

¹² *Ivey* (UKSC) [50] (Lord Hughes (with whom Lord Neuberger, Lady Hale, Lord Kerr and Lord Thomas agreed)).

¹³ *ibid* [50].

¹⁴ Gambling Act 2005, s 42.

- (c) *Probability*: in the sense of a judgement about a single case, which is a subjective assessment based on available knowledge.

And I would also recommend to constantly keep in mind that probability is unintuitive and difficult.